**Neo-Liberalism, National Champions, and the Commuter and Regional Aircraft
Manufacturing Industry**

Continuous and Discontinuous Policy Paths in the Aerospace Sector

by

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Abstract

The main purpose of this dissertation is to examine the impact of the neo-liberal shift of the late 1970s and early 1980s on industrial policy towards national champions in the commuter and regional aircraft manufacturing industry. Many countries, including the Netherlands, Brazil, and Canada, established a presence in the aircraft industry in the post war period based on strong state support for their national champion firms. When a series of crisis hit the commuter and regional aircraft industry beginning in the 1980s, coinciding with a period of neo-liberal policy shift, the traditional industrial policy path in the industry came under pressure to change. States “puzzled” and “powered” over the industry’s problems and re-examined their policy path with respect to national champions in the sector.

This thesis challenges two commonly held views about policy options in a globalized economy. It questions the neo-liberal view that industrial policies around the world are converging towards a neo-liberal, non-interventionist approach to policy. At the same time, it also sets out to challenge the view of the neo-institutionalists that states are locked into a historically based policy trajectory. It shows that results are more nuanced, with neo-liberalism having an impact on policy choice

In the case of “liberal” Canada and “statist” Brazil, a form of “bounded policy innovation” took place where policy did change, but it did not challenge the consistency of the historical policy path. In both cases, past policies that supported the national champion were recast in a more neo-liberal fashion. In the third case, the Netherlands, a “socially managed economy”, there was a fundamental change in the policy path based on a new policy paradigm. Here the old path that supported the national champion was swept away in favour of markedly less interventionist approach. Several factors played a role in the policy outcomes including neo-liberal ideas, Schumpeterian ideas, the economic importance of the sector, the political significance of the sector, policy legacies, the performance of the national champion, internationalization strategies, trade policies, and the fiscal position of governments. These cases show that a national champion strategy is still viable in a globalized environment.

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Postscript

The first years of the new century have been challenging ones for the commuter and regional aircraft manufacturing industry. Economic difficulties, and the events of September 11, 2001, had a major impact on the airline industry and the aircraft manufacturing sector. On the bright side, regional jet service continued to expand as the major network carriers faced difficulties and reduced capacity. Network carriers replaced mainline aircraft with regional jets to better match capacity to demand.

Despite the increase in regional airline service, regional carriers had difficulties raising financing for aircraft purchases in the post-September 11, 2001 environment. Governments had to step into the void, and both Canada and Brazil used government export financing to help win sales. Despite healthy order backlogs from the boom of the 1990s, regional aircraft manufacturers were forced to announce layoffs and production cutbacks in the face of a difficult environment and future uncertainties. Sales dropped dramatically in 2001 and 2002. After reaching a peak in 2000 at 726 aircraft, regional jet net sales dropped to 312 in 2001 and to 121 in 2002. There were major order cancellations in 2002, with the cancellation of 207 orders exceeding the year's order intake of 86 aircraft. Turboprop producers were hard hit as the downward trend in sales continued to new lows. Turboprop sales continued their decline with 79 net sales in 2000, 57 in 2001, and 25 in 2002. There are only two major manufacturers of turboprops left – ATR and Bombardier.

There were casualties in the industry downturn. British Aerospace cancelled its RJX regional jet program in October 1991 and withdrew from the regional jet market. Another casualty was Fairchild Dornier that went bankrupt in 2002. In 2003, AvCraft of the USA bought the Dornier 328Jet program, and D'Long International Strategic Investment Group of Xinjiang, China bought the Dornier 728Jet program. Efforts are under way to restart both programs.

Despite the difficult environment, several new players have entered the regional and commuter aircraft manufacturing industry since 2000. Russian manufacturers are entering the industry. In 2002, the Russian government held a competition to select a regional jet program that would receive government support. The Russian Regional Jet (RRJ), a three aircraft family ranging from 55 to 95 seats, developed by Sukhoi, Ilyushin, and Boeing, won the competition. The aircraft is now under development and is expected to fly in 2005. In addition to the RRJ, Antonov has its An-148 family of regional jets, which will seat between 40 and 100 passengers, under development. Tupelov and RSK MiG are continuing development of the Tu-334, a regional aircraft that will seat between 72 and 126 passengers. This aircraft, having its origins in the early 1990s, and having had its first flight in 1999, has had its development hindered by the economic difficulties in the Russian industry. The Chinese are also intent on entering the industry. In 2001, China Aviation Industry Corporation I unveiled its ARJ21 regional aircraft family. This government backed aircraft project will lead to a family of regional aircraft in the 70 to 90-seat category. It is expected to

fly in 2005 and enter service in early 2007. Both Russia and China are trying to protect their market, through such mechanisms as high taxes on imports and directed buying, to allow for the development of their own regional jet projects. Japan is also still considering its entry into the regional jet market.

In the year 2003, things started to look brighter for the industry as regional jet sales hit 323 aircraft, a substantial improvement over the previous two years. However, cancellations left a net order total of 262 aircraft. Turboprop net orders remained low at 41 aircraft. Embraer's performance rose dramatically in 2003, after a very poor showing in the previous 2 years, and much of this success was due to the new Embraer 170 family of aircraft. Embraer's regional jet sales were 418 in 2000, 30 in 2001, 19 in 2002, and 139 in 2003. In 2004, the 70-seat Embraer 170 was certified and entered service shortly thereafter, and the Embraer 190 was also rolled out. Large orders from low cost carrier JetBlue, US Airways, and Air Canada fueled sales of Embraer's new family of jets. Embraer's success with its new regional jet family has left many questioning Bombardier's strategy of using derivatives to serve the market and canceling its BRJ-X program. Slow sales of the CRJ-700 and CRJ-900 reinforced this view. Bombardier's regional jet sales were 228 in 2000, 230 in 2001, 36 in 2002, and 72 in 2003. Bombardier was forced to undergo a major financial restructuring in 2003, in part to improve the performance of its regional aircraft division. After the major sales breakthroughs of Embraer, Bombardier has launched a new study to determine whether to launch a new 100-seat regional jet family. If it proceeds,

the new aircraft family will cost around \$2 billion to develop, and would require several hundred million dollars in government aid. Bombardier could lose out if it does not develop a new family of jets, as Embraer and competitors from Russia and China are poised to take the market over the next few years. If that happens, one may see another shift in the locus of production in the commuter and regional aircraft manufacturing industry.

Table Of Contents

	<u>Page</u>
Abstract	iii
Acknowledgements	v
Postscript	vii
Table of Contents	xi
List of Figures	xiii
Introduction	1
<u>Chapter 1: Neo-Liberalism, Convergence, and Policy Choice</u>	7
Techno-Economic and Economic Policy Paradigms	8
The Old Techno-Economic Paradigm: Keynesianism and Industrial Policy	12
The New Techno-Economic Paradigm: The Neo-Liberal Argument	18
The New Techno-Economic Paradigm and Policy Alternatives	36
<u>Chapter 2: The State and Industrial Policy Choice</u>	52
Domestic Politics and Path Dependency	53
Domestic Politics and Path Shaping Strategies	60
Puzzling and Powering: Different Policy Outcomes	66
<u>Chapter 3: Industrial Policy and the Regional and Commuter Aircraft Manufacturing Industry</u>	69
The Regional and Commuter Aircraft Industry and Regional and Commuter Airlines	70
National Champions, Industrial Policy and Aerospace	76
Neo-Liberalism, Deregulation and New Opportunities	88
Difficulties In the late 1980s and the 1990s	111
The State and Policy Options in the Commuter and Regional Aircraft Manufacturing Sector	116
The Cases	121

<u>Chapter 4: The Netherlands and Fokker: A Change of Direction</u>	129
1919 to 1980: Building Up The National Champion	131
1980 to 1996: The Netherlands, Neo-Liberalism and Fokker in Crisis	158
The Demise of a National Champion	188
1996 and Beyond: Policy After The Crisis	194
Reflections on the Fokker Case	203
<u>Chapter 5: Brazil: Straight Ahead on a Modified Trajectory</u>	218
1969 to 1990: Building Up The National Champion	220
The Creation of National Champion: Embraer	231
The Early 1990s: Brazil Embraces Neo-Liberalism and a Financial Crisis at Embraer	246
1995: Policy After The Crisis	263
Reflections on the Embraer Case	288
<u>Chapter 6: Canada: Growing Intervention Over Time and a National Champion in the 1990s</u>	297
The 1920s to the Early 1980s: The Development of an Industry	299
1980 to 1986: A Period of Crisis and Neo-Liberal Shift	328
Policy After The Crisis: Towards an Aerospace National Champion	344
Reflections on the Canadian Case	388
<u>Chapter 7: Conclusions</u>	399
<u>Appendix 1</u>	417
<u>Appendix 2</u>	418
<u>Appendix 3</u>	419
<u>Bibliography</u>	420

List Of Figures

<u>Figure</u>		<u>Page</u>
1	World Regional Airline Traffic 2000 Top 100 Carriers by Geographic Region	73
2.	Country of Manufacture Turboprops and Regional Jets in Service 2000	74
3.	Turboprops and Regional Jets in Service	75
4.	Regional Jet and Turboprop Production 1971-2000	80
5.	U.S. Regional Airlines Passenger Traffic 1970-2000	90
6.	U.S. Regional Airlines - Aircraft Operated 1970-1996	91
7.	U.S. Regional and Commuter Forecast Revenue Passenger Enplanements 1992-2009	92
8.	Firms In the Commuter and Regional Aircraft Manufacturing Industry	99
9.	Turboprop and Regional Jet Sales 1989-2000	102
10.	Europe: Share of World Production 1971-2000	105

Introduction

The role of the state in advanced economies faced significant challenges and underwent significant change in the decades after the 1970s. Economic stagnation at the beginning of both the 1980s and the 1990s challenged the postwar role of the state as manager of the national economy. Financial pressures on the state pushed for reform, while economic forces of globalization and technological change increased the pressures on the state for a new approach to industrial policy. The period was marked by a major shift in economic policy away from the interventionism associated with Keynesianism towards a neo-liberal approach that emphasized an increased role for market forces in the development of the economy. This shift had an impact in many policy areas, including industrial policy.

Advocates of the neo-liberal approach to policy claim that the world is converging towards the neo-liberal ideal of non-interventionism in the economy, and that national governments have no real alternative except to adopt neo-liberal policies. One of the tools of industrial policy that came under increasing challenge was the “national champion” firm. In the past, many states had utilized large state supported industrial firms to represent the national interest in specific industrial sectors. Such sectors included strategically important industries such as aircraft manufacturing. The neo-liberal challenge was harsh on the role of the

national champion firm and it advocated the abandonment of such policies in favour of market forces.

The focal point of this research is two stories. The first involves the shift in the overall economic policy framework towards neo-liberalism. The second involves policy in a specific industrial context. The question is how changes in the big picture affected the policy approach adopted in a specific industrial sector. The thesis examines the impact of the shift towards neo-liberal economic policies on industrial policies in the regional and commuter aircraft manufacturing industry, and, more specifically, it looks at the impact of the neo-liberal shift on policies toward national champion firms in Canada, Brazil, and the Netherlands. It seeks to examine the influence of mediating variables on the transmission of neo-liberal ideas from the level of overall policy to the industrial policy adopted in this sector.

Worldwide, the commuter and regional aircraft manufacturing industry went through a period of major change after 1970. The late 1970s were, generally speaking, good times for the industry as the spreading deregulation movement, that formed a part of the broader neo-liberal trend, opened up opportunities for commuter and regional carriers. Many countries, including the Netherlands, Brazil, and Canada, jumped into the industry or expanded their activities during this period, often through national firms backed by strong government support. In contrast, in the early to mid-1980s, a long-term period of

retrenchment began, as recessions, declining sales, and the arrival of the regional jet led to financial difficulties and a period of major industry restructuring. This period of restructuring continued in the boom times of the 1980s and intensified during the downturn that began in the early 1990s. The restructuring changed the face of the industry as it struggled to adjust to changing circumstances.

This thesis will contest two commonly held views about policy options in a globalized economy. It will challenge the view that industrial policies are converging in the globalized economy towards a neo-liberal, non-interventionist approach to policy. It will question the view that national politics no longer matters in the formation of industrial policy. At the same time, this thesis will also challenge the neo-institutionalist counter to the neo-liberal convergence thesis that countries are locked into a particular historically-based policy path that constrains their future policy options and resists convergence. This thesis will show that the results are more nuanced, with neo-liberalism leaving its mark by helping to shape a new industrial policy path.

As we shall see, a period of major crisis provides a period of opportunity for domestic politics to shape the future direction of policy. Such periods of crisis open up opportunities for “path shaping strategies” as political struggles emerge over a totally new policy direction based on new ideas or policy paradigms. Through a process of “puzzling” and “powering” domestic politics has its impact

on policy. A process of “puzzling” examines current problems and identifies possible solutions. Through “powering”, political and social support is developed for the selection of a specific policy solution. Such a solution could alter the existing historical policy path.

This is well illustrated by the different choices that The Netherlands, Brazil and Canada have made with respect to their national champion firms in the commuter and regional aircraft manufacturing industry. In all three of these states, throughout the post-war period, a national champion strategy was employed because the aircraft industry was seen as a strategic sector. If the neo-liberal convergence hypothesis is accurate, all three countries would have abandoned state support for their national champion aircraft firms in the 1980s and 1990s. They would have allowed the future of their industry to be determined by market forces. If, however, the neo-institutionalist claim held, they would have continued their past post-war policy of supporting their national champion firm. As we shall see, the results are more mixed. Neo-liberalism left its mark in all three countries such that all three deviated from the previous policy path. The Netherlands, a socially managed organized market economy, went furthest down the neo-liberal road, abandoning its national champion firm and adopting a more hands-off approach to the industry. Canada, a liberal state, and Brazil, with its statist orientation, continued support for their national champion firm, but in a more neo-liberal fashion.

In all three countries, neo-liberal globalization and the associated pressures for restructuring had an impact, yet the responses were not all the same. Several factors influenced the policy path adopted in the face of pressures for industry restructuring. The industry was viewed by all three countries as strategically important in economic and/or military terms. A national champion strategy was used in the industry because of its technological intensity, its capacity to develop high skilled and high paying jobs, and its ability to generate high value added exports. In Brazil, the sector was of particular importance to the military, a group that played a defining role in the state-led process of industrial development, and this gave the sector and its national champion additional status. In Canada, the industry's location in the industrial and political heartland of the country gave it political weight and tied it to the political future of the country. Policy legacies were important, particularly with respect to the way that those legacies were intertwined with the industry's own performance. In Canada and Brazil, the industry's performance confirmed the value of past government support. In Canada, the weight attached to a renewed commitment to high technology development played a role in sustaining support for the industry. In the Netherlands, however, the legacy of poor performance on the part of the national champion played a major role in undermining support for a national champion strategy. In addition, the failure of efforts aimed at international partnerships and European restructuring, and the pressures against state support originating from the European Union, played a role in turning the tide against the national champion.

This thesis will offer counter-evidence to those who argue that industrial policy approaches around the world are converging or are confined by past policy patterns. It will help to show policy makers that they do have options and are not locked into either a non-interventionist approach or a fixed approach based on the past. It will also show that a national champion strategy can still be a valid approach to use when developing high technology industries.

This thesis draws on primary and secondary sources, along with interviews, as its source materials. Secondary sources were used in the development of the theoretical framework and in providing background information on the industry. Major primary sources include government documents, company publications, and industry trade journals. The aerospace industry is covered by several well-known trade journals that provide good coverage of industry developments. Interviews with government officials were utilized in the Dutch and Canadian cases. Difficulties were experienced in getting access to Dutch government documents, as almost all such documents were declared confidential because they included commercially sensitive company information. Limited cooperation was obtained from Brazilian officials due to the ongoing trade dispute over regional jets between Canada and Brazil.

Chapter 1

Neo-Liberalism, Convergence, and Policy Choice

The 1970s marked the beginning of a period of economic change that brought into question the economic role that the state had assumed in the postwar period. Invoking the forces of globalization and technological change, neo-liberals argued that industrial policies, including those that helped to support “national champion” firms in international competition, had been rendered obsolete. The new flexible, competitive, high tech economy required the state to abandon industrial policies and national champions, and adopt a hands-off approach in an open world economy. Sectors that traditionally harboured state supported national firms, such as the strategically important aircraft industry, should be left on their own to face international competition. States had effectively no choice in this matter, and eventually all states would converge on this neo-liberal ideal.

While neo-liberals preached a policy of non-intervention, others looked at the new high technology economy and argued that there were alternatives that provided a better fit for the new conditions. In fact, if states wanted to effectively capture some of the benefits of the international high technology economy, interventionist policies in support of “national champions” remained essential. This thesis supports this latter position, arguing that neither the new techno-economic paradigm nor globalization require the adoption of neo-liberal policies. For technology-intensive sectors such as aircraft manufacturing, there remain

other viable and preferable policy options. This argument will be developed in the rest of this chapter, but first two key terms, techno-economic paradigm and economic policy paradigm, and the relationship between them, need to be defined.

Techno-Economic and Economic Policy Paradigms

The period of change in the economy and society that began in the late 1970s can be viewed as a period of paradigmatic change or paradigm shift. A period of paradigmatic change involves two inter-related transformations. One transformation is techno-economic in character, and it involves shifts in the techno-economic paradigm (Freeman and Perez, 1988: 38-49). The term techno-economic paradigm refers to the key technologies in the economy and the social and economic institutions and infrastructure that manages or regulates the economy. The latter provides an appropriate environment for the development of the technology (Freeman and Perez, 1988: 38). The other transformation is related to, but not reducible to, the first. It involves a shift in the public policy framework that governs the economy and society. A change in the techno-economic paradigm does not require a change in the public policy framework, as the old public policy framework could continue to exist under the new techno-economic conditions. However, a policy shift can provide a more suitable environment for the adoption and development of new forms of economic and social infrastructure (Hall, 1993: 279-281). As this thesis will show, there is no single correct option for the new economic policy paradigm. Contrary to what the

neo-liberals suggest, there remain a range of possible approaches, with some public policy options in fact providing a better fit for the new techno-economic environment than the policy option put forward by the neo-liberals.

A crucial element in any techno-economic paradigm shift is the emergence of a key factor input which is characterized by falling relative cost, unlimited long run supply, and its potential use in many products and processes in the entire economic system (Freeman and Perez, 1988: 60-65). This new key factor input leads to widespread changes in the economy that have major impacts on all sectors. Such changes have been described as:

a combination of interrelated product and process, technical, organizational and managerial innovations, embodying a quantum jump in potential productivity for all or most of the economy and opening up an unusually wide range of investment and profit opportunities. Such a paradigm change implies a unique new combination of decisive technical and economic advantages (Freeman and Perez, 1988: 47-48).

For instance, new information technologies have been widely adopted in the production process and products of the commuter and regional aircraft industry. By allowing for effective and quick links between different industry players, new technologies have allowed for the internationalization of the industry through sub-contracting and risk sharing partnerships.

A new techno-economic framework emerges within the pre-existing framework, and it shows its competitive advantages initially within only a few sectors. It emerges more fully when it clearly demonstrates its potential for

substantial increases in productivity, and this opens up opportunities for new investment. The emergence of the new framework leads to a mismatch between the new technology and the socio-economic framework associated with older technologies. A period of recession and structural adjustment takes place during which a social and political search for, and experimentation with, a new institutional framework takes place. The search is aimed at finding a new framework that provides a good match for the new technology.

If the social and economic infrastructure of society is going to develop and function, it requires an appropriate public policy framework. As indicated earlier, a period of techno-economic change is likely to be associated with a period of public policy change. A change in the techno-economic paradigm does not, however, dictate that there be a change in the public policy framework. It is possible for the old public policy framework to be adjusted to fit the new techno-economic conditions. However, a public policy paradigm shift can create the opportunity to develop a more suitable environment for the adoption and development of new forms of economic and social infrastructure that may be better suited to the new techno-economic environment.

The shift from one public policy framework to another usually follows the accumulation of a series of problems that existing policy has difficulty confronting, attempts at new approaches to policy, and a series of policy failures that lead to a shift in the centre of policy authority. The problems are associated with the mismatch between the new technology, the socio-economic framework

associated with older technologies, and the public policy framework associated with the old order (Hall, 1993: 279-281). As Bob Jessop argues, the recent techno-economic changes have required a shift in the public policy framework governing the economy. For Jessop, the transition in the techno-economic paradigm over the last two decades from a mass-production centred economy to one based on flexible specialization has required a shift in the economic policy framework to one more suitable to the new paradigm. The old Keynesian policy framework was giving way to a new Schumpeterian framework. The objectives of this new framework are “the promotion of product, process, organizational and market innovation; the enhancement of structural competitiveness of open economies mainly through supply side intervention; and the subordination of social policy to the demands of labour market flexibility and structural competitiveness” (Jessop, 1993: 9). Yet Jessop also recognizes that shifts in the techno-economic paradigm do not automatically lead to policy convergence. Just as there were several different approaches to implementing the previous Keynesian economic policy framework, however, there are several different approaches to implementing the new Schumpeterian framework. States, therefore, had, and continue to have, real policy options (Jessop, 1993: 10-19, 28-33).

Although the new techno-economic paradigm does not limit the range of potential policy options, there are certain options that may provide a better fit for the given techno-economic conditions. This opens the opportunity for debate over the options, one not simply driven by technological changes. As we shall

see later, this debate is also driven by domestic politics and it involves conflicting ideas, institutions and interests. The new policy framework becomes embedded when its advocates achieve authority over the policy making process and institutionalize the new framework (Hall, 1993: 279-281). The new public policy framework guides future policy development.

The Old Techno-Economic Paradigm: Keynesianism and Industrial Policy.

The techno-economic paradigm that prevailed during the first 25 years of the post-war period has been described as the “Fordist” paradigm. The Fordist paradigm was based on the mass production of consumer goods in large size firms that used standardized equipment and semi-skilled labour. Production emphasized an extensive division of labour, with exports playing a crucial role in achieving economies of scale. Wages were linked to productivity. (Boyer, 1996: 44-45; Drache, 1996: 41-42). The Keynesian welfare state, with its emphasis on achieving full employment and mass consumption through demand management in a closed national economy, incorporated the ideal set of policies for the Fordist paradigm (Jessop, 1993: 9). Keynesian economic policies, therefore, were a good match for the oil-based Fordist economy that emphasized mass production and demand.

The new Keynesian policy paradigm was not discovered overnight, but was adopted after a period of policy experimentation. The laissez faire policies of the pre-World War I period were brought into question by the severe economic

crisis of the 1930s. The experience of the Great Depression led to a search for alternative policy formulations that would prevent the recurrence of a crisis of such magnitude in the future. Keynesian economics helped inaugurate a shift to a more active role for the state in economic matters. Keynesian economics advocated the use of an activist budgetary policy to smooth out the business cycle and achieve full employment. These macro-economic policies helped to stabilize demand and helped to meet the needs of the new mass production industries (Chang and Rowthorn, 1995: 3-4; Jessop, 1993: 9; Reich, 1992: 58-59, 67-68).

In addition to operating at the macro-level, Keynesianism also allowed for a role for the state at the micro-level of the economy. Successful state interventions in the wartime economy led to the adoption of interventionist policies to influence the structure of the economy. Indicative planning, investment strategies, nationalization, sectoral industrial policies, and corporatist bargaining frameworks were some of the tools used by various countries to shape their industrial development (Chang and Rowthorn, 1995: 3-4). The twenty-five year period after World War II became known as the “Golden Age of Capitalism”, and during this period “interventionist policies were highly successful across the world, firmly establishing the state as an important and often the leading actor in the functioning of the economy”(Chang and Rowthorn, 1995: 2).

One key element of micro-economic policy during the period of the Keynesian welfare state was industrial policy. Industrial policy is concerned with

the development of the long-term structure of the economy. It can be used to adapt to, retard, or initiate change. According to Peter Katzenstein:

Industrial policy is concerned with the structure of the economy, that is the patterns of production in different sectors. It includes both adjustment-promoting and adjustment-retarding measures that operate directly or indirectly at both the macro- and the micro level. Its purpose is to influence industrial competitiveness and through it achieve objectives such as employment, investment, growth, or an improved balance of payments (Katzenstein, 1985: 24-25).

Industrial policy is concerned with the structure of the economy, which are “relatively lasting arrangements affecting the use of resources and the patterns of world production and trade resulting from them”(Diebold, 1980: 6). Governments had a variety of tools at their disposal, such as research and development and other subsidies, tax incentives, export credits, trade protection measures, and government procurement, that they could use to influence business activity and thus the structure of the economy. States, therefore, had choices as to the tools and approaches they could use with respect to industrial policy.

The nature of industrial policies has varied over time and across countries, partly in accordance with the nature of the challenges facing the economy. In Europe, for example, the period immediately after the war was concerned with reconstruction, and the concern focused on the ability of European firms to match the mass production capabilities of the United States. The focus was on firm size and productivity. In the 1960s, the focus of industrial policy changed to technology as countries looked for ways to keep up with U.S. technological development and maintain independence in technologically advanced sectors. The economic difficulties which followed the oil crisis of the early 1970s shifted

attention towards policies to support industries in difficulty and those, such as shipbuilding, steel and chemicals, which faced over-capacity. The General Agreement on Tariffs and Trade (GATT) limited the ability of states to use trade measures to support their industries, so they increasingly turned to subsidies and other non-tariff barriers (Sharp, 1997: 91-92).

One element of the industrial policy framework that many countries utilized in the 1950s and 1960s was the “national firm” or “national champion”. National champions were essentially large firms, either public or private, that were supported by the state and operated in the national interest in specific industrial sectors. Such sectors included those that were seen to be of strategic importance to the economy, such as aerospace and electronics, and sectors where economies of scale were important, as in, for example, the auto industry. Given the emphasis on mass production and exports in the Fordist paradigm, large “national champion” firms were seen as the ideal institutional vehicle to represent a country in specific sectors in international markets.

As neo-institutionalist theory would contend, different countries made different choices with respect to the formation and support of “national” champions. In the United States, a liberal state, national champions were the large-scale privately-owned firms that dominated industries in the U.S. economy. These core corporations were involved in the mass production of goods such as automobiles, chemicals, appliances, and food products. Their size gave them a high level of importance in the economy:

Because of their size and central role in the economy, America's core corporations came to identify themselves, and be identified by Americans and others around the world, with the American economy as a whole. They were the champions of the national economy; their successes were its successes. They *were* the American economy (Reich, 1992: 47).

Outside of the defence sector, the U.S. government, acting in a liberal fashion, did not act to pick winners with respect to national champion firms. It did, however, undertake to maintain the profitability of these core corporations. It attempted to smooth out the business cycle to maintain demand for mass produced products, provided public education, regulated public health and safety, and it maintained an adequate defense. It also worked actively to support the activities of the national champions abroad. Other than the defense sector, the U.S did not provide the more direct types of support, such as subsidies and state ownership, to U.S. national champions that became common in other countries.

Canada, like the U.S., adopted a liberal variant of the Keynesian economic policy paradigm, but it differed from the U.S. in its approach to national champion firms. It had a mixture of both private sector and public sector national champions. Examples of private sector national firms included Bell Canada in communications and Northern Telecom in telecommunications equipment. Canada also had public sector national champions to promote the development of certain strategic sectors. These public sector firms were active in, among others sectors, the oil, airline, telecommunications, and television industries. As we shall see, Canada used both approaches, the public and the private national champion, at different times to promote the development of its aircraft industry.

In Europe, the approach to national champions was different from the United States. The European approach, reflecting the socially managed (the Netherlands, Austria, Germany) and statist (France) nature of the different European economies, involved much closer links between national champions and governments. The European idea of a national champion was “an enterprise responsive to its national government’s needs and entitled to its national government’s support” (Vernon, 1974: 11). The impetus to form national champions in Europe was a fear on the part of many European states that, without a proper national response, the United States and its large corporations would dominate the industrial and high technology economy (Reich, 1992: 66-67). The Europeans, therefore, set out to develop their own large national firms to compete against the U.S. giants. In the case of the Netherlands, for example, the Dutch supported the development of DAF in motor vehicles, RSV in ship-building, Philips in electronics, and, as we shall see, Fokker in the aircraft industry. Some European national champions were formed through the merger of several national firms in an industry. Britain took this approach in the aerospace sector when it merged several firms to form British Aerospace. Other attempts to form national firms involved the establishment of state owned firms. For example, many countries established a state-owned airline as their national champion in the air. European national champions received substantial financial and political support from their national governments. This included subsidies, export financing, and political support for sales. In the case of Europe, the

“bargains between European nations and their core corporations were far more explicit than those between America and its own” (Reich, 1992: 67).

Third World and Newly Industrializing Countries have also used national firms in their development efforts, often as part of a statist government’s attempt to develop the economy. Some, such as Korea, have used large private firms or industrial groupings as their chosen instrument. Other countries have established state-owned enterprises to fulfill this task. For example, statist Brazil has used state-owned enterprises to develop the computer, defence, and engineering industries. As we will see, it also used a state-owned national champion to build up its aircraft industry. India has used state-owned enterprises in the aerospace, computers, and pharmaceutical industries (Ramamurti, 1987: 5-6; 20-21). The use of a national firm strategy is, therefore, not limited to the industrialized world.

The New Techno-Economic Paradigm: The Neo-Liberal Argument

The 1970s and 1980s were a turning point for the world economy. The increasing internationalization of the economy and the onset of very severe recessions marked this period. For some, it is globalization that has transformed the role of the state. Philip Cerny, for example, has made this argument. For Cerny, the changing nature of the structural conditions for the provision of public and private goods has undermined the state’s role in the economy. The traditional government activities in the areas of regulation, production, and

redistribution have been eroded as the public nature of these activities has changed. For example, many production goods provided by governments have become private goods on the international market, and this has undermined the state's ability to provide these goods (Cerny, 1996). However, such changes cannot be solely attributed to globalization. Others point to the emergence of the new information economy. The old Fordist framework, based on oil as its key factor, emphasized oil, chemical, automobile, and mass goods production. Its institutional infrastructure emphasized Fordist assembly line production and hierarchical corporations. The new post-Fordist framework, with the microchip as its key factor, emphasizes integrated systems, flexible production, and information technology investment. (Freeman and Perez, 1988; Jessop, 1993).

In fact, it was revolutions in transportation, electronics, and communications that helped to shape a more global economy and led to changes in products and production techniques. Improvements in transportation technology, such as the development of wide-bodied aircraft, led to a major reduction in transportation costs for both passengers and cargo. The electronic revolution changed the nature of production by allowing for more flexible production, an increased emphasis on quality, and a more rapid period of product development. The communications revolution, through such developments as digital technology, substantially lowered the cost of communications and allowed for the coordination of geographically dispersed production networks. The accelerating pace of technological change and the shortening of product life cycles made it difficult to stay in the forefront of the technological race. In order

to support such activities, firms had to look to global markets to survive (Turner and Hodges, 1992: 1-21). The beginnings of a new techno-economic paradigm began to emerge that was built on “flexible production, innovation, scope-economies, innovation rents, and more rapidly changing and differentiated patterns of consumption”(Jessop, 1993: 14).

The onset of these changes led to a crisis in policy as old policies and instruments seemed unable to deal with the consequences of change. The economic boom that prevailed in the 1950s and 1960s came to an end, and the oil crisis of the early 1970s led to a period of economic difficulties. Increasing international flows of capital undermined the ability of the state to use macro economic policy. Competition from Japan and the newly industrialized countries put pressure on industries in North America and Europe. A squeeze on profits reduced levels of investment. The social consensus that existed over the welfare state and Keynesian economics broke down (Chang and Rowthorn, 1995: 7-8). Governments began a search for policy alternatives that could better meet the demands of the times. The period of economic and social disruption of the 1980s and 1990s can be seen as a period of mismatch between the requirements of the new information technology and the old socio-political infrastructure from the oil-based framework. This was a period of experimentation to find the appropriate socio-political environment for the development of the information economy (Freeman and Perez, 1988; Jessop, 1993).

Neo-liberals have seized the opening created by the techno-economic paradigm shift to advance the claim that their approach to policy is the only one capable of governing the economic and social infrastructure of the new information-based economy. They are highly critical of industrial policy, which they see as “government intervention, prompted by and for the benefit of production interests, often offering subsidies as an alternative to protection and, like trade protection, open to capture by production interests” (Sharp, 1997: 91). Certainly, the 1980s and 1990s witnessed a resurgence of faith in markets as a method of allocating society’s resources. The failure of Keynesian policies in the 1970s, and the associated policies of propping up industries in trouble, provided an opening for neo-liberalism. The new micro policy approach it favoured focused on four main areas: labour markets, financial markets, industrial policy, and public sector issues. The new policies moved toward enhancing the role of market forces through a reduction in government intervention. Deregulation, privatization, tax reform, social security reform, and public sector restructuring were the major features of the new approach (Ostry, 1990: 53-55).

As Margaret Sharp and Peter Holmes suggest, the shift in economic thinking captured the mood of a public growing increasingly skeptical about the abilities of the state to intervene in the economy:

There is little doubt that the neo-liberal dogma caught the growing mood of skepticism prevalent in the late 1970s and early 1980s about how much state intervention could actually achieve. At a macro-economic level it was reflected in the rejection of the Keynesian demand management techniques: the impotence of the state to control either inflation or unemployment soured public experience, while the fruitless Mitterrand attempt in the early 1980s

to insulate France from the tide of recession illustrated only too well the futility of trying to go it alone. At the micro-economic level public attitudes reflected a growing recognition that the two oil crises of the 1970s represented not just a blip in trend, but the beginnings of a major shakeout in industrial structures. On the one hand technology was changing rapidly, on the other new suppliers in the form of Japan, South Korea, Taiwan, etc. were entering the market. The problems were becoming increasingly complex and uncertainty was rife. Successful strategies depended increasingly on market information which governments were poorly equipped to acquire or analyse (Sharp and Holmes, 1989a: 219-220).

Governments had problems dealing with the economic difficulties of the past, and they were perceived to be incapable of dealing effectively with the changes occurring in the world economy. These difficulties created fertile ground for neo-liberalism to take root.

The neo-liberal school of thought advocates a political and economic perspective that is generally based on a set of anti-interventionist theories. It celebrates the role of the market mechanism. It seeks to realign the role of the state and market in economic life, and shift the emphasis more definitively towards the market. Neo-liberals believe that virtually all economic activity should take place within the institutions of market capitalism, featuring private property and the right to contract. Government should be limited to an “umpire” role that involves setting the framework for market capitalism¹. The interventionist state built up during the post-war period must be dismantled, with most responsibilities transferred to civil society (Gray, 1989: 15-16, 75). Neo-liberals seek to unleash the market and allow it to govern the widest possible

¹ Limited government can include some positive tasks: “A limited government will always have positive duties in respect of encouraging the relief of poverty and the diffusion of wealth, the support of education and health services and the protection of valued cultural traditions” (Gray, 1989, p. 16).

domain in economic life. The market is seen as a self-regulating system that maximizes societal benefit:

The basic message, with its powerful metaphor of the 'invisible hand', provides a model of a perfectly functioning economic system maximizing consumer benefits, operating efficiently, with no welfare losses and with no incentives for economic agents to rearrange their economic behaviour. Into this any government activity must tentatively impinge or try to invade. And, indeed, this is what the government is largely seen as doing: invading an otherwise self-regulating, cost-minimizing and welfare-maximizing social arrangement - the market mechanism (Thompson, 1990: 16).

If the market mechanism fails, it is not due to market failure. Government intervention and the associated government failure are the main culprits behind any perceived failure of the market mechanism. Markets would function on their own, and produce the optimal results, if states would not intervene in the market (Chang and Rowthorn, 1995: 16-17).

Kenichi Ohmae provides one view of the role of the state in a neo-liberal and globalized world. His view clearly reflects the neo-liberal idea of a minimalist state. According to Ohmae, government no longer has a role of protecting its citizens and natural resources from outside economic forces. In a globalized world, there is no longer a purely national economic interest because the close interdependencies between national economies mean that all countries are in things together. The role of government "is to ensure that its people have a good life by ensuring stable access to the best and the cheapest goods and services from anywhere in the world - not to protect certain industries and certain clusters of people" (Ohmae, 1990: 12). Government must educate its citizens and provide them with information so that they can make informed choices. It should

provide the necessary infrastructure for the economy to prosper. Governments must strive to make their national environment attractive to foreign firms and must encourage domestic firms to go global. Government subsidies and protection do not provide the basis for competitive success. Governments must not be in the business of determining choices for their citizens (Ohmae, 1990: x-xiv, 11-16, 194-201). For Ohmae, the new techno-economic paradigm will only flourish if governments get out of the way and let market forces dominate.

The swing towards neo-liberalism had an influence, in varying degrees, all over the globe. Many countries, including some governed by Labour governments, adopted market friendly policies:

From the mid-1970s onwards, neo-liberal doctrines gained a wide following throughout the world. They inspired liberalization and privatization in many developed and developing countries, and even political revolution in many socialist countries. Amongst the advanced capitalist countries, neo-liberal programmes were implemented vigorously in the UK and the USA, and somewhat less vigorously in most of the rest. Many developing countries have also implemented neo-liberal programmes in the areas of trade, industry, and labour market policy - sometimes by choice and sometimes under pressure from external creditors. As a rule, the promise of these programmes has been that of freeing up of markets and the reduction in direct state intervention would make economies more flexible and creative, helping to solve their immediate economic problems and contribute to their long-run economic dynamism. (Chang and Rowthorn, 1995: 17).

Neo-liberal ideas spread to many countries because many governments believed that it would improve their country's chances in the new flexible and innovative economy.

As noted above, neo-liberals are especially opposed to the idea of industrial policy. They reject the idea of an activist industrial policy as unnecessary and unproductive in the new economy. Previous government involvement in the economy “had led to inefficiency and economic decline in which individual initiative, self-reliance, and drive had been progressively undermined by a reliance instead on state subsidies and bureaucratic administration”(Thompson, 1990: 92). In order to reinvigorate the economy, market actors should be free to pursue their own interests under the direction of the profit motive, without any specific encouragement from the government in one direction or another.

Neo-liberals object to both “accelerative” and “decelerative” industrial policies (Burton, 1983: 29-30). Accelerative policies are those that are designed to encourage the growth of new enterprises and the adoption of new technologies. Decelerative policies are designed to rationalize, restructure, and rejuvenate declining industries. Neo-liberals believe that governments do not have the ability to pick winners and, therefore, cannot engage in accelerative industrial policy. Government does not have the incentives and information needed to act as entrepreneurs. Decelerative policies interfere with the process of natural selection in the market, and government bailouts permit large unprofitable firms to delay needed adjustments. Such policies impose costs on all members of society through the taxes used to finance subsidies to loss making firms. The failure of inefficient firms to adjust is also a burden on the

efficient firms in the economy, which operate without subsidy (Burton, 1983: 28-47).

For neo-liberals, the operation of the political system has led to the expansion of industrial policy against the best interests of society as a whole. From their point of view, industrial policy is an example of rent seeking behaviour. Governments can create rents for business firms by either granting a monopoly or by providing subsidies. These are the typical tools of industrial policy. Politicians introduce industrial policies in order to gain political support. Since the tax base that is used to finance industrial policy is very wide, the costs of such policies will be spread over a large number of taxpayers who will not have the incentive to organize to oppose the policies. Providing subsidies to one set of firms encourages other firms to seek the same treatment. Finance and management effort is, therefore, diverted from more productive uses to engage in the search for government subsidies and other forms of public support. The large bureaucracies that develop and administer industrial policies impose further costs on the economy, and they have an incentive to enlarge government industrial policy efforts. The bureaucracy's interest in survival and expansion leads to constant pressure to expand industrial policy programs. The political process therefore imposes a substantial burden on the economy through industrial policy (Burton, 1983: 48-62).

According to neo-liberals, government use of accelerative industrial policies to support high technology industries distorts the operation of the market.

Governments also have characteristics that make them unsuitable as promoters of high technology development. Governments are often driven to support high technology industries because they fear a loss of living standard if such industries do not develop. Interest in high technology sectors is also driven by national prestige. Governments have difficulty in generating the internal, or obtaining the external, information needed for the assessment of high technology projects. Once a government is committed to a project, it lacks the ability to withdraw or cancel unsuccessful projects. In addition, there is a mismatch in the time horizons of governments and high technology projects. Governments think short term, while high technology projects require long-term consideration. The spin off and social benefits associated with high technology initiatives are not as great as are claimed by government officials and proponents of such projects. High technology development should be left to the market, and government should withdraw its support for such activities (Jewkes, 1972).

Neo-liberals believe that government targeting of high technology sectors tends to lead to over-investment, and this leads to a series of actions and reactions, involving firms and states, that result in excess competition. An excessively competitive industry is one that features low returns, severe price and cost competition, excess capacity, and innovation and investment races. Excessive competition is harmful to social welfare unless extremely large externalities exist to offset the negative impacts (Brahm, 1997).

The development and use of national firms or national champions is one aspect of industrial policy that has been strongly challenged in a globalized and neo-liberal world. According to Robert Reich, the idea of a national champion becomes irrelevant in a globalized world. National firms are now entangled in global webs that use information technology to link production workers, designers, engineers, subcontractors, marketers, distributors, and others worldwide. Goods and services are no longer developed, produced, and marketed on a national basis. They are composites that combine various inputs from various nations. These global webs make nationality irrelevant (Reich, 1992: 110-118). According to Reich, these developments have undermined national champions from all countries:

The trend is worldwide. National champions everywhere are becoming global webs with no particular connection to any single nation. As American corporations increasingly produce or buy from abroad, and foreign-owned firms increasingly produce or buy from America, the two sets of global webs are coming to resemble each other - regardless of their nominal nationality (Reich, 1992: 131)

Jack Hayward points out that globalization and neo-liberal policies have undermined the national champion strategy. Deregulation and international trade agreements have led to a loss of domestic monopolies or near monopolies for national champion firms and have opened up the domestic market to international competition. The fiscal crisis of the state has meant that governments are no longer as willing as they once were to finance their national firms, and these firms increasingly have been forced to obtain capital finance from international markets. International agreements have also greatly reduced the ability of the state to subsidize operations. National firms are therefore required to be more

self-sufficient. National firms have also realized that they need an international strategy if they are going to be competitive in a globalized world economy, and such a strategy would include international alliances, joint ventures, and foreign direct investment. The changing environment is increasing the desire of national firms to serve their own interest rather than act on behalf of any national interest (Hayward, 1995: 1-2). All of these changes have worked to undermine the notion of national champions.

The internationalization of business activity, especially in high technology sectors, has challenged the idea of basing industrial policy on the national ownership of firms. In Europe, for example, the rising importance of Japanese and American firms in high technology sectors has brought into question an industrial policy approach that emphasizes ownership. Traditionally, many governments in Europe used a national champion strategy to promote firms in high technology industries. The failure of this approach led policymakers in some European countries to look at the idea of creating European champions, but neither governments nor firms could agree on such a strategy. As we shall see in the Dutch case, the inability of European governments and industry to develop a unified strategy for the commuter and regional aircraft manufacturing sector in Europe contributed to the downfall of the Dutch manufacturer. The result has been that countries such as France, which still place emphasis on national high technology firms, have had to compromise with states, such as the UK and Ireland, which are more receptive to foreign owned firms. The continuing difficulties faced by some European national champions have made this

compromise somewhat easier. "The growing difficulty of defining European corporate identity is gradually leading European governments and institutions towards a policy based more upon the *location* of economic activity rather than the *ownership* of assets" (Wyatt-Walter, 1995: 430). This has led, for example, to the inclusion of foreign firms in collaborative high technology programs in Europe (Wyatt-Walter, 1995). Such an approach undermines a national or European champion strategy.

In fact, neo-liberals argue that the necessity for alliances undermines a national firm strategy. If states and firms are going to achieve competitive success in international markets, strategic international alliances are an essential part of any strategic strategy. Globalization makes alliances necessary. The convergence of consumer tastes is one of the driving forces of globalization and one of the forces that makes alliances essential. In a globalized world, consumers do not care if national firms produce the products that they purchase:

Economic nationalism flourishes during election campaigns and infects what legislatures do and what particular interest groups ask for. But when individuals vote with their pocketbooks - when they walk into a store in the Triad - they leave behind the rhetoric and mudslinging and trappings of nationalism.... At the cash register, you don't care about country of origin or country of residence. You don't think about employment figures or trade deficits. You don't worry about where the product was made (Ohmae, 1989: 144).

Converging consumer tastes, the dispersion of technology, and the need to spread fixed costs all lead to the necessity of international alliances (Ohmae, 1989: 143-147). The reduction of nationalist sentiments and the necessity of alliances undermine the basis for any strategy that emphasizes national firms.

Firms involved in international alliances may not be fully responsive to the national interest. As we shall see, alliances are an important element of the strategic response of the aircraft industry to the changing industry environment.

There has also been a noticeable shift in many countries towards policies that support small business and away from support for national champion firms. This shift is consistent with the move toward privatization, deregulation, and competition in many countries. "The changed focus on SMEs is being accompanied by erosion of traditional policy regimes, which were seen to be conducive to the promotion of national champions rather than smaller firms" (Parker, 1999: 68). Smaller firms began to be seen as the engine of job creation, innovation, and growth. Various types of support programs were developed to encourage the start-up and development of small business. National champions came to be seen as an element of past policies that choked off growth and structural change. Economic orientations of a statist and corporatist nature were seen as being conducive to the development of large national champion firms over small firms (Parker, 1999: 63-69).

Instead of using industrial policies to support the development of national champions, neo-liberals tended to place their faith in free trade as the best bet for policy. Economic liberals have traditionally believed that free trade is the best policy because of the benefits it brings for global wealth and consumption. Specialization, and the international division of labour that comes with free trade, increases productivity and global wealth. Specialization and trade also increase

consumption possibilities (Gilpin, 1987: 172-180). Countries should open themselves up to international trade, foreign direct investment, and foreign capital flows. By opening up, the development of institutions favourable to the advance of effective capitalism will develop through the spread of people and ideas (Calomiris, 2002: 11-24, 53-55). For many neo-liberals, free trade is the major way to ensure the development of strong indigenous firms. The removal of national regulation and intervention, and the associated subsidies and protection, the adoption of free trade and other outward initiatives, and an improved international orientation on the part of business, will lead to successful long-term indigenous firms (Rugman and D'Cruz, 1990: 24, 45-47).

Of course, not all neo-liberals advocate a completely non-interventionist policy. The emphasis on free trade has led some to advocate a minimal level of government intervention to support the competitiveness of domestic firms. This became evident in the mid-1990s, when policy emphasis shifted to "international competitiveness". Philip Cerny has coined the term "competition state" to describe this new form of state (Cerny, 1996: 124). For Cerny, "the main task or function of the contemporary state is the promotion of economic activities, whether at home or abroad, which make firms and sectors located within the territory of the state competitive in international markets"(Cerny, 1996: 124). The main activity of this state is thus to maintain an environment conducive to domestic and foreign investment, and also to provide a very limited range of goods such as human capital, infrastructure, R&D support, and basic public services. Cerny views the "competition state" as a residual state that has shed

most of its contemporary functions and is constantly looking to marketize its activities, through privatization and deregulation, to improve its effectiveness. It exists in a world where the national economy is of increasing irrelevance (Cerny, 1996). Muller also talks of “neo-liberal interventionism”(Muller, 1995: 159), which combines an emphasis on competition and respect for the free market with minimal state action to support the development of the industrial base. To aid in maintaining international competitiveness, state support is provided for basic research along with economic and social policies that support industrial development. Emphasis is placed on maintaining the competitiveness of firms so that they can be attractive partners for international alliances. Neo-liberal interventionist policies are more prevalent in high technology sectors (Muller, 1995; McGuire, 1997: 190-197). As we shall see, this emphasis by some neo-liberals on competitiveness begins to blur the lines between neo-liberalism and alternative policy approaches.

Nevertheless, one of the key ideas of neo-liberalism is convergence, the idea that states around the world are converging by adopting similar neo-liberal economic policies. At a very basic level, convergence is the tendency for all countries to move toward a common way of “producing and organizing economic life” (Berger, 1996: 1). “Convergence is the tendency of policies to grow more alike, in the form of increasing similarity in structures, processes, and performances” (Drezner, 2001: 53). The idea of convergence is based on two basic propositions. First, the changes in the economy and society associated with globalization reflect real changes in the structure and functioning of the

capitalist economic system. Second, these changes are resulting in the erosion of differences in national institutions, policies, and practices (Radice, 2000: 721).

There are four basic types of convergence. One is input convergence. This type of convergence occurs when there are common pressures and constraints placed upon a given economy. Policy convergence occurs when there is convergence in the policies or policy paradigms pursued by specific economies. Output convergence occurs when there is convergence in the consequences and outcomes of specific policies. And finally, process convergence occurs when there is convergence in the processes used to sustain the development of an economy (Hay, 2000: 514).

Neo-classical economic theory takes the view that the world economy is in a relentless drive towards convergence. Even though countries specialize in the production of specific products according to their factor endowments, the pressures of competition and trade would lead factor prices and incomes to converge. Institutions would become more alike as competition forces the adoption of the best practices, which are market conforming, and drives out other sub-optimal approaches. This move to convergence is seen to be the natural outcome of economic processes.

More recent advocates of globalization and neo-liberalism see forces and pressure both from inside and outside the national economy working to bring about policy convergence between national economies. These advocates see

“other forces at work in the world, smashing national borders under rising tides of mobile technology, trade and finance and creating a world market that national interventions were helpless to resist”(Berger, 1996: 5). While in the past trade was seen as the primary driver of convergence by economists, the new advocates of globalization and neo-liberalism see capital mobility as the main driver of the process. These capital flows were unleashed by the deregulation of financial markets.

Neo-liberals largely believe that natural economic processes will work in such a way that optimal market conforming policies will push out inefficient interventionist policies. They admit that differences do exist between countries because of different historical circumstances, but they believe that these differences will naturally disappear over time. If they do persist, and work to maintain interventionist policies, it is because government or special interests are using non-market resources to maintain these unique social and economic institutions.

The advocates of neo-liberalism see only one option available to national economies as they try to adapt to the changing world economy. That option involves the adoption of socioeconomic policies that allow the free market to operate and automatically adjust the economy and society to changing circumstances. The trajectory of change in the world economy leads in one direction - towards Anglo-Saxon style free market policies:

According to the new orthodoxy, we are now entering a new phase in world history in which cross-border flows in goods and services, investment, finance and technology are creating a seamless world market where the law of one price will prevail. What we are witnessing, say the proponents of globalism, is no less than the demise of the nation-state as a power actor, the end of 'national capitalisms' with their characteristic welfare systems and industrial policies, and ultimately world-wide convergence on one kind of economic system: Anglo American-style free-market capitalism (Weiss, 1998: 167-168).

Growing economic interdependence is eliminating the ability of nationally-based societies to maintain their particular forms of economic, social, cultural, and political organization (Boyer, 1996: 29). The move to free market policies will come about naturally if non-market forces are not allowed to unnaturally hinder their development.

The New Techno-Economic Paradigm and Policy Alternatives

While neo-liberalism and globalization pushed for non-intervention in markets, and the tide seemed to turn against national champion firms, some have argued that neo-liberalism is not the most appropriate policy response in the new globalized, competitive, and high technology economy. States have other choices that are, in fact, better suited to the new techno-economic paradigm.

One of the alternative views looks at the world in a "Schumpeterian" fashion. As we saw earlier, Bob Jessop has argued that the new post-Fordist techno-economic paradigm requires a new economic policy paradigm, but he rejects the neo-liberal idea that policy should converge on the minimalist state.

He is one that argues that a Schumpeterian policy approach is what is needed. Such an approach promotes innovation in products, markets, processes, and organizations. It works to improve the competitiveness of an open economy through supply side actions. It focuses social policy on the promotion of labour market flexibility and competitiveness. According to Jessop, neo-liberalism is only one of several possible ways of achieving these goals, and there are more effective versions of a Schumpeterian approach (Jessop, 1993: 9-10, 28-33; Jessop, 2000). In fact, the latter offer a more appropriate response to the new techno-economic environment to the extent that they better address the problem posed by knowledge as a “fictitious commodity “ (Jessop, 2002).

High technology industries, such as the aircraft industry, remain of crucial importance in the new post-Fordist techno-economic paradigm and they can play a key role in a Schumpeterian approach to policy. The aircraft industry was a key industry under the older Keynesian paradigm, but it plays an important role in the new economy as a user of key inputs such as computers, electronics, and new materials. High technology industries involve the production of technologically advanced products by large firms in imperfectly competitive markets. Such high technology industries are sources of innovation and technological spillovers, and they play a role in promoting high wages, increased productivity, and improved labour skills. The “characteristic features of high technology industries - imperfect competition, strategic behaviour, dynamic economies of scale, and technological externalities - provide a fertile breeding ground for interventionist

policies” (Tyson, 1992: 4). Such interventionist strategies would include support for national champion firms (Harris, 1985: 26-35; Tyson, 1992: 1-14).

Of key importance in the high technology economy is the diffusion of new innovations, or key factors, throughout the economy. In order for the innovations associated with high technology industries to have an impact on the wider economy, the innovations coupled with those industries must spread through large parts of the economy. Not only does the opportunity for profit attract others to reproduce the initial innovations, it also encourages others to launch a series of further incremental and related innovations. By destroying older products and processes, rapid diffusion becomes possible as others in the economy see the benefits of the innovations. Users, after seeing an opening for improved profit, adopt the innovations to improve their performance. The processes of innovation, imitation, and incremental innovations help to spread the benefits of high technology industries throughout the economy as the advantages reach to other sectors and branches of industry (Freeman, Clark, and Soete, 1982: 64-68).

One industrial policy perspective that emerged in the late 1980s, and reflected a Schumpeterian view of the world, was Strategic Trade Policy. This approach broke with the classical assumptions of perfect competition and unchanging technology. Its focus was on imperfect competition in the high-tech economy where oligopolistic firms engage in a form of Schumpeterian competition in which they struggle for technological rents. Innovation and

barriers to entry, which limit new entrants into the technological race, allow high technology firms to earn supernormal profits from their technological activities. Given the importance of these industries in the new techno-economic paradigm, it is clear that the structure of the economy matters and states should strive to increase their presence in such industries. Industrial policies in support of national firms, therefore, are seen as necessary if such firms are to participate in the technological race. Such policies assist national firms to overcome entry barriers, and allow them to capture the benefits from the technological competition. This more strategic view of trade and government policy provided new justification and support for state policies that support national industries and firms (Harris, 1985: 28-30; Tyson, 1992: 1-14).

One rationale for continued support for national firms is thus “profit shifting” which essentially involves the shifting of profits from foreign to domestic firms (Brander, 1986: 26). This is based on the idea that a “country can raise its national income at other countries’ expense if it can somehow ensure that the lucky firm that gets to earn excess returns is domestic rather than foreign” (Krugman, 1987: 135). The basic idea is that government, through policies such as research and development subsidies, export subsidies, and the protection of the domestic market, can provide domestic firms with an advantage over foreign firms in world markets. One way to achieve this would be through subsidization of national firms. If the government-supported national firm can enter a market first, it may, under certain circumstances, deter foreign firms from entering the market. It can, therefore, capture the technological rents for the national

economy. Another way to achieve the same goal would be through the protection of the domestic market. If learning curve effects in the industry are substantial, and the domestic market is an important market for the product, protection of the domestic market can allow the national firm to move down its learning curve faster than it otherwise would move. This would give the national firm lower unit costs and this competitive edge would eventually allow the national firm to drive foreign firms out of the market. This would allow the national firm to capture the technological rents (Krugman, 1987: 134-136; The Economist, 22 September 1990: S19).

Another rationale for a strategic trade policy in support of national firms is the external economies that can be generated from entering the technological race. Government support for national firms in high technology industries, such as the aircraft industry, can be used to encourage activities that generate positive externalities. These positive externalities originate from the inability of the domestic firm to fully appropriate the results of its investment in research and development. Such expenditures can have positive effects on other firms and other industries, and these benefits are not accounted for by the innovating firm. Since the firm cannot capture the full benefits of its research, it tends to under-invest in research and development from a national perspective. Government should, therefore, intervene to promote R&D by subsidizing and protecting their high technology national firms that yield such positive externalities (Krugman, 1987: 137-138; The Economist, 22 September 1990: 19). This policy perspective, therefore, provides strategic public support to national firms.

Another approach to industrial policy that began to emerge in the early 1990s can be termed the “national competitiveness” policy paradigm. This approach emphasizes the importance of the nation in competitiveness, and it views the primary goal of the nation to be the achievement of a high and rising standard of living for its citizens. The standard of living depends on productivity, so the only significant measure of national competitiveness is national productivity. Competitiveness must not be viewed on an economy wide basis: the focus must be on specific industries and industry segments. Increases in productivity require a continually upgrading economy (Porter, 1990: 1-6). While sounding similar to neo-liberal ideas about the “competition state”, this approach is significantly different.

According to the national competitiveness approach, globalization makes the nation more rather than less important. This emphasis on the nation differentiates this approach from neo-liberal ideas on the “competition state” that see the nation, and efforts to build up a national economy, as declining in importance in a globalized world. According to Michael Porter, competitive advantage is established and built up in a highly localized fashion. The nation is therefore important in a globalized economy:

Differences in national economic structures, values, cultures, institutions, and histories contribute profoundly to competitive success. The role of the home nation seems to be as strong as or stronger than ever. While globalization of competition might appear to make the nation less important, instead it seems to make it more so. With fewer impediments to trade to shelter uncompetitive domestic firms and industries, the home nation takes on growing

significance because it is the source of the skills and technology that underpin competitive advantage (Porter, 1990: 19).

The nation provides the home base for firms to compete in the global economy.

The home base will be the location of the best jobs using the most advanced skills. It will be the location where firm strategies are determined and the core technologies are created and improved. The home nation provides the base where the competitive advantage of firms is established and nurtured (Porter, 1990: 19).

There are four attributes of a nation that influence the environment in which firms compete and that nurture or impede the development of competitive advantage. These four factors are factor conditions, demand conditions, the presence of related and supporting industries, and the nature of firm strategy, structure and rivalry. Factor conditions are the factors of production and the methods of their deployment and upgrading. Demand conditions refer to the composition, growth, sophistication, and the internationalization of home country demand. Related and supporting industries refer to the presence of competitive supplier industries and related industries. Firm strategy, structure, and rivalry refer to the style, goals, and international outlook of firm management and the level of rivalry between domestic firms. Each of these elements forms part of a “diamond” that underpins national advantage. The diamond acts as a system where the four attributes interact. If the attributes of a nation are favourable to competing in a specific industry or segment, the interaction between the attributes can create new industries or an upward spiral for existing industries

where the basis of competitiveness is constantly upgraded. Where the elements are not favourable, industries are not formed or existing industries lose their competitiveness. The national “diamond” operates to favour the clustering of industrial activity in certain regions or cities within nations (Porter, 1990: 69-124, 131-159).

The national competitiveness approach to policy sees a significant role for government in influencing economic development. It rejects the view that the role of government should be passive and let market forces operate. Here again, this approach differs from neo-liberal ideas regarding the “competition state” that see a circumscribed role for the state in the national economy. According to Porter, the main objective of government is to ensure that the nation’s economic resources are put to use in achieving high and rising levels of productivity. Government’s role in achieving this goal is important, but it cannot achieve it on its own:

Government has an important influence on national competitive advantage, though its role is inevitably *partial*. Government policy will fail if it remains the only source of national competitive advantage. Successful policies work in those industries where underlying determinants of national advantage are present and where government reinforces them. Government, it seems, can hasten or raise the odds of gaining competitive advantage (and vice versa) but lacks the power to create advantage itself (Porter, 1990: 128)

The government’s main tools are the levers it has to influence each of the four attributes of the national diamond. For example, government influences factor conditions through capital market policies, infrastructure investment, and education policies. It influences demand through product standard setting,

regulations that impact on buyers and government procurement. It has an impact on related and supporting industries through its regulations on the media and distribution channels. It can influence firm strategy, structure, and rivalry through capital market regulation, tax policy, and competition policy. These government policy instruments are far more extensive than the residual levers envisioned by Cerny in the “competition state”.

Government actions can have both positive and negative consequences for national advantage. Policy should be aimed at encouraging upgrading and innovation. For example, it should create an environment where existing firms innovate by adopting new technology and move to produce higher value added goods and services. It should also encourage entry into new industries with higher productivity. It should not protect declining industries because a loss of advantage in some industries is a crucial part of innovation. Support for industries that are losing competitive advantage zaps the innovative capacity of the economy (Porter, 1990: 126-128, 617-682).

Given the importance attached to domestic rivalry in the national competitiveness approach to policy, this approach does not advocate the use of a “national champion” strategy. Domestic rivalry is the key determinant of an upgrading and innovative economy. It is strong rivalry between domestic firms that encourages improvement and upgrading in all the elements of the “diamond”. Domestic firms in a rivalrous environment push each other to upgrade. (Porter, 1990: 143 - 144, 662). According to Porter, the idea of forming national

champions, where the establishment of one or two national firms allows for the reaping of economies of scale, has not proved to be a successful strategy. The way to achieve economies of scale is through selling on a global basis. It is not the economies of a single firm that count, but the economies of the entire national industry. Few national champion firms are internationally competitive, and they are often supported by government subsidies and other forms of protection. With a national champion strategy, there is a tendency for government to provide preferential treatment to the one or two national firms in the industry. Subsidies, directed government purchases, the development of restrictive product standards, and other similar actions by government reduce the incentives to upgrade. A strategy that encourages domestic rivalry is the only strategy for a government that wants an upgrading and innovative economy. (Porter, 1990: 117-118, 662-663). National advantage is, therefore, an interventionist approach that supports the development of national industries, but does not utilize interventionist tools to support specific national champions.

The early 1990s also witnessed an increasing level of interest in the idea of “national systems of innovation”. National systems of innovation are based on a set of institutions whose interaction plays a major role in shaping the innovative performance of national firms. Innovation refers to those processes whereby firms master and adopt new product or process technologies, and it is based on scientific research, technological development, and incremental learning by doing. Important elements of the national system of innovation include industrial firms and their research laboratories, upstream suppliers and downstream firms,

universities, training institutes, public laboratories, and other government agencies (Nelson, 1993: 3-18). The networks supporting innovation in different industries are not the same in all industries as, for example, different players could be involved. Embedded within the national system of innovation are, therefore, “sectoral systems of innovation” that are made up of national institutions that are highly specific to industrial sectors. A sectoral system of innovation is a set of products and the individuals and organizations that carry out both market and non-market interactions for the creation, production, and sale of the products (Mowery and Nelson, 1999: pp. 369-370; Malerba, 2002: 250-251). Governments do not play the same role in different sectoral networks, with the state being more important in some industries, such as the military and agricultural industries, than in others. The government plays an important role as an actor in the innovation system and as a funder of other actors. These national and sectoral systems of innovation play a crucial role in supporting the development of national firms (Nelson, 1993: 3-18).

One of the more recent industrial policy approaches to emerge is “Innovation Policy”, an approach closely associated with a “Schumpeterian” view of the world and earlier ideas concerning “national systems of innovation”. Appearing in the late 1980s and 1990s, it grew out of the recognition of the changing nature of economic activity and the increasing importance of innovation in the world economy. Growth and competitiveness can be based on the search for lower costs, the establishment of market power, or innovation. In a globalized world economy, market power is being eroded and the search for lower costs has

its limits in industrialized countries. Long-term progress must therefore be based on innovation (Cantwell, 1999: 226-229). For advocates of innovation policy, the economic progress of a country is now crucially dependent on knowledge and the ability to learn. "Most importantly it has been explicitly recognized that the key resource is knowledge and that it is the learning capabilities of people, firms and national systems which dictate their relative economic success"(Lundvall, 1999: 19). A shift toward innovation policy would be driven by the recognition of the increasing role of knowledge and learning in economic progress, and by the increasingly limited ability to use more traditional approaches to policy, such as macro-economic policy, labour market policy, and traditional industrial policy efforts. Globalization and international agreements are making these tools increasing off limits and reducing their effectiveness.

Technological capability is closely linked with processes of interactive learning. The traditional approach to innovation focuses on research and development, and it indicates that firms have a great deal of difficulty in appropriating returns from their research and development activities. Innovation policy advocates focus in on a wider view of innovation, one that views tacit capability, which is accumulated through learning, as important. Firms cannot use knowledge without having the tacit capability to use it, and the development of this capability requires investments by the firm. Firms appropriate a return on this tacit capability. If there is under-investment in knowledge, it is a failure of institutions and not markets. Improving the working of the market for knowledge cannot solve the problem of under-investment (Cantwell, 1999: 229-236).

Interactive learning is heavily influenced by the structure of the economy and its institutional elements. As we have seen, the national system of innovation is the collection of public and private institutions in a country that develops, imports, adjusts and spreads knowledge and new technologies in the economy. If the institutions that are in place encourage learning and encourage firms and individuals to improve their capability to learn, interactions between firms and new investment in research will result (Archibugi, Howells, and Michie, 1999: 1-3; Cantwell, 1999: 236). Within the society and its institutions, social cohesion and trust play an important role in determining long term economic development because of their importance in comprehending new technologies, mastering new more flexible organizations, and the social nature of the learning process generating tacit knowledge (Lundvall, 1999: 23-24).

Innovation policy has led to a new set of ideas on the role of the state in the economy. The major role for the state is to promote learning at the organizational and individual levels. The government should undertake a long term effort to influence the production structure and institutions in the economy to stimulate the process of learning. Policies directed at training, education, developing managerial skills, and adapting to technological change are crucial instruments of policy. Government can act as a catalyst to encourage private sector R&D through its funding of public research institutes, universities, and the science base. Collaboration can be encouraged between organizations such as firms to encourage the diffusion of technology (Archibugi, Howells, and Michie

,1999: 9-10; Cantwell, 1999: 236-237; Dalum, Johnson, and Lundvall, 1992: 302-310)

The increasing importance of social cohesion and trust for economic development means that the focus of industrial and technology policies must be widened to include the social dimensions of such policies. For example, the increased importance of learning places added importance on the individual's ability to learn. Disparities resulting from differences in learning ability will be hard to eliminate after the fact, so emphasis should be placed on preventative measures such as an expansion of educational opportunities (Lundvall, 1999: 19-20, 26-27).

While innovation policy does support a role for the state in the economy, it does not favour the development of "national champions". Government intervention in the learning process should allow for processes of self-learning and should avoid detailed interventions. If the economy has a strong cluster of innovative activity, and if institutions are in tune with technological developments, the capacity for self-learning will be strong and there will be no need for detailed government intervention to pick winners (Dalum, Johnson, and Lundvall, 1992: 307). Technology policy should place emphasis on small firms because small dynamic firms are a major source of innovation and they rely more heavily on government funding for these activities when compared to larger firms (Chesnais, 1992: 295). "Technology programmes aimed at supporting emerging industrial complexes may...put a special emphasis on involving the most dynamic

small and medium sized enterprises in interactive learning, rather than fostering a few national 'champions'" (Dalum, Johnson, and Lundvall, 1992: 310).

Given the nature of the economy under the new techno-economic paradigm, the national champion is still useful as a strategic concept, as Chaing argues: "Despite some argument for the inappropriateness of national champion strategies in today's global arena, it still is a useful concept to guide strategic thinking at the national level. And national rivalry does not seem likely to diminish in the foreseeable future" (Chiang, 1990: 251). The key to using the national champion as a strategy is to recognize that it has to be adapted to economic conditions. For example, in some industries, a "multiple national champion" strategy may be appropriate where several national firms compete in the domestic market and represent the country in international markets. In some industries, where foreign competition is strong, a "multinational champion strategy" maybe appropriate. Here national firms from several countries join together to form the multinational champion. Airbus Industrie, the European plane maker, provides an example of this approach (Chiang, 1990: 235-252).

The shift that has occurred in the last two decades towards a new techno-economic paradigm does not require the adoption of a neo-liberal non-interventionist public policy framework. By showing that alternative approaches to industrial policy existed in addition to the approach advocated by the neo-liberals, those that pushed for other approaches opened the door to alternative choices for states to follow. With the possible exception of large economies like

the United States, the neo-liberal option may be considered a less suitable fit for the conditions in the new economy.

States, therefore, face choices in industrial policy. When developing and supporting strategically important sectors like the aircraft industry, states face a range of options, some of which are more interventionist than others. Included in these choices is the option of adopting interventionist policies that support national champion firms. The decision as to which option to follow is heavily influenced by domestic politics. The focus of the next chapter will be on how these choices are made.

Chapter 2

The State And Industrial Policy Choice

As Chapter One argued, in the new international high technology economy, states do have options when it comes to industrial policy. Governments have choices, despite the neo-liberal argument that the only industrial policy option open to states in the new economy is one of non-intervention. These choices open up various avenues for state policy as policymakers try to improve the performance of their economies in the new economic environment.

As we shall see in this chapter, these industrial policy choices are made in a context shaped by domestic politics. Domestic political forces, in the form of ideas, institutions and interests, help to mold the specific industrial policy direction chosen by the state. Such choices will shape the historical policy path pursued by the state, and several outcomes are possible as states adjust their policies to accommodate the needs of the new techno-economic paradigm. The outcome could be, as the neo-institutionalists suggest, the status quo continuation along the same basic policy path. Other possibilities include a recasting of existing policy to make it more responsive to existing conditions or even a major re-ordering of policy through the adoption of a completely new policy paradigm that leads industrial policy down a completely new path. While the neo-institutionalists recognize that divergent path-dependent choices are possible, this chapter will argue that, while not without insight, the neo-

institutionalist approach fails to recognize the possibility of a serious break with path dependency. As we shall see later, in the area of industrial policy in the commuter and regional aircraft manufacturing sector, while Canada and Brazil pursued a modified version of their historical policy direction, the Netherlands made a dramatic break with its historical policy path. In all three cases, the impact of neo-liberalism was evident.

Domestic Politics and Path Dependency

If a policy framework, such as neo-liberalism, is to prevail over other policy choices as the cornerstone of economic policy, it must, as Peter Gourevitch points out, have the support of those who exercise political power. Competing policy proposals emerge out of the process of politics (Gourevitch, 1986). As we have seen in the previous chapter, governments have choices to make when it comes to industrial policy. Governments always have a range of alternative economic policy approaches from which to choose. "To explain economic policy choices, we need to link policy outcomes to politics. Our explanatory approaches must have some way of accounting for the connection between policy and choice - between what could be done and the various factors that shape what decision makers actually chose to do"(Gourevitch, 1986: 54). These choices are influenced by external factors, but decisions are primarily shaped by the political, social, economic, cultural, and intellectual forces in society. For example, national institutions provide the setting within which policy choices are made, and they act to channel and filter the impact of domestic forces and external factors

on policy choice. In other words, domestic politics, in the form of ideas, institutions, and interests, has a major impact on policy choice (Hood, 1994: 3-4; Trubowitz, Goldman and Rhodes, 1999: 4-5; Walsh, 2000).

Institutionalists highlight the key role that institutions and history play in policy choice. For institutionalists, national institutions provide the setting within which national policies are made. These institutions differ between countries and they are deeply rooted in society, history, and culture and are, therefore, resistant to change (Hay, 2000: 511-512). "Stable, dissimilar institutional features lead to persistently different patterns of policy formation and economic outcomes from one country to another. Even nations facing common international pressures and with similar geographical positions and factor endowments follow different paths of policy and economic performance due to their institutional framework" (Thatcher, 1999: 1).

National institutions are the "structure or organizational framework within which a state's policymakers take decisions" (Thatcher, 1999: 10). Other factors, such as markets, demographics, and technology must work through institutions in order to influence public policy. These institutions do not simply feed such factors into the policy process. They "serve to channel, filter and mediate common challenges in highly specific ways, often reinforcing the distinctiveness (both institutional and cultural) of distinct national (and, indeed, local and regional) capitalisms" (Hay, 2000: 512). Institutions, therefore, do not play a

neutral role as they interpret and mediate the impact of the various factors impinging on the policy process (Thatcher, 1999: 10).

The institutionalist perspective is based on three basic elements. First, national institutions are stable and they change very slowly. Any change is influenced by the past history and development of institutions within the national environment. Second, institutions differ between countries and institutions in different countries develop along different paths. Changes in institutions in different countries proceed along different paths. And finally, differences in national institutions between countries result in different patterns of policy making and different outcomes from country to country (Thatcher, 1999: 312).

For institutionalists, countries are set on a given policy path and there is a strong link between path dependency and policy inactivity. Path dependency refers to the idea that states are constrained by a particular model of development that influences future policy options (Torfing, 1999: 371). There is little room for major policy reforms because past policy choices are locked in and are difficult to reverse or change (Hemerijck, 2002: 187). Future policy choices are highly influenced by policy legacies which are longer-term patterns of past government activity. Previous policies tend to mold the ideas held by politicians and civil servants as to what is feasible, and such policy ideas will be a source of resistance when future events lead to a push for, and the acceptance and implementation of, a new policy framework or path (Goldstein, 1993: 3; Weir and Skocpol, 1985: 120-121). As we shall see, in the case of Brazil, old

developmentalist ideas, that dominated the industrial policy institutions in the country in the post war period up until the early 1990s, played a role in maintaining support for the country's aircraft industry national champion, Embraer, after a policy shift towards neo-liberalism.

Institutionalists also disagree with the advocates of globalization and neo-liberalism on the question of convergence because they believe that common external pressures are unlikely to lead to convergence. These external forces impact the domestic economies of different countries in diverse ways and they are understood and interpreted differently by different national systems. States respond to them differently, even if they agree on what these forces are, because they have different abilities to respond (Hay, 2000: 512).

There is some validity to the idea that states are to a certain extent path dependent. As Peter Katzenstein (Katzenstein, 1985: 23) points out, states can have different economic orientations that have an impact on their responses to economic pressures. These different orientations reflect the paths along which policy has developed based on historical experiences and institutional development.

Some states can be classified as liberal in nature as a result of historical experiences and institutional responses to them, and such states can be described as "Liberal Market Economies" (Hall and Soskice, 1999: 8-9; Soskice, 1999: 110-112). The market is seen as the main coordinating mechanism in the

economy, and these states emphasize market solutions and market driven adjustment to economic changes. In general, government action must not impede the operation of market forces, and government, therefore, does not implement programs to help industries adapt to change. The market drives structural change in the economy. State action is generally limited to implementing the optimal macroeconomic environment to allow the private sector to flourish. The free flow of capital, labour, and technology would provide an automatic adjustment to the pressure emanating from the world economy. The state often lacks the institutional capacity to intervene in markets to shape economic responses. If market policies fail and some state support is required, it usually takes the form of protectionist policies that export the costs of adjustment on to others (Katzenstein, 1985: 23-26). Canada is an example of a Liberal Market economy.

Other states can be described as having an “Organized Market Economy” (Hall and Soskice, 1999: 9; Soskice, 1999: 106-110). These type of states rely more on non-market methods as coordinating mechanisms in the economy. In these economies, some states emphasize the role of the state as a coordinating mechanism, while others emphasize the role of social management as the key mechanism.

Some organized market economies have the state playing a central role. These states have a more “statist” economic orientation. They use government policies to help their industries and firms adjust to international competition. This

use of policy is based on the view that comparative advantage is not only determined by market forces, it can also be constructed through political action. These states use government policy to help promote structural change in response to economic pressures. It could involve helping sunset industries in decline, helping firms improve their competitiveness, or providing assistance to allow firms to enter entirely new market segments or industries. These states have the institutional capability to implement effective policies to deal with structural change. Protection is sometimes required to allow for an adequate period of adjustment (Katzenstein, 1985: 23-26). Linda Weiss describes these states as “developmental” states (Weiss, 1998: 20). Brazil is an example of a state with a “statist” orientation.

Other organized market economies emphasize the social management of change¹. These states accept the need for economic change and generally advocate open international markets. They use various mechanisms, including tripartite bargaining, to develop social and economic policies in response to economic pressures. Generally, these states manage economic change by a controlled adjustment in production that minimizes the negative consequences for stakeholders in the economy. This controlled adjustment often involves a progressive industry contraction and the modernization of the remaining core industrial core activities. It also often involves efforts to take advantage of new opportunities that arise. Any contraction takes place in a way that minimizes the

¹ For an example of this in the steel and shipbuilding industries see Esser and Vath, (1987), Capron (1987), and Strath (1987).

impact on labour. The Netherlands is considered to be a socially managed economy.

The economic orientation or path of the state will have a major impact on its handling of neo-liberal pressures. One would expect that liberal states would be the least resistant to the pressures from neo-liberalism and globalization. The ideas, institutions and interests associated with these states would have the least resistance to further liberalization of the economy and the reshaping of the main development path in a more liberal direction. In those sectors of the economy where the liberal state does intervene heavily, one would expect that state to be the least resistant to pressures for change in the direction of liberalization. The statist states, and those that emphasize the social management of change, can be expected to offer more resistance to pressures for liberalization. Here, the legacies and political forces in favour of the old policy path would likely resist the shift towards neo-liberalism. In statist states, whose institutional capability is designed to allow for effective state intervention, the resistance is likely to be strongest. The ideas, institutions and interests built up around effective intervention will oppose the adoption of neo-liberal policies that would effectively reduce their ability to intervene. The shift here towards neo-liberalism would be the most difficult. The position of states that emphasize social management of change would be more open to liberalization if they were capable of managing the industrial adjustment effectively with minimal social disruption.

There does, therefore, seem to be some soundness to the idea that states have their policy choices somewhat constrained by their historical policy path. For example, states with an “organized market economy” would have their future policy options limited because of their past historical development along organized market lines. This thesis examines industrial policy in the commuter and regional aircraft industry in three states with different historical economic orientations. It examines policy in the Netherlands, a state that is commonly seen to have a Socially Managed Economy. It also looks at Brazil, a state that traditionally has had a “statist” orientation. And finally, it looks at policy in Canada, a state that has often been described as a Liberal Market Economy. One of the key questions that motivates the analysis is the ability of states to maintain their industrial policy path in the commuter and regional aircraft industry after a period of crisis.

Domestic Politics and Path Shaping Strategies

Despite the tendency to path dependence, some observers have argued that policy innovation is possible in an environment characterized by path dependency. Often such innovation occurs during a period of crisis (Torfing, 1999: 390-391; Hemerijck, 2002: 187-189). Policy innovation implies that policy paths have a built-in elasticity that allows the path to accommodate change. Generally speaking, the path can accommodate minor challenges or events, but major new events or a major crisis can challenge the cohesion of the path. During these periods, the existing path cannot deal with the problems at hand,

and opportunities may open up for a political struggle over a totally new direction based on new ideas or policy paradigms (Torfing, 1999: 390-391).

When these opportunities to set the fundamental direction of future policy open up, political forces within a society can make use of path shaping-strategies to influence future policy. In such strategies, political forces, with different conceptions as to the right policy response, struggle over the future direction of policy and try to influence the choice in their direction. Such forces intervene to shape the direction of the policy debate and remake the path so that a new path becomes a possibility (Torfing, 1999: 389).

Peter Hall has described a process of major policy reorientation that provides insight into the type of government policy changes that would go on during the period of change from one policy path to another. For Hall, there are three variables in the policymaking process and these are goals, instruments, and the setting of instruments. First order change occurs when the instrument settings are changed in response to past experience and new developments, while the overall goals and instruments remain unchanged. Second order learning occurs when both the instruments and their settings change based on past experience, while the goals remain the same. Third order change occurs when the instrument settings, instruments, and goals all change. Third order change involves a change in the public policy framework governing society and the economy (Hall, 1993: 278-279). With third order change, the selection of a

new policy direction or framework results from two processes, namely, “puzzling” and “powering” (Hemerijck, 2002: 188).

Puzzling involves determining the nature and extent of the current problem, determining the priorities, and identifying possible solutions. The process of puzzling is closely linked to learning and the struggle over ideas. As we have already seen in Chapter 1, ideas and the struggle between ideas play an important role in the choice of a strategic framework that policymakers will use to confront a given economic problem, and, therefore, determine the future policy path. They are a crucial guiding element in the public policy framework or development path and the shift from one framework or path to another (Hemerijck, 2002: 188; Saint-Martin and Dobrowolsky, 2001: 8-11). Ideas are “mental constructions” (Heclo, 1994: 375) or “shared beliefs” (Goldstein, 1993: 11). They provide a roadmap to political decision-makers that guide their decisions. Reversals of policy, for example, often originate from ideas that challenge and change the status quo. New economic theories originating from outside infiltrate the policy community and can lead to major changes in policy (Hood, 1994: 5-7). As we saw in chapter one, both neo-liberal and Schumpetarian ideas began to influence the debate over industrial policy in the post-1970s period. The outcome of struggle between these two approaches played a major role in shaping the state’s industrial policy paths for the 1980s and beyond.

The development of policy ideas often involves “lesson-drawing” and “political learning “ (Rose 1993; Heclo, 1974: 306). Lesson drawing is based on the common experience of problems. Policy makers learn lessons from their own past experiences and the knowledge that exists about the ways policies worked in the past. They can also learn lessons from the policy experiences of others (Rose, 1993). Similarly, political learning is a long-term change in policy behaviour that has its origins in experience. For Hall, changes in policy reflect a process of social learning where there is “a deliberate attempt to adjust the goals or techniques of policy in response to past experience and new information. Learning is indicated when policy changes as the result of such a process” (Hall, 1993: 278). Such learning can involve the adoption of a specific policy approach for use with similar problems through the repeated use of such an approach. For example, the use of subsidies to support firms in financial difficulty could be extended for use in other situations where firms are in difficulty. Subsidies could become a standard approach for industries in trouble. Political learning can also involve learning from the impact of previous policy. Past experience with subsidies, for example, could play a role in determining a government’s future approach to industrial policy (Heclo, 1974: 315-318). Both lesson drawing and political learning play a role in first, second and third order policy change.

As we shall see, ideas played a crucial role in the choices made with respect to industrial policy in the commuter and regional aircraft industry in the Netherlands, Brazil, and Canada. These ideas were particularly important in third order policy change. Development of industrial policy was heavily influenced by

the ideas underpinning the basic policy path in each country. For example, policy in Brazil, which emphasized state backing for the national champion firm, Embraer, was influenced by ideas sustaining a statist economy. Each country's policy path was also influenced by neo-liberal or Schumpeterian ideas. For example, the transfer of the national champion to the private sector in all three countries reflected the impact of neo-liberalism. States were also influenced by other more specific ideas. For example, the idea that the aircraft industry was of "strategic" importance to the national economy played a major role in all three countries in maintaining long-term support for their aircraft industry national champions. Policy learning will also be evident. In the one case where the long-term support for the national champion aircraft firm was undermined, the case of the Netherlands, the poor performance of the country's national champion in the aircraft industry, Fokker, helped to undermine the legacy of the Dutch government's support for the aircraft manufacturer. Ideas clearly played a role in shaping choices in industrial policy in the aircraft sector in all three countries.

The other element of the process of policy choice is "powering". In order for the ideas developed during "puzzling" to play a role in policy, they must have political support. Powering involves developing the necessary political and social support for the choice of a specific solution. Power involves struggles between competing interests in society, and it requires an appeal to the interests of various stakeholders in society to build up support for a solution (Hemerijck, 2002: 188; Saint-Martin and Dobrowolsky, 2001: 8, 11, 25). Individual actors and institutions, including the state, have their own interests. These interests try to

influence policy through ideas and institutions. Policy choices are made, and individuals and organizations try to influence those choices, so that certain interests can be achieved through policy. They try to shape the policy path that is developed so that it is in-line with their interests. Interests are the “real, material interests of the principal actors, whether conceived as individuals or as groups” (Hall, 1996: 2). Interests, therefore, focuses on the “self-interested and purposive pursuit of material goals” (Heclo, 1994: 375).

As Christopher Hood points out, policy change can reflect the dynamics of shifting interests. “If policy reflects the successful exercise of power by some groups over others, a reversal of policy must presumably be explained by changing dynamics of interests - such as the formation of new coalitions of forces or the mobilization of previously unorganized groups” (Hood, 1994: 7). Interest pressures can originate from shifting domestic interest coalitions, from international pressures originating from economic and military competition between states, and from policy entrepreneurs that repackage policy options and thus remaking interest coalitions. For example, the shift away from progressive income taxes was influenced by a shifting pattern of foreign and domestic interests (Hood, 1994: 7-10).

In all three cases examined here, as we shall see, interests played a role in shaping policy. All three states, for example, had an interest in supporting the commuter and regional aircraft industry because it generated technology, jobs, and exports. In Brazil, support for Embraer met the interests of the country's

military leaders by helping to reduce dependence on foreign suppliers of military hardware. Later, when the defence sector in Brazil had crumbled, support for Embraer was in the interest of the new civilian government because it permitted the government to salvage something with civilian potential from the defense industrial base. In the case of the Netherlands, the interests of Deutsche Aerospace, Fokker's German parent, in a major change in strategy to rectify its own poor financial situation, contributed heavily to the downfall of Fokker. The conflicting interests of the players in the European commuter and regional aircraft industry also hindered the development of a European solution. In the case of Canada, the regional interests of successive governments in power helped sustain support for the national champion Bombardier.

Puzzling and Powering: Different Policy Outcomes

The processes of “puzzling” and “powering” can lead to several outcomes. As will be illustrated in the three cases looked at here, the outcome of these processes is not necessarily policy inertia or convergence. Neo-institutionalists would argue that the policy choice that results from the process of puzzling and powering would maintain the status quo, possibly with some path-dependent incremental changes. The historical policy path would be maintained and there would be only minor adjustments in past policies that supported the national champion firm to accommodate the new techno-economic paradigm. In this case, the state would basically maintain its existing policy path in the face of

pressures pushing in the direction of neo-liberalism. This would work against the idea of convergence.

In the three cases looked at here, no state was able to maintain the status quo. Another possible outcome of puzzling and powering is change that is non-radical in nature that basically acts to recast existing policies so they are more responsive to existing conditions. Past policies that supported the national champion would be recast to be more congruent with the new techno-economic paradigm. This type of policy innovation has been described as “bounded policy innovation” and it does not challenge the consistency of the historic path (Hemerijck, 2002: 174-177). In our cases here, for example, past statist policies in Brazil that acted to support national champion Embraer were recast to be more responsive to the requirements of new post-Fordist techno-economic paradigm. Here the possibility exists for a partial non-path dependent policy shift in a neo-liberal direction and thus partial convergence.

In other cases, as was pointed out in the previous chapter, the challenge is seen so fundamental that those political forces advocating a completely new policy paradigm are successful in achieving a completely new path based on a new policy paradigm (Hall, 1993). With this outcome, the new paradigm completely replaces the old policy path. Here the possibility exists that an old policy path that supported the national champion is swept aside in favour neo-liberal policies that advocate market forces. In the cases looked at here, policy in the Netherlands switched onto a mainly neo-liberal track.

This chapter has looked the question of how choices are made in the area of industrial policy. We have seen that those choices are heavily influenced by domestic politics, namely, ideas, institutions, and interests. The choices that can result include the status quo, a recasting of policy, or a completely new policy approach. The next chapter will move us to an examination of the industry that is the target of state policy choice - the commuter and regional aircraft industry. It will provide an overview of the industry, a review of the role of the state in the industry, and an overview of the strategic choices available to states as they face an industry undergoing change.

Chapter 3

Industrial Policy And The Regional And Commuter Aircraft Manufacturing Industry

This chapter focuses on industrial policy options in the commuter and regional aircraft manufacturing industry. In order to better understand developments in this rapidly changing industry, this chapter will provide an overview of the sector and the role of the state in its development. During the Keynesian period, the commuter and regional aircraft manufacturing industry was a target of state industrial policy, including the use of national champion strategies, as states sought to capture the benefits from participation in this high technology sector. The characteristics of the industry drove the need for state intervention in the sector. During the post-Fordist period, airline deregulation, changes in the organization of production, and the rise of the regional jet opened new opportunities for the industry in the 1980s and 1990s. At the same time, the recessions in the early 1980s and early 1990s, and the resulting series of crisis in the industry, unleashed pressures for restructuring that required policy choices about the future of the industry. As we saw in chapter two, these choices would be influenced by domestic politics. The choices made in the Netherlands, Brazil, and Canada with respect to this restructuring are the focal point of this analysis.

The Regional and Commuter Aircraft Industry and Regional and Commuter Airlines

The aircraft industry was a key industry under both the Keynesian and post-Fordist techno-economic paradigms. While the industry was not a “key factor” in either period, it did act as an important diffuser and user. Aircraft are one example of a “complex product system” (Eriksson, 2000: 653). Complex product systems are large items that include a lot of engineering content and are often customized. They are usually made up of various interrelated subsystems and components, and users are often heavily involved in the product innovation process. Complex product systems are rarely mass-produced (Eriksson, 2000: 1-2). During the Keynesian period, the aircraft industry, and its complex products, played an important role in developing and diffusing new technological developments throughout the economy. It also played an important role by providing a key input for the oil-based transportation system and the basis for mass air travel. In the new post-Fordist paradigm, as we shall see, the aircraft industry acted as a user of key technologies such as information technology, electronics, and new materials. It also helped to diffuse some of these technologies, such as new materials, to other sectors of the economy, through backward and forward linkages.

The industry of interest here, the commercial aircraft industry, is concerned with the manufacture of aircraft for civilian passenger and cargo transportation. The structure of the industry can be described as pyramid

shaped, with the top of the pyramid occupied by the prime manufacturers of commercial aircraft. Below the peak of the industry pyramid is a large substructure that feeds the prime manufacturers at the top. This substructure includes other manufacturers of aircraft and other aerospace products, the engine suppliers, major structure suppliers, producers of parts and components, and materials suppliers.

The peak of the industry pyramid is composed of two groups of prime manufacturers. One group consists of the manufacturers of large commercial aircraft. This group is composed of the world's two main large aircraft suppliers - Boeing and Airbus Industrie. The second group consists of manufacturers of commuter and regional aircraft, and it is the second group that is of interest here.

The regional and commuter aircraft manufacturing industry consists of prime manufacturers that supply aircraft for the use of regional and commuter airlines. Generally speaking, such aircraft include both turboprops and jet aircraft in the 15 to 120 seat categories (See Appendix 1 and 2 for a list of current regional and commuter aircraft). The range of these aircraft is anywhere from 450 to 1,700 nautical miles.

Commuter and regional aircraft have gone through a series of stages in their development. The traditional propeller powered commuter and regional airplane has been refined with changes in technology and customer demand. Initially, most aircraft used by commuter and regional airlines were modified

business or private aircraft. For example, the Piper Apache, Piper Aztec, and the Aero Commander were all modified propeller-powered business aircraft. A key technological development occurred in 1964, when Pratt and Whitney Canada introduced the PT6 lightweight turboprop engine. It was an ideal engine for aircraft suited for commuter operations. Two key aircraft that utilized that engine were the 20-seat de Havilland Canada Twin Otter and the 15-seat Beech Aircraft Beech 99. In the U.S., both of these aircraft contributed to rapid commuter airline growth in the 1960s. In the 1970s, larger aircraft started to appear. Key aircraft to appear at this time were the 50-seat de Havilland Dash-7, the 19-seat Swearingen Metro, and the 30-seat Shorts 330. Another period of rapid commuter airline growth in the 1980s led to the introduction of further new designs. The 36-seat Shorts 360, the 19-seat Jetstream 31, and the 19-seat Embraer EMB-110 were all introduced in the early 1980s. The mid to late 1980s saw the introduction of the latest series of commuter/regional aircraft. This included the 19-seat Beech 1900, 34-seat SAAB 340, 36-seat de Havilland Dash-8, 42-seat ATR-42, and the 30-seat Embraer EMB-120. One significant development of the latter half of the 1990s has been the rise of the regional jet sub-niche. While regional jets are not a totally new product, the late 1980s and 1990s has seen a constant rise in interest in 30 to 90 seat regional jets. As we shall see, these aircraft have begun to revolutionize commuter and regional airlines.

Regional and commuter aircraft manufacturers supply their products to the regional and commuter airlines that make up the demand side of the industry.

Regional and commuter airlines provide service between major centres and their outlying communities, between smaller centres and airline hubs, and they provide direct service between smaller centres (Davies and Quastler, 1995: xxi-xxiv, p. 133; French, 1995, pp. 1-3). Airline Business defines a regional airline as “those carriers whose fleet is entirely or mainly composed of aircraft smaller than 100 seats, and fly scheduled services on routes up to 800 km”(Airlines Business, May 1999: 54). The U.S. Federal Aviation Administration defines the regional and commuter airline industry as “those air carriers that provide regularly scheduled passenger service and whose fleets are composed primarily of aircraft having 60 seats or less” (Federal Aviation Administration, 1998: IV-1). In providing services, regional and commuter airlines use smaller equipment that match market demand.

The regional airline industry is a major segment of the world airline industry. In 2000, the top 100 regional carriers carried 192 million passengers with a fleet of 3,033 aircraft. For these carriers, passenger traffic in 2000 was up by 9% over 1997. The average trip length was 530 kilometers in Europe and 451 kilometers in the US (Airline Business, May 2001: 58, 64).

The regional airline industry has a presence in all the major geographic regions of the world. Figure 1 shows the geographic distribution of regional airline traffic in 2000 for the world's top 100 regional carriers. North America and Europe account for over 80% of the traffic, but there are major regional carriers present in the regions of Asia-Pacific, Latin America-Caribbean, and Middle East -Africa.

The commuter and regional aircraft manufacturing industry is unique in that it is one sector of the aerospace

**Figure 2: Country of Manufacture
Turboprops and Regional Jets in Service 2000**

Source: Flight International (29 August - 4 September 2000). World Airliner Census, pp. 54-81

industry where the United States does not dominate¹. In contrast to the large commercial and military aircraft sectors, the U.S. does not play a major role as a supplier of regional and commuter aircraft. Figure 2 shows the percentage distribution of the worldwide commuter and regional aircraft fleet in service as of August 2000 by the country of origin of the manufacturer. As the graph shows, US manufacturers supplied only 15% of the total aircraft in service as of August

¹While the U.S. may not be a major supplier of commuter and regional aircraft, it is a major supplier of components and subsystems that are incorporated into non-U.S. made aircraft. For example, the SAAB 2000 regional turboprop manufactured by SAAB of Sweden contained a high level of U.S. content. The engines, avionics, environmental control system, auxiliary power unit, wheels and brakes, fuel indication system, oxygen system, nose wheel steering, de-icing system, tires, windows, and antennas are some of the components for the SAAB 2000 that were provided by US suppliers. Another example is provided by the new de Havilland DASH-8-400 70-seat turboprop. The aircraft interior,

2000. The only U.S. domestic production is in the 15 to 19 seat turboprop category. In this segment of the industry, two U.S. firms, Fairchild and Beech, were major aircraft suppliers. The U.S. firm Fairchild bought the German manufacturer Dornier in 1996, and this brought a U.S. manufacturer into the 30-seat and up and regional jet segments of the industry. This move did not involve domestic U.S. production as manufacturing activity at Dornier remained at Oberpfaffenhofen, Germany. The firm recently went bankrupt²

While the U.S. does not play a major role as a manufacturer of aircraft in the industry, its domestic airline industry is the leading market

for sales of commuter and regional aircraft in the world. Figure 3 shows the

auxiliary power unit, hydraulic systems, and fuel system are provided by U.S. suppliers. Thus many of the non-U.S. built regional and commuter aircraft have a high level of U.S. content.

² The U.S. tends to attribute the lack of a U.S. presence in all but the lower end of the commuter and regional aircraft industry to several factors. The development of national aircraft industries in other countries that focused on the development and manufacture of commuter and regional aircraft, the inability of U.S. manufacturers to meet the lower costs of foreign producers due to lower labour costs and government subsidies, and the failure of U.S. manufacturers to anticipate the growth in the commuter and regional airline industry after deregulation, all contributed to the lack of a U.S. presence in the industry (U.S. International Trade Administration, 1984: 136-137). Others attributed the lack of U.S. participation to "the residual effects of US regulation" (Kasper, 1987: 34). By regulating airlines based on aircraft size, the demand for commuter and regional aircraft was restricted to airlines that operated smaller aircraft that were not subject to regulation. The U.S. industry concentrated on the general aviation market and adapted these aircraft for regional use. The industry in the United States was therefore inadequately positioned to supply the new and larger aircraft required after deregulation. The shift to larger aircraft after deregulation benefited foreign manufacturers (Kasper, 1987: 16-17, 34-35).

percentage distribution of the worldwide commuter and regional aircraft fleet in service as of November 1998 by the country of the operator of the aircraft. As the graph shows, U.S. carriers operated 37% of the worldwide commuter and regional aircraft fleet. It is commonly believed that a commuter and regional aircraft must have good sales in the U.S. market if it is to be a successful product. Two recent aircraft that had a limited level of success, the SAAB 2000 and the Fokker 50, had minimal sales in the U.S. market. Foreign producers often aim their product at the U.S. airline industry. For example, in September 1998, Embraer launched a 44-seat derivative of its highly successful EMB-145 50-seat regional jet. According to Embraer, once “in production, it is estimated that approximately 80% of the forecasted demand for the new aircraft will reside in the United States regional air transport market” (Embraer, 30 September 1999). The U.S. airline industry is thus the major sales target for non-U.S. based manufacturers. As we shall see, the deregulation of this market opened up major opportunities for commuter and regional aircraft manufacturers.

National Champions, Industrial Policy and Aerospace

During the Keynesian era, national governments often intervened in their aircraft industries, including the commuter and regional aircraft sub-sector, and frequently utilized a national champion strategy in their efforts to develop the industry. Governments supported the development of the industry for military and economic reasons, and the underlying economic characteristics of the industry pushed in favour of a national champion strategy.

Traditionally, governments have had a major role in the development of aviation, both in terms of support for the aircraft industry and the airlines that use the products of that industry:

Along the way, commercial aviation has benefited enormously from policies of government. Government actions brought forth the first air carriers in both Europe and the United States. Major air forces, including Germany's Luftwaffe, played pathbreaking roles in midwifing the jet engine. The U.S. Air Force brought forth the jet airliner, and went on to lay the groundwork for today's wide-bodies, including the Boeing 747. Governments also promoted air safety by taking responsibility for air traffic control. More recently, subsidies from European governments have promoted the growth of Airbus Industrie, now rising rapidly to challenge Boeing for supremacy (Heppenheimer, T. A., 1995: 1)

The keen interest of governments in this sector was initially driven by the industry's links with the military, and the aircraft industry is seen as a strategic industry in a military sense. There are spillovers between the military and civilian parts of the industry. Military aircraft design and production often helps to offset the cyclical changes in the civilian side of the industry. A domestic aircraft industry can also help to enhance national sovereignty by contributing to a level of self-sufficiency in military needs (Tyson, 1992: 157-160; Todd, Simpson, and Humble, 1985: 2, 14-15).

Governments have targeted the aircraft industry for several other reasons. The industry helps to promote high technology development. It is the type of high technology industry that governments were seeking to promote during the Keynesian period and continued to support in the post-Fordist environment. The industry has very technology intensive product design and manufacturing

processes, and it is, therefore, very innovation intensive. It is an industry that undertakes a large amount of research and development and it produces high valued added output. The industry also promotes high quality employment. It is a source of high paid employment as it employs a large number of engineers, technicians, designers, and highly skilled production workers. The industry can also be a major generator of foreign sales. For nations with an aircraft industry, aircraft and other aerospace products can be a major source of high technology exports. Newly industrializing countries can use aerospace as part of a strategy of export-led growth. Governments often support the industry because of the prestige factor. A presence in the industry can be seen to reflect a high level of technological sophistication (Todd, Simpson, and Humble, 1985: 2, 10-11; Hill, 1997: 123-124; Golich, 1992: 910-913). A “Sectoral System of Innovation” often supports growth of the industry, and it commonly includes the aircraft firms, the supplier base, government funding agencies, public research organizations, and the military.

Governments also support the aircraft sector because of the sector's substantial spillover effects into the rest of the economy. Government support for the aircraft industry is, therefore, seen as having a wider payoff beyond the industry itself. The industry acts as a user and diffuser of technologies in the both the Keynesian and post-Fordist techno-economic paradigms. The Japanese, for instance, place a lot of emphasis on the spillover benefits that accrue from the aircraft industry:

Japanese policy-makers see military aerospace and the FSX project in particular as essential to developing a civilian aerospace industry. They look to aerospace to revitalize Japan's heavy industrial sector and spread the benefits of high technology throughout the economy. They believe that aerospace manufacturing has close ties to the machinery, housing, automotive, leisure, and service industries, and commonly compare it to a tree whose "roots" (process technologies) and "fruits" (products) will sustain Japan into the twenty-first century (Samuels and Whipple, 1989: 43-44).

The industry generates both backward and forward linkages into the economy.

Backward linkages refer to the connections between the industry and its supplier base. As a producer of complex products, the aircraft industry utilizes the output of several high technology sectors including electronics, information technology, new materials, and engines. Initial developments in these sectors arose during the Keynesian period, and the aircraft industry played a key role in the development, use, and diffusion of these technologies. These same sectors are now some of the key drivers of the new post-Fordist economic paradigm, and the aircraft industry still plays a key role as user and diffuser of these technologies.

Strong backward linkages can lead to a high level of innovation in the supplier industries and it can act as a catalyst to supplier industry growth. Forward linkages refer to the connections between the industry and its users. Strong linkages between the aircraft industry and its airline customers can lead to the development of aircraft that better meet user needs and, therefore, have better potential for market success and stronger export performance. Aircraft that are designed based on strong links with airline users can also diffuse new technology into the airline sector and provide new or improved aircraft that can stimulate airline industry growth. Through the backward and forward linkages,

the industry can act to diffuse the key technologies into the supplier base and other key industrial sectors (DeBresson, Niosi, Dalpe, and Winer, 1990: 2-5; DeBresson, Niosi, Dalpe, and Winer, 1991: 317-318; Hill, 1997: 125).

The underlying economic characteristics of the industry were the real drivers that pushed for state intervention and a national champion strategy during the Keynesian period. These characteristics made the industry a high risk and high cost industry, and this often led to the choice of a national champion strategy and the adoption of policies to bolster that champion. Through the instrument of the national champion, the government could capture the aforementioned economic and military benefits that accrue from national participation in the aircraft industry.

One of these economic characteristics is the cyclical nature of the industry. The demand for commuter and regional aircraft is closely tied to the demand for commuter and regional air travel. Since air travel demand is heavily

influenced by economic cycles, this is reflected in the demand for commuter aircraft. Figure 4 is a graph that sets out turboprop and regional jet production for the years 1971 to 2000. The cyclical nature of the industry is evident from the graph. The impacts of the economic downturns of the early 1970s, 1980s, and 1990s are evident. The troughs of the production cycle often correspond to periods of crisis for one or more of the aircraft manufacturers.

Governments can assist the industry and its national champion firm by smoothing out the production cycle in several ways. They can exert influence over aircraft purchasing decisions. This instrument is often used in socially managed and statist economies. This influence can extend to the purchasing decisions of airlines and the acquisition of aircraft by government and its agencies. For carriers that are owned by the state, governments can exert influence over their aircraft purchase decisions. For example, in 1985, the Dutch government, owning a controlling interest in KLM, decided that the national flag carrier should buy aircraft from the Dutch manufacturer Fokker. The order was for 10 Fokker 100s with an option for a further 5 aircraft (Aviation Week and Space Technology, 3 June 1985: 71)³.

Governments can also influence demand through their military activities. This can involve the direct purchase of aircraft or the awarding of other military contracts to their regional and commuter aircraft producers. The use of this

³ Another example of influence over purchase decisions is provided by Indonesia. The government-controlled airline Merpati, a domestic Indonesian carrier, has made large purchases of IPTN produced aircraft. IPTN is an Indonesian based commuter and regional aircraft manufacturer. It purchased 22 of the IPTN produced NC-212 Aviocar turboprops,

instrument can be found in socially managed, statist, and liberal regimes. For example, the government can make direct military aircraft acquisitions. For example, in January 1991, the United States Air Force placed an order for 37 Fairchild C-26s, the military version of the Fairchild Metro turboprop. Over the years the U.S. military has ordered 51 C-26 aircraft and optioned another 16 (Jane's Information Group, 1998: 638)⁴. In response to the demand from the military market, most of the commuter and regional aircraft manufacturers offer military versions of their aircraft to tap that market.⁵ The government can also award other military contracts, such as for maintenance and overhaul, to their commuter and regional aircraft producers to help smooth out fluctuations in demand. As we shall see, military procurement has played an important role in the development the Dutch, Brazilian, and Canadian national champions examined here.

Another feature of the commuter and regional aircraft manufacturing industry is the learning curve effects present in the industry. The learning curve phenomenon works to reduce the cost of successive units of output as learning takes place during the production process. The costs associated with the initial units of production are high, but those of successive units decline reflecting the reduction in man-hours required to produce each additional unit as workers become more experienced at their jobs through repetition. This effect is mainly a

31 of the CN-235 turboprops, and it has ordered 15 of the new N-250 turboprop aircraft (Jane's Information Group, 1998: 167, 170, and 192).

⁴ Another example is provided by Indonesia. The armed forces have acquired military versions of turboprop aircraft produced by IPTN. The Indonesian armed forces have purchased 22 of the military version of the NC-212 turboprop and 24 of the military version of the CN-235 turboprop (Jane's Information Group, 1998: 170, 192).

⁵ For example, de Havilland offers two versions of the Dash-8 aircraft, the DASH-8M and the Dash-8 Triton for military purposes. The first is a passenger/cargo version of the aircraft and the second is a navigation trainer version (Jane's

function of production volume, but the level of automation and tooling can also have an influence on the learning curve phenomenon. As production takes place, workers improve their skills and longer production runs allow for the utilization of specialized equipment. An example of this phenomenon has been found at Embraer, where substantial learning curve effects were found in the production of the EMB-120 turboprop aircraft (Frischtak, 1994: 607-610).

The impact of learning on production forces producers to emphasize sales. Higher sales and, therefore, levels of production helps to push firms down the learning curve more quickly and thus reduce production costs. Both learning curve effects and high development costs produce pressures to increase sales, including export sales. As we have seen, government can influence sales by directed purchases. Governments can also support their industry, and back their national champions, by influencing the level of export sales through export financing. Socially managed and statist economies often use such financing to support their industry. Export financing can be in the form of below market rate export loans or loan guarantees for aircraft purchases. Loans and loan guarantees can reduce the cost of financing or allow access to financing that would otherwise not be available. Such financing can become important because sales tend to be lumpy with an airline ordering a large number of aircraft at one time. This lumpiness tends to exacerbate export finance rivalry. As we shall see, export financing has played a major role in the national champion strategies of both Brazil and Canada. Both countries have used export

financing to support their national champions in the commuter and regional aircraft industry. In addition to export financing, government and military purchases can also help aircraft firms increase sales and move down the learning curve.

The regional and commuter aircraft manufacturing industry also faces high development costs and long cost recovery periods. The non-recurring costs of designing, developing, and tooling for a new or derivative commuter or regional aircraft are high and on the rise. For example, the cost of developing the AIR-70, a proposed 70-seat regional jet, was estimated at \$1.2 billion U.S. (Aviation Week and Space Technology, 20 October 1997: 62; Interavia. March 1997: 35). It is estimated to have cost IPTN \$650 million U.S. to develop its 60 to 68 seat N-250 turboprop (Jane's Information Group, 1998: 167). Even the costs of developing derivative aircraft can be high. The cost of developing the 50-seat Embraer EMB-145 regional jet, in part a derivative of the turboprop EMB-120, was estimated to be \$300 million U.S. (Jane's Information Group, 1998: 18). The cost of the 35-seat EMB-135 jet derivative was \$100 million U.S. (Flight International, 24-30 September 1997: 7). High development costs also mean that that these costs can only be recovered if a high production volume is achieved. If the production level is too low, each aircraft will bear a disproportionate share of the development costs or it will take an extended period to recover those costs.

High development costs and long payback periods in the sector have led governments to support their industry and their national firms by extending financial support to the industry for research and development. This assistance can be in the form of grants, repayable loans, or loan guarantees. Such assistance can reduce the cost of R&D or can give the firm access to financing that might otherwise not be available from other sources. Most firms in the commuter and regional aircraft industry have received such support at some point in time. For example, when SAAB was developing the SAAB 340 with Fairchild Industries in the early 1980s, the Swedish government provided SAAB with a loan to help cover R&D costs. This loan, on commercial terms, was for a total amount of 350 million Swedish Krona. The funding was to be repayable by a royalty paid on each aircraft sold after the first 100 (SAAB, 1981: 42). In 1981, the Canadian government provided \$450 million in loan guarantees to government-owned de Havilland to help with financing of the development of the Dash-8-100 (Aviation Week and Space Technology, 9 February 1981: 42). The Dash-8-100 was a competitor of the Saab 340. In addition to direct financial assistance, governments also fund research efforts by government labs and other bodies, such as universities, that can benefit regional and commuter aircraft manufacturers. For example, the National Research Council of Canada developed a noise control system for turboprop aircraft that was developed using the de Havilland Dash-8 (Flight International, 25-31 March 1998: 27). Research and development support has been a major tool used by socially managed, statist, and liberal economies to support their firms in the domestic aircraft industry. As we shall observe, such support has played a key role in the

development of Fokker, Embraer, and Bombardier, the three national champion aircraft firms looked at here.

The above characteristics make the commuter and regional aircraft industry a high cost and high-risk industry. During the Keynesian period, this often moved states to use a national champion strategy because only one large firm was seen to be capable of dealing with the high risks and the high costs. One option for the national champion strategy was for the state to take an ownership stake in the national champion aircraft firm. At one time or another, most of the major aircraft firms have been state-owned enterprises. For example, British Aerospace, ATR partners Aerospatiale and Alenia, and IPTN have all had state owners. As we shall see, all three national champions examined here were at one time partially or fully owned by the state. Only the two U.S. producers, Beech and Fairchild, and SAAB and Dornier have a history with no government ownership.

State owned firms are said to possess both advantages and disadvantages in the aircraft industry. The main advantage for a state owned firm is its ability to overcome entry barriers. The state can raise large amounts of capital for research and development and personnel. It can also be crucial in a strategic fashion by allowing for the deterrence of potential competitors. Commitment, strong financial backing, and the ability to endure losses are key elements in deterring entry, and thus state backing and financing can be a big advantage. Another advantage comes from the potential of the government to

control the home market in favour of the domestic firm. State ownership also has its disadvantages. Restricted hiring practices, a lack of decision-making freedom, difficulty in meeting evolving customer needs, an inability to make long term plans, and red tape are some of the disadvantages that are closely associated with state-owned firms (Ramamurti, 1987: 22-23, 258; White, 1984).

In addition to the use of state-owned firms, some states have taken further action, including the protection of the domestic market, to stimulate their commuter and regional aircraft manufacturing industry. For example, China is currently in the process of developing its regional jet industry and it has taken several measures to help kick-start its industry. In order to purchase an aircraft, Chinese carriers must have government approval, and the government has been slow to give its approval for regional jet orders. It has also imposed a VAT and import duty on regional jet purchases and this has made it difficult for foreign aircraft firms to supply the Chinese market⁶. The government appears to be trying to protect the domestic market so as to prevent a large number of foreign-built regional jets from being purchased by Chinese airlines. This would allow time for domestic projects to develop, and encourage foreign aircraft firms to produce complete aircraft or components in China (Flight International, 29 January - 4 February 2002: 11; Flight International, 29 October - 4 November 2002: 42-44)⁷

⁶ In 2001, China imposed a 17% VAT and a 6% import tax on regional jets (Flight International, 29 January - 4 February 2002: 11).

⁷ Russia is also trying to develop its industry and it has also imposed high taxes as a way to protect the market (Aviation Week and Space Technology, 25 July 1994, p. 35; Flight International, 7 - 13 May 2002, p. 13). In order to stimulate its moribund industry, the government has decided to tender an order from Russian industry for 200 70-80 seat regional jets⁷ (Flight International, 1 - 7 October 2002: 8; Flight International, 19 - 25 November 2002: 13; Flight International, 7-13 January 2003: 10).

In addition to the advantages that come with state support for this industry, such support can also have its drawbacks. The investments associated with the industry are large. New product development and the investment in manufacturing facilities can be quite high. These sums are incurred without any guarantees that the aircraft produced will be successful, and there have been many costly failures in the industry. The industry involves a high level of risk that substantial public investments will lead to little or no return. The public money spent on aerospace could be spent on alternative public investments with less risk that could yield the same or better social returns (Todd, Simpson, and Humble, 1985: 2-3).

Neo-Liberalism, Deregulation and New Opportunities

One of the major policy changes made as the economy was transitioning to the new period of post-Fordism, that had an impact on the commuter and regional aircraft manufacturing industry, was airline deregulation. Deregulation brought the commuter and regional aircraft niche to life and encouraged new entrants into the industry. Further new opportunities also opened up in the regional jet sub-niche, but the pressures in the industry in the late 1980s and 1990s would put pressure on national champions to restructure to survive. This would open up possibilities for state action.

One of the early precursors of the shift towards neo-liberalism was the move to deregulate the airline industry. One of the major elements of the new

neo-liberal paradigm was the deregulation of markets that aimed at introducing more market discipline and flexibility into traditionally regulated industries. Deregulation was seen as vital to increasing flexibility in the airline industry, a key requirement in the new post-Fordist techno-economic paradigm. The move to relax airline regulation started in the United States in the 1970s and it is gradually spreading worldwide. The airline industry was the first sector to be deregulated, and it set a precedent for the deregulatory movement that spread to other sectors in the 1980s and 1990s⁸. This movement removed regulation from sectors traditionally subject to price and/or entry regulation such as transportation and financial services. The move towards a deregulated market had a major impact on the manufacturers of commuter and regional aircraft. Many argue that it was the growth spurred by deregulation or liberalization that led to the development of a multitude of new commuter and regional aircraft and spurred demand for these aircraft in the 1980s and 1990s.

In the United States, the Airline Deregulation Act of 1978 lifted government control over airline industry entry, route entry and exit, and fares. The Act brought about several major changes that had an impact on commuter and regional airlines. In addition to allowing commuter and regional airlines more freedom to enter and exit routes and set fares, the main change was an

⁸ There are two basic approaches to reducing economic regulation of the airlines. One approach can be called deregulation and this generally involves the removal of government controls over price, market entry and exit, and service levels. This is a laissez-faire approach and it basically involves the removal of all economic controls over the industry. The other approach can be termed liberalization. Liberalization does not totally remove government intervention from the airline industry. This approach recognizes that the removal of controls is not sufficient to guarantee competition. For example, in an environment where there are no controls, airlines can still collude between themselves to limit competition on a route. Government intervention is needed to overcome various market failures that limit competition, and liberalization policies therefore "assume the necessity of continued intervention to protect and perpetuate such competition" (Graham, 1995: 55). The United States has followed a deregulatory approach, while many other countries,

increase in the permitted size of commuter aircraft⁹. The move to a deregulated market also led to the introduction of subsidies under the Essential Air Services program that were designed to protect service to small communities in a deregulated environment. Also introduced was a provision allowing for federal equipment loan guarantees for small commuter carriers. This program lasted until 1983 (Davies and Quastler, 1995: 115-120).

One of the major impacts of airline deregulation in the United States on the commuter and regional airline industry resulted from the increased freedom allowed to the major air carriers. The freedom to enter and exit routes led many of the larger airlines to withdraw from low-density markets. They were simply too big, and operated aircraft that were too large, to serve these markets effectively. This opened up many opportunities for the smaller commuter and regional carriers to enter these markets with more appropriate equipment. Small commuter

carriers grew into larger regional carriers. For example, Comair, based in Cincinnati,

such as Japan, Taiwan, and the European Union, have followed a liberalization approach to policy (Graham, 1995: 54-57). Safety regulation is not altered by deregulation or liberalization.

⁹ The seat limit was raised from 30 to 55 seats and the payload restriction was raised from 7,500 to 18,000 pounds. "This relaxation of the size regulations was an abrupt departure from precedent, bringing as it did a host of aircraft types in the 40 to 50 seat class...within reach of the hitherto deprived commuter airlines" (Davies and Quastler, 1995: 115). In 1979, the passenger limit was raised to 60 seats (Davies and Quastler, 1995: 115-120).

started in 1977 with a fleet of 3 small 7-seat turboprop aircraft. By 2000, the airline, by then acquired by Delta airlines, carried 8 million passengers per year and had an all-jet regional aircraft fleet of 100 aircraft, one of the largest regional jet fleets in the world. The other major development to arise from deregulation was the development of hub and spoke networks by the major carriers¹⁰. As these hub operations developed, regional carriers became a crucial element of hub operations by serving short haul and small markets more effectively than the larger carriers. Commuter and regional carriers, therefore, developed a major role providing feed traffic to the hub airports of the major carriers (Kasper, 1987: 21-27).

Deregulation has led to an expansion of the regional and commuter airlines in the United States. As Figure 5 shows, passenger traffic has risen by 462 percent from 11 million passengers in 1978 to 84.6 million passengers in 2000. The number of aircraft in service with regional carriers, as indicated in Figure 6, has more than

doubled from 1,047 in 1978 to 2,271 in 2000. As regulations were eliminated on

¹⁰ A hub is an airport where an airline provides services through a series of arrival and departure banks. Passengers can move quickly between connecting flights in each bank. Through its hub operations, an air carrier can collect passengers from many cities, flow them through the hub, and feed them through connecting flights to a large number of destinations.

the type of aircraft that could be operated by regional and commuter carriers, the size of aircraft rose. Average seating capacity per aircraft has risen from 18.4 passengers in 1986 to 37.9 passengers in 2000 (Aviation Week Group, 1996: 196; Aviation Week Group, 1998: 243; Aviation Week Business Intelligence Service, 2003: 326, 339).

Forecasts for the future development of the U.S. commuter and regional airline industry predict continued growth. The 1998 aviation forecasts of the U.S. Federal Aviation Administration sees

passenger enplanements growing at an average annual rate of 5.5% between 1997 and 2009. As Figure 7 shows, passenger enplanements are expected to rise from 61.9 million to 117.0 million passengers during that time period (Federal Aviation Administration, 1998: IV-14, IX-22). The Agency also predicts that the size of the aircraft fleet of the commuter and regional airlines will grow at an average annual rate of 2.9 percent between 1997 and 2009. During this period, the fleet is expected to grow from 2,121 to 2,996 aircraft (Federal Aviation Administration, 1998: IV-16, IX-23). Finally, the Agency predicts that the composition of the aircraft fleet in terms of aircraft size will continue to reflect the

move towards larger aircraft. Aircraft carrying up to 19 passengers will see their share of the total fleet decline from 50 percent of the fleet in 1997 to 29 percent in 2009. Aircraft carrying 20 or more passengers will see their share of the fleet increase from 50 to 71 percent over that same time period. The number of regional jets with 60 or less seats will grow from 103 aircraft in 1997 to almost 800 in 2009 (Federal Aviation Administration, 1998: IV-16 - IV-17, IX-23).

Pressure to relax the economic regulation of the airlines in Europe started to develop in the early 1980s, partly in response to developments in the United States. In 1982, the European Civil Aviation Conference issued a report that urged movement towards a more open aviation market ¹¹(Aviation Week and Space Technology, 6 September 1982b: 54-55). The first move by the European Commission towards a more open market came in 1983 with approval given to a Council Directive on inter-regional air services that liberalized certain services ¹²(Official Journal of the European Communities, 26 August 1983; Aviation Week and Space Technology, 15 August 1983). Further efforts to liberalize air services within the European Union proceeded on two fronts. One was bilateral in nature, and it involved the negotiation of more liberal bilateral air services agreements between E.U. countries ¹³(Doganis, 1991: 79-82). The other front in the effort to

¹¹ The report highlighted the lack of competition among the airlines in Europe, the existence of the restrictive bilateral agreements between governments, and the pooling arrangements between the airlines (Aviation Week and Space Technology, 6 September 1982b).

¹² This directive applied to airlines flying aircraft with 70 seats or less on journeys within the Community greater than 400 kilometres in length on routes between regional points other than the national capitals and other major hubs. It required states to approve new applications for service unless it could be shown that the infrastructure was incapable of handling the additional service or if the route was already well served by existing direct services. Fares would have to be approved if they were related to costs and did not constitute dumping (Official Journal of the European Communities, 26 August 1983; Aviation Week and Space Technology, 15 August 1983). Because the directive excluded services to the capital city airports and other major hubs, only 14 new services were launched under the Directive by 1986 (Aviation Week and Space Technology, 14 April 1986a: 37).

¹³ It began in 1984 when the United Kingdom started a process of renegotiating its bilateral air agreements with its European partners. It first negotiated a liberalized agreement with the Netherlands, which effectively deregulated services

liberalize was multilateral in nature. It originated at the European Commission and it involved a series of “packages” designed to create the Single Aviation Market¹⁴. The European aviation market was fully deregulated when the “Third Package” was fully implemented in April 1997 (Graham, 1995: 140-143; French, 1995: 44-47; Doganis, 1991: 86-89).

One of the major changes brought about by European airline deregulation is closer links between regional and commuter airlines and the major European carriers. In the aftermath of deregulation, the European majors have moved to strengthen their major national hub airports that provide the gateway to international services and trunk services within Europe. In order to increase feed into the hub airports, such as Amsterdam, the major carriers have found it increasingly beneficial to utilize the commuter and regional carriers to feed traffic from smaller centres to the hubs. Such centres are too small to be economically serviced by the major carriers themselves. Some of the commuter and regional carriers provide services on behalf of several European carriers. These closer links with the majors has spurred commuter and regional airline growth in Europe¹⁵ (French, 1995: 22-41; Graham, 1997: 229-237). In addition to their hub

between the two countries. The agreement allowed for multiple airline designations, open route access, no controls on capacity, and double disapproval of fares. The UK went on to sign more open bilateral agreements with Luxembourg, France, Belgium, Switzerland, and Ireland. Other European states also began to renegotiate their air bilaterals to introduce gradual liberalization (Doganis, 1991: 79-82).

¹⁴ The “First Package” went into effect on January 1, 1988, and it allowed for automatic approval of discount fares, double approval of full fares, multiple designation on country to country routes, and fifth freedom rights (right to fly between one point in one country to another point in another country, with both points being outside the home country) for up to 30% of capacity. Services between hubs and regional airports were also to be permitted. The “Second Package”, that became effective on November 1, 1990, further loosened the restrictions on fares, capacity, airline designations, and market access. It provided for double disapproval of full fares and it relaxed the rules on fifth freedom traffic by allowing such traffic up to 50% of capacity. The “Third Package” went into effect on January 1, 1993 and it was progressively implemented until April 1997. It allowed for free pricing for all fares, full access to all routes between all E.U. countries, full cabotage rights after April 1997 (cabotage being the right to fly between domestic points in another country), and an E.U.-wide “right of establishment” and criteria for licensing new carriers (Graham, 1995: 140-143; French, 1995: 44-47; Doganis, 1991: 86-89).

¹⁵ These closer relationship has been formalized in several different forms. For example, some majors have franchised

feeding operations, the European commuter and regional airlines operate routes between secondary cities that bypass the major hub airports and they have operations that link provincial cities with their national capitals (Graham, 1997: 229-237).

European airline deregulation led to major growth for the commuter and regional airline industry. Traffic carried on the 73 airline members of the European Regional Airline Association increased by 73% from 1993 to 1998. The number of passengers carried steadily rose from 36.2 million in 1993 to 62.6 million in 1998 (ERAA). Average aircraft size in the fleets of Europe's regional and commuter carriers has been increasing, and 12 to 19 seat aircraft have almost disappeared from most fleets (Aviation Week and Space Technology, May 12 1997: 60). Change so far has been somewhat more limited than in the United States in the post-deregulation period¹⁶.

All three of the countries that are the focus of this study deregulated their airline industries in the 1980s and 1990s. Brazil deregulated its industry in 1993, Canada deregulated its industry between 1984 and 1987 (1996 for the North), and the Netherlands deregulated, as part of the European Union, between 1988

their brand to the smaller carriers. For example, CityFlyer Express is a British Airways franchisee providing feed traffic to its London Gatwick hub. Another approach involves the establishment by the major carrier of a wholly owned or majority owned subsidiary. Lufthansa has established Lufthansa Cityline as a wholly owned subsidiary to provide commuter and regional services to its major hub airports.

¹⁶ The idea of a more open airline industry spread not only to Europe, but to other parts of the world as well. The idea met with differing levels of resistance in different parts of the world. In the western area of the Pacific Rim, including Japan, South Korea, Singapore, Taiwan, and Hong Kong, the adoption of a more liberal environment has been greeted with less open arms than in the U.S. or Europe. Japan, South Korea, Taiwan, and Indonesia allow competition on domestic routes. In Australasia, a more open industry has been adopted as the main policy approach. For example, Australia abandoned its two-airline policy, which dated from the 1950s, to adopt domestic deregulation in the 1990s. Small regional airlines in Australia have expanded with strong traffic growth. In South Asia, India has allowed competition on domestic routes and Pakistan has also deregulated the domestic airlines. In Latin America, abrupt deregulation has occurred. Mexico, for example, deregulated its industry in 1991 (Graham, 1995: 189-198, 219-223).

and 1997.

Manufacturers of commuter and regional aircraft were generally supportive of efforts to deregulate air services because they sensed the opening of a new market niche and, therefore, new market opportunities from a deregulated airline industry. For example, when Europe began considering the deregulation of its airline industry in the early to mid-1980s, European manufacturers of regional and commuter aircraft supported the move to liberalize. Basing their position partly on developments in the U.S., the European regional manufacturers supported deregulation because it offered the potential for increased aircraft sales. According to the industry, liberalization would encourage the establishment of new airlines, new routes, and more flights, and it would lead to a change in airline fleet composition as increased frequency favoured the use of smaller aircraft. The European manufacturers actively lobbied for a relaxation of the rules and they particularly wanted no restrictions on airlines operating aircraft of up to 70 seats. They did not favour a limited form of deregulation that only applied to carriers operating aircraft of 30 seats or less because the manufacturers felt that such a move would only benefit the Brazilian firm Embraer, which had a strong presence in that market segment (Aviation Week and Space Technology, 14 April 1986b: 39).

Canadair was supportive of efforts to liberalize the air transportation relationship between Canada and the U.S. when that became an issue in the early 1990s. Canada and the United States launched an effort to liberalize their

transborder air relationship in 1991, and this culminated in the signing of the “Open Skies” agreement in 1995. At the time, the Canadian manufacturer felt that a more open environment would provide increased opportunities for sales of its then newly launched 50-seat Canadair regional jet. During the negotiations leading up to “Open Skies”, Canadair presented analyses to government officials showing the beneficial impact liberalization would have in opening new transborder markets and increasing transborder travel. Canadair estimated that “Open Skies” would generate an additional 13 million passengers between 1992 and the end of the century. By the year 2000, transborder traffic would be 24% higher than it would be under a continuation of the then existing restrictive agreement. More than two-thirds of the new nonstop jet markets that would develop, would be suitable for a 50-seat regional jet, and this represented a fleet of approximately 55 to 60 new Canadair regional jets (Canadair Regional Jet Division, 1991: 1-7).

Deregulation is widely seen as expanding the opportunities available to commuter and regional airlines and, therefore, bringing the commuter and regional aircraft niche alive by stimulating demand for regional aircraft. Many new commuter and regional aircraft were launched in the years following the passage of the U.S. Airline Deregulation Act in 1978. Appendix 3 shows the life span of the 30 most used regional turboprops and the 14 most used regional jets from 1950 to 1999. As the figure indicates, more than half (16 out of 30) of the turboprops and virtually all of the regional jets (13 out of 14) were launched after 1978. Deregulation of the U.S. market, the world’s largest for commuter and

regional aircraft, provided a major impetus for the manufacturers to introduce new models.

In the post 1978 deregulated environment, governments and their national champion aerospace firms saw opportunities to enter into or expand existing activities in the thriving regional and commuter aircraft niche. For example, the state owned national champions in France and Italy, Aerospatiale and Alenia, entered the regional and commuter aircraft industry in 1980, through the formation of the ATR consortium. Many of the new aircraft that were developed in the years after 1980 had state support. For example, SAAB received government loans to support the development of the SAAB 340 (Saab, 1981: 42). This increasing interest in the industry on the part of national champion firms and their governments resulted in an increase in the number of industry players. During the 1980s and 1990s, there were thirteen major firms in the industry. These manufacturers were based in the United States, France, Canada, Sweden, Spain, The Netherlands, Northern Ireland, Britain, Germany, Brazil, and Indonesia. As Figure 8 shows, the number and types of firms in the industry were diverse.

In all of the three cases examined here, the national champion firm saw opportunities in, and responded to, the deregulation of the airline industry. This was especially the case for the world's largest market, the United States, where all three manufacturers saw major new market opportunities.

Figure 8

FIRMS IN THE COMMUTER AND REGIONAL AIRCRAFT MANUFACTURING INDUSTRY

ATR - A consortium formed in July 1980 by Aerospatiale of France and Alenia of Italy to produce and market a line of commuter aircraft. Current products include the 50-seat ATR-42 and the 74-seat ATR-72. The consortium is based in Toulouse, France.

Beech Aircraft Corporation - Founded in 1932, the Beech Aircraft Corporation is based in Wichita, Kansas. Current products include the 15-seat King Air series and the 19-seat Beech 1900 series of aircraft. In 1980, the company was taken over by Raytheon Aircraft Corporation.

British Aerospace - British Aerospace produced a line of turboprop aircraft that included the 50-seat BAe 748 and its successor the 64-seat ATP (also known as the Jetstream 61), the 19-seat Jetstream 31, and the 30-seat Jetstream 41. Production of all turboprop types was ended in the 1990s. The current product line of BAe is its Avro series of regional jets. Based on the 100-seat BAe 146 jet designed in the 1970s, the Avro four-engined regional jet family covers the 94-115 seat range with 4 different aircraft (RJ70, RJ85, RJ100, RJ115). Turboprop production was located at Prestwick, Scotland, and regional jet production is located at Woodford in the United Kingdom. Regional jet production was ended in 2001 with the termination of the RJX program.

Canadair - Founded in 1944, Canadair entered the regional aircraft market in 1991 with the first flight of the 50-seat Canadair Regional Jet (CRJ). A 70-seat stretched version of the CRJ, the CRJ-700, entered service in January 2001. A 90-seat derivative, the CRJ-900, entered service in January 2003. Based in Dorval, Quebec, Canadair is part of the Bombardier Aerospace Group.

CASA - Construcciones Aeronauticas SA (CASA) was founded in 1923 and is based in Spain. It designed and built the 23 to 26 seat CASA C-212 Aviocar. It currently produces the 44-seat CASA CN-235 turboprop with IPTN of Indonesia.

de Havilland Canada - Toronto-based manufacturer that produces a family of turbo-prop commuter aircraft. De Havilland has had a long history of involvement in the commuter and regional aircraft industry. It produced the 19-seat Twin Otter and the 50-seat Dash-7. Its current family includes the 36-seat Dash-8-100/200 and the 50-60 seat Dash 8-300. The company's latest product, the 70-seat Dash-8-400, was introduced into service in January 2000. De Havilland is part of the Bombardier Aerospace Group.

Dornier - Formed by Claude Dornier in 1922, Dornier launched itself into the commuter and regional aircraft industry in 1981 with the first flight of the 15-seat Dornier 228 turboprop. The company's line included the 34-seat Dornier 328 and the 34-seat Dornier 328Jet. Dornier had plans for a family of larger regional jet aircraft. The family was to be based on the 70-seat Dornier 728Jet and the 100-seat Dornier 928Jet. The 728Jet was rolled out in May 2002. The company's major facilities were in Oberpfaffenhofen, Germany. In 1985 Daimler-Benz acquired a majority shareholding in the company from the Dornier family. In 1990, Fairchild Aerospace of San Antonio, Texas acquired an 80 percent interest in Dornier. Fairchild Dornier went bankrupt in 2002.

Embraer - Based in Sao Jose dos Campos in Brazil, Embraer entered the commuter market in 1972 with the 19 to 21 seat turboprop EMB-110 Bandeirante. The company's current product line includes the 30 seat EMB-120 Brasilia turboprop, the 50-seat EMB-145 Regional Jet, and the 35-seat EMB-135 Regional Jet. A new Embraer family of small jets, the 70-seat Embraer 170, the 78-seat Embraer 175, the 94-seat Embraer 190, and the 106-seat Embraer 195, is currently under development. The first flight of the first member of the new family, the Embraer 170, took place in February 2002. The firm was established by the Brazilian government in 1969, but it was sold to private investors in 1994.

Fairchild - Based in San Antonio, Texas, Fairchild produced the 19-seat Metro turboprop. The aircraft was first flown in August 1969. In 1990, Fairchild acquired 80 percent of the German aircraft manufacturer Dornier.

Fokker - Founded by Anthony Fokker in 1919, Royal Netherlands Aircraft Factories NV Fokker has a long history of involvement in the commuter and regional aircraft industry. The 40 to 50-seat Fokker F27 turboprop first flew in 1955 and the 65 to 85 seat F28 jet first flew in 1967. Both aircraft were taken out of production in the 1980s. The company's most recent products included the 50-seat Fokker 50 turboprop, the 109-seat Fokker 100 jet and the 80-seat Fokker 70 jet. Fokker declared bankruptcy in 1996 and is no longer producing aircraft.

IPTN - Founded in 1976 by the Indonesian government, PT Industri Pesawat Terbang Nurtanio (IPTN) has produced the 23-26 seat C-212 Aviocar under license from CASA of Spain since 1976. It also has a joint venture with CASA known as Airtech that developed and produced the 44-seat CN-235 turboprop. That aircraft first flew in 1983. IPTN entered a more independent stage of development in 1989 when it announced the 64-seat IPTN N-250 turboprop. The aircraft first flew in 1996. In 1994, IPTN announced a 10-year program to develop a family of regional jets based on the IPTN N-2130 104 passenger twinjet. The company's facilities are located in Bandung, Indonesia.

SAAB - Founded in 1937, SAAB entered the commuter and regional aircraft industry in 1983 with the first flight of the 37-seat SAAB 340. Its current product line includes the Saab 340 and the 50-seat SAAB 2000. Based in Linköping, Sweden, SAAB announced its intention to withdraw from commuter and regional aircraft manufacturing in 1999.

Short Brothers - Based in Belfast, Northern Ireland, Short Brothers produced the 30-seat Shorts 330 turboprop that had its first flight in 1974. It also produced the 36-seat Shorts 360 turboprop that was introduced in 1982. Established in 1908, Short Brothers was acquired by the Bombardier Group in 1989. The company no longer produces commuter and regional aircraft, but it supplies components to Bombardier.

MAJOR REGIONAL AND COMMUTER AIRCRAFT MANUFACTURERS IN THE 1990s

BOMBARDIER
AEROSPACE

FAIRCHILD
DORNIER

BRITISH AEROSPACE
Regional Aircraft

AR

Raytheon Aircraft

Beech
Hawker

EMBRAER

One new sub-niche that emerged in the 1990s, and had a major influence on the regional and commuter aircraft industry, was the emergence of the regional jet. The large-scale emergence of the regional jet market in the 1990s opened up major opportunities for industry players. Regional jets are not a new phenomenon. As we shall see, in 1969, Fokker introduced its Fokker F-28 Fellowship, which was a 85-seat regional jet. In 1975, VFW-Fokker introduced a strange looking aircraft with engines mounted on the top of the wing. This aircraft, known as the VFW-Fokker 614, was a 40-seat regional jet. While the Fokker F-28 was a success with 241 aircraft delivered by the time production stopped in 1987, the 614 was a failure with only 19 aircraft produced (Air International, February 1995).

The 1980s and 1990s have witnessed a renewed level of interest in regional jets. At first, the focus was on the 70 to 120 seat category. During the late 1980s and early 1990s, there were several proposals for new regional jets in that seat range. Many of these projects had Asia as their focus, with attempts made to get Asian partners involved in the programs. Of all the aircraft proposed, none were actually built (Interavia, August 1990: 635-639). The 1990s has seen an increased focus on the 30 to 70 seat regional jet. In this category, there has been a takeoff of regional jet production and sales. Canadair started things rolling with its 50-seat Canadair regional jet, which was introduced into service in November 1992. Embraer followed suit with its 50-seat EMB-145 in 1996. In 1999, both Embraer and Fairchild Dornier introduced 30-seat regional jets into airline service, and Canadair began the certification process for

its 70-seat CRJ. The late 1990s saw a further shift in focus towards the 70 to 100 seat market. Fairchild-Dornier, Embraer, Bombardier, and British Aerospace all launched projects in this market segment. Fairchild-Dornier and Embraer launched all new designs, the Dornier 728/928 family (70/100 seats) and the Embraer 170/190 (70/100 seats) family respectively, but Bombardier cancelled its all-new design, the BRJ-X, and settled for a stretched CRJ-900. British Aerospace updated its older 100-seat RJ into the RJX-100. In this market segment, the regional aircraft manufacturers run up against the large aircraft manufacturers - Airbus and Boeing. Both of these latter companies are in the 100 seat market with, respectively, the Airbus A-318 and the Boeing 717 (Air International, October 2001: 246-250; Avmark Aviation Economist, April 1999: 8-11).

Figure 9 shows a graph of commuter and regional turboprop and jet aircraft sales for the years 1988 to 2000. As the figure shows, the rise of the

regional jet has harmed another niche in the commuter and regional aircraft manufacturing sector, namely, the turboprop sector. Sales of turboprops fell dramatically in the early 1990s and regional jet sales started to pick up steam in the second half of the period. Regional jet sales surpassed those of the turboprop in 1997, and the turboprop has not been able to regain any of the sales lost in the early 1990s.

The rise of the regional jet has stirred a big debate in the industry. The big questions relate to the economics of the regional jet and the implications of the jet for the future of the turboprop. Turboprop manufacturers such as SAAB argued that the regional jet is more costly to operate on typical commuter and regional routes when compared to a similar turboprop. On typical routes, the advantage in time savings from the higher speed of jets would not offset the higher operating costs. SAAB's answer, the fast turboprop 50-seat SAAB 2000, which offered near jet speeds with the economics of a turboprop, was not able to hold its own against the regional jets. Introduced into service in 1995, SAAB ceased production of the aircraft in 1999 after only 63 were produced. Evidence to date seems to indicate that few regional jets are replacing turboprop aircraft. Most have been used to start up new routes and replace existing jet equipment with more suitable aircraft. Some have been used to supplement existing turboprop operations. What seems to be clear is that passengers have a preference for jets over turboprops, in part because turboprops have an image of being old technology. The rise of the regional jet has set off a round of severe competition in the industry and seems set to attract more players to the game

(Flight International, 4 March 1989: 42-44; Flight International, 5 - 11 March 1997: 25-26; Flight International, 11 - 17 February 1998: 27; Interavia, May 1998: 34-37).

The introduction of the small regional jet in the 1990s revolutionized the commuter and regional airline industry. Through the introduction of these new aircraft, the commuter and regional aircraft manufacturers helped to diffuse jet powered aircraft technology down to the regional airline sector. It opened up opportunities for regional carriers to build on deregulation by allowing for more flexible airline operations, a crucial element of the post-Fordist techno-economic paradigm. Their longer range, far longer than most turboprops, has opened up a much wider catchment area for regional airlines. Regional jets also allow the smaller carriers to offer a standard of service closer to that of the major carriers. The regional jet has led to a new “paradigm of growth” for the industry:

The jets are providing a new paradigm of growth and are acting as a springboard for the industry. Long, narrow routes never served by airlines before are now possible. Regional airlines are also better able to fine-tune their major airline partners’ schedules with off peak jet service. Also, because the speed of these jets significantly surpasses turboprop aircraft, regional airlines can build hubs with additional connecting banks, boosting revenue (Warburg Dillon Read, August 1998: 4)

Despite the growing popularity of regional jets, turboprops will always have a place in the regional airline industry. Continuing demand for service from communities too small to support jet service, runway limitations at many small airports that prevent regional jet use, and the good short haul economics of the

turboprop are all factors that point to a continuing need for turboprops in commuter and regional airline fleets. Nonetheless, the emergence of the regional jet market has put pressure on governments and their aircraft industry either to enter the market or deal with the downsizing of the turbo-prop segment.

With industry restructuring and the rise of the regional jet, European industry has come under major pressure. Up until the early 1990s, the major centre of world production in the commuter and regional aircraft industry was Europe. Of the 13 major firms active in the industry in the 1980s, 7 were based in Europe. Figure 10 shows the percentage share of world production attributable to European firms between 1971 and 2000. During these years, Europe accounted for approximately 50% of all turboprop production and 70 % of all regional jet production. Up until the introduction of the new generation of regional jets in the early 1990s, European firms produced 100% of the regional

**Figure 10: Europe: Share of World Production
1971-2000**

Source: Airclaims (2003). Turbine Airliner Fleet Survey, Sections 5A & 5B

jets sold on the world market.

Europe's decline began in the early 1990s and it was due to two main factors. First, several European firms withdrew from the industry. As we shall see, Fokker ceased production of regional jets and turboprops in 1996. British Aerospace also phased out turboprop production during the 1990s, as did SAAB in early 1999. Second, European firms were slow to react to the rise of the new generation of regional jets. Despite several years of talking about launching a new generation of jets, European firms did not move forward to launch a new program. As the chapter on the Netherlands will show, the Fokker series of regional jets ceased production with the bankruptcy of Fokker. Until recently, BAe was the only producer of regional jets in Europe. Fairchild-Dornier entered the market with its 34-seat Dornier 328 Jet in 1998. It also launched the 70-seat Dornier 728 and 100-seat Dornier 928 aircraft, but it faced stiff competition from competitors that emerged outside Europe. The recent bankruptcy of Fairchild-Dornier brought into question the future of the latter two programs. British Aerospace ended regional jet production in 2001.

The case studies examined here will show that the rise and development of the regional jet had a major impact on the three national champion firms. The Dutch national champion, Fokker, pioneered the regional jet field in the 1960s, but it would be undone by its attempt to develop new regional jet aircraft in the 1980s and 1990s. The national champions of Canada and Brazil, on the other

hand, can attribute a good portion of their success in the 1980s and 1990s to their success in tackling the regional jet market.

Industry pressures in the 1990s have also forced the industry players to review their business model, and new opportunities were opening for those firms or national champions that could adopt their model to the new realities. There was a major effort in the industry to reform and re-organize production. This was done in line with the ideas of the new techno-economic paradigm. Lean production, risk sharing partnerships, and international alliances became standard tools for success (Summerfield, 1994).

One of the key developments was a major process of firm reorganization within the industry, as firms struggled to improve their viability. As P. H. Summerfield, Managing Director of Operations at Avro International Aerospace, the regional aircraft arm of British Aerospace, has pointed out, regional aircraft manufacturers would have to undergo a process of change to meet changing conditions:

Representing a significant and highly demanding, sector of the global aerospace industry, the regional jet business has to recognize the need for radical and fundamental structural change if it is to meet this competition head-on and capitalize on new market opportunities. Such change has to include reduction in excess manufacturing capacity through strategic alliances or joint ventures and the adoption of cost reduction policies of the kind so successfully applied by leading edge motor vehicle and electronics companies. The major business drivers for the regional aerospace industry for the rest of the 1990s will focus on cost-of-ownership and product efficiency, while introducing business infrastructures which are capable of reacting rapidly and in a cost-effective way to the increasing market demands for new product development

(Summerfield, 1994: 367)

British Aerospace, for example, launched a major reorganization of its regional aircraft activities in 1992 that resulted in a one-time charge of 750 million pounds. The company announced its intention to consolidate its regional jet and turboprop production operations at two manufacturing centers (Woodford, Prestwick), its intention to sell 50 percent of its regional jet program to Taiwan Aerospace Corporation in a joint venture, and other changes to help improve production efficiency (British Aerospace, 1993:12). It set out to reorganize its production process towards a "lean production" model. It moved to reduce production lead time, reduce work-in-process inventories, reform the supply chain, and adopt a team work approach in manufacturing ¹⁷(Flight International, 7 - 13 September 1994: 50; Flight International, 26 August - 1 September 1998: 36)

¹⁷ Other firms also underwent restructuring. For example, SAAB-Scania embarked on a major reorganization and restructuring of SAAB Aircraft AB. This restructuring involved a major change in company production philosophy:

Together with reductions in the workforce, a cost-cutting program is in progress covering the whole chain from development and design to delivery. This necessitates a radical change in philosophy and completely new production systems. The goal is to reduce throughput times, increase flexibility, i.e. increase or decrease the production rate at short notice, improve efficiency in production hours per aircraft, raise delivery precision and reduce capital tied up. Subcontractors are also affected by the program. During the year projects were initiated comprising over 50 percent of the purchase volume....The lean production program has been inaugurated in all production areas and is now rapidly being implemented to its full extent. The program is designed to improve competitiveness in the international market (SAAB-Scania Holdings Group, 1993: 19).

The restructuring programs in the industry were designed to adjust production to the lower levels of demand and allow firms to meet future changes in demand with an efficient and flexible production structure in place.

Boeing also launched a major production reform effort to improve the competitiveness of its smallest jet, the 100-seat Boeing 717, that will compete with the new generation of 90 plus seat regional jets. Boeing has introduced a moving final assembly line for the 717 modeled after the Toyota production system. The company also launched a major effort to improve the design of components and improve production methods. The new approach aimed to cut production lead time for the aircraft by more than 50%, improve quality, and lower costs (Aviation Week and Space Technology, 9 August 1999a: 44, 65; Aviation Week and Space Technology, 19 June 2000: 43; Aviation Week and Space Technology, 30 October 2000: 56-58; Flight International, 11 - 17 January 2000: 13; Flight International, 27 March - 2 April 2001: 36-37)

Another gradual change that has been occurring is the increasing internationalization of the industry. This trend is in line with the thinking behind the new post-Fordist paradigm. While the industry has always had some element of international participation, rising development costs have been the catalyst that has led to an increase in the internationalization of production. A commuter and regional aircraft manufacturer does not produce all of the major components and systems that combine to produce a given aircraft. A supplier base is used to provide components and systems, and this supplier base often spans various parts of the globe. For example, the new de Havilland Dash-8-400 has its 22 major components and systems supplied by 22 different suppliers located in 6 different countries. For example, Canadair of Montreal builds the wing and nose sections, Mitsubishi of Japan builds the fuselage, Sextant Avionique of France provides the avionics, and Microrechnica of Italy supplies the flap system (Flight International, 9 - 15 September 1998: 78). The Embraer EMB-145 has its 26 major components and systems provided by 25 different suppliers from 9 countries. For example, Liebherr-Aero-Technik of Germany supplies the nose landing gear and flaps, Honeywell provides the avionics, and Vibrometer of Switzerland supplies the central maintenance computer (Commuter World, 1995: 8).

As we saw earlier, the cost of developing new aircraft has been rising. This has led the commuter and regional aircraft manufacturers to use risk-sharing partners on their projects. Many of the suppliers for the Dash-8-400 and the EMB-145 are in fact risk-sharing partners. The risk-sharing partners are

involved in the development of their component or system and, therefore, contribute part of the development funds for the aircraft. Risk sharing partners provided 40% of the \$100 million U.S. in development cost needed to produce the 35-seat EMB-135 regional jet (Flight International, 24 - 30 September 1997: 7).

Another way in which internationalization has affected the industry has been the movement towards the formation of international consortia, joint ventures, and mergers. Much of this activity is driven by the need to reduce costs, especially that required for new programme development. Most of these efforts end in failure. The only successful joint venture to date in the regional and commuter aircraft industry is ATR. While there is only one successful joint venture, there were a multitude of unsuccessful ones. In 1993, British Aerospace (BAe) and Taiwan Aerospace concluded an agreement to create a joint venture company to take over BAe's regional jet business. That agreement fell apart in 1994 (Aviation Week and Space Technology, 25 January 1993: 53; Flight International 30 August - 5 September 1995: 23). In 1996, Aerospatiale, Alenia, and British Aerospace formed Aero International Regional (AIR) to market and develop regional aircraft. In mid-1998, the AIR partnership ended because of a failure to commit to the development of a new regional jet (Aviation Week and Space Technology, 1 January 1996: 20; Flight International, 22-28 July 1998: 42). Many times, alliances or consortia are used as part of a

jockeying process within the industry over new aircraft programs¹⁸. Alliances were evident in the jockeying to build 80 to 120 seat regional aircraft in the 1990s. Several alliances competed with different proposals, but in the end no new regional jet was built (Aviation Week and Space Technology, 3 July 1995: 27-28; Flight International, 3 - 9 July 1991a: 32-33).

As we shall see in the following chapters, the ability to improve performance by adopting a new approach to the business on the part of the national champion was an important element that influenced policy, especially in the case of the Netherlands and Canada. The Dutch national champion, Fokker, had difficulty in its attempt to adopt a new approach, while Canada's national champion, Bombardier, prospered on such efforts.

Difficulties In the late 1980s and the 1990s

As was previously indicated, the period between the late 1980s and the mid-1990s was a period of difficulties for the commuter and regional aircraft manufacturing industry. The airline industry was particularly hard hit by the economic recession that began in the late 1980s, and that downturn was

¹⁸ The existence of various proposed "paper" aircraft projects has led to competition between firms and countries to become partners in such projects. Essentially, a paper airplane is just that - a airplane that is defined on paper. The project has not reached the stage where detailed development or a prototype or production model has been produced. For example, CASA of Spain had a proposed 70-seat turboprop airplane known as the CASA 3000 (Flight International, 2 - 8 October 1991a: 10). It was defined and specifications were developed on paper, but no prototypes were ever built. Many times "paper" aircraft are put forward "as bargaining counters to gain access to alliance negotiations" (Flight International, 17-23 February 1993: 42). An example of this was provided in the Asian market, where a contest developed to get involved in a regional airliner program for the Asian market. There was the German and Chinese project for a 60 to 85-seat regional jet known as the MPC-75. Then there was a new German-Chinese twinjet known as the FA-X (Future Aircraft-X). There was also a joint Aerospatiale - Alenia proposal for a 100-seat jet known as the AS-100. None of these aircraft got beyond the stage of paper specifications and into production (for a good summary of the Asian regional jet proposals see Walters (1996).

compounded by the impacts of the Persian Gulf Crisis of 1991. The impact on the commuter and regional aircraft industry was dramatic as sales of turbo-prop and regional jet aircraft fell dramatically. Sales reached a peak in 1989, when 871 turboprop and regional jet aircraft were sold on world markets (Avmark Aviation Economist, January 1991: 16; Avmark Aviation Economist, May 1991: 11). By 1992, sales had dropped by 70%. In that year, sales of turboprop and regional aircraft totaled only 276 aircraft (Avmark Aviation Economist, January/February 1994: 4; Avmark Aviation Economist, March 1994: 5).

The decline in market demand led to a major crisis in the industry and accelerated changes that were already getting under way. Most manufacturers endured cost-cutting, layoffs, and production cuts. Profitability in the industry suffered. "Chronic manufacturing overcapacity and a steep downturn in order inflow combined to push the whole regional aircraft industry into heavy loss worldwide"(British Aerospace, 1993: 2). For example, British Aerospace's Commercial aircraft activities suffered a loss of 56 million pounds in 1991 and 410 million ponds in 1992. Most of these losses were attributable to its regional aircraft activities (British Aerospace, 1993: 2, 26). SAAB-Scania attributed the problems of SAAB Aircraft AB as being due to cyclical and structural factors. The cyclical factors were those associated with the recession and the drop in demand. The structural factors were due to "strong political interests in the industry, which distorts competition and preserves a structure with too many actors supported by government subsidies"(Saab-Scania Holdings Group, 1994: 5).

This crisis also occurred at a time when state finances were under pressure. Many countries experienced severe public deficit problems in the 1990s, which limited the state's ability to maneuver. When faced with a situation of limited or reduced resources, states had to make some tough choices as to priorities. State funding for the aircraft industry had to compete for funding with other social and economic priorities. The financial difficulties facing a state often played a crucial role in decisions made to transfer a national aircraft manufacturer to the private sector, as the crisis prevented the state from providing needed capital or operating funds.

The crisis of the early 1990s brought to the forefront the overcapacity problem in the industry and the over-crowded nature of the market. Several manufacturers were old and established players in the industry, having produced commuter and regional aircraft since the late 1950s. This group included Fokker, British Aerospace, Short Brothers, Embraer, Beech and Fairchild. The 1980s witnessed an influx of new manufacturers, and this new group included ATR, IPTN, SAAB, and Canadair.

The over-crowding was particularly evident in the turboprop sector. Between 1980 and 1996, turboprop commuter aircraft production totaled 5,239 aircraft. The average annual production over the 17-year period was therefore 308 aircraft. This level of production was shared between 12 manufacturers offering all together between 16 and 18 different models. There were clearly too

many aircraft available for the given production levels. The problems in this sector become evident during periods of downturn:

The 19-70 seater turboprop market is relatively small but overcrowded - currently about 20 different aircraft types are being offered. Fierce competition has depressed prices and thrown doubts on the validity of many programmes. Unlike the major jet manufacturers, turboprop manufacturers are not cushioned against recession by huge order backlogs - most can offer immediate deliveries. Consequently, the past two years' order slump has created havoc in an industry sector that has never been very profitable even in the best of times (The Avmark Aviation Economist, 1992: 13)

The problem is not as acute in the regional jet sector. In the years before 1990, there were two manufacturers of regional jets. These were British Aerospace and Fokker, and they concentrated in the 70 to 100 seat market. In the 1990s, the small regional jet market came alive with three manufacturers present: Canadair, Embraer, and Dornier. So far, rising aircraft sales have provided room for each of the manufacturers.

In the past, there have been periods when an influx of manufacturers into a specific seat sub-range of the commuter and regional aircraft industry threatened to lead to over capacity. In the early 1990s, manufacturers were focused on the 80 to 130 seat aircraft range. No fewer than six manufacturers (British Aerospace, Airbus, Boeing, McDonnell Douglas, Fokker, and Deutsche Aerospace) were proposing projects in this seat category (Interavia, August 1991). In the mid-1990s, attention switched to 50 to 80 seat aircraft. Six manufacturers (ATR, British Aerospace, de Havilland, CASA, IPTN, and Embraer) proposed projects in this category (Flight International, 12-18 May 1993b: 38-39; Aviation Week and Space Technology, 21 June 1993: 27; Flight

International, 30 June - 6 July 1993: 32-33). In the late 1990s, large regional jets have become the focus of attention. Eight manufacturers (Canadair, Fairchild Dornier, Embraer, ATR, a revived Fokker, British Aerospace, Boeing, and Airbus) proposed to launch projects in this seat range (Flight International, 23 - 29 September 1998: 28-29). If all of the projects had been launched as proposed, there would have been a substantial degree of excess capacity in the industry. Many of the projects remained on the drawing board and were never produced.

Advocates of neo-liberalism feel that there is too much state intervention in the aerospace industry. One of the outcomes they predict from such intervention is the overcapacity problems that have plagued the industry. They object to government involvement in the industry through industrial policy. The market for civil aircraft is imperfect because of government intervention in both the airline industry and the aircraft manufacturing industry. The state has an obligation to create "a civil aircraft market in which consumers can express their preferences"(Hartley, 1974: 58). Governments should cease to have a decision-making, financing and risk-sharing role in the civil sector. All restrictions should be removed from the airlines so that they are free to buy the aircraft that meets their needs. Governments should stop providing launch aid to support the development of civil aircraft projects. Private firms would then be the sole decision makers and would base their decisions on profitability (Hartley, 1974: 58-64). Many liberals argue that state support for the aircraft industry leads to an oversupply situation in the market. "Every country which makes ships or aircraft is busy subsidizing so that inevitably the world is likely to have more aircraft and

ships than it wants or is anxious to buy” (Jewkes, 1972: 9). The new technoeconomic paradigm requires a flexible response on the part of the industry. It should be allowed to function according to the dictates of market forces, with the market weeding out those firms that are inefficient. This would lead to an optimally structured industry. As we have seen, others have argued that neoliberalism’s “letting the cards fall where they may” is not the best option for policy.

The State and Policy Options in the Commuter and Regional Aircraft Manufacturing Sector

There are several options available to a state and its firms when they are considering a role for themselves in the international aircraft industry. They can, of course, choose to remain outside of the industry and leave the business for other countries and other firms. While there are many potential rewards from being involved in the industry, including jobs, exports, and technology, a country and its firms could decide that the risks, especially in terms of financial costs, outweigh the benefits, and they could, therefore, decide to remain outside the industry. A country could also enter the industry as a supplier of parts for the minor and major aircraft producers. In this role, the nation’s firms would simply act as parts manufacturers and would not be involved in research, development, and design (Scott and Creighton, 1994: 67-69). With these first two options, states and the national economy would not capture many of the crucial technological and economy-wide benefits that come from the new technoeconomic paradigm

Four other options are available that would allow the state, the firm and the national economy to capture, in a graduated fashion, the crucial technological and economy-wide benefits associated with the new economy. The first of these options would see the country seek to become significant sub-contractors to the big manufacturers. This option allows a country's industry to gain access to technology without the risk of seeking to manufacture an entire aircraft. It could allow for a role in the design and development of major subassemblies, such as propulsion or avionics. As more and more prime manufacturers increase their sub-contracting activity, opportunities for this type of industry involvement are growing. The second option would see a country's firms enter the industry as risk sharing partners or through risk and profit-sharing joint ventures. With this option, national firms would assume part of the financing and risk for an aircraft project being undertaken by a prime manufacturer. Often, the national firm will take responsibility for the development, design, and production of a specific subassembly. With the increasing costs of developing new aircraft, aircraft manufacturers the world over are increasing their use of risk sharing partners. Opportunities to become risk-sharing partners are, therefore, increasing. A third option would see the country's manufacturers join up with an international consortium to develop an aircraft project. In other words, several firms from different countries would form a grouping to share the risks on a new aircraft program. This is the "multinational champion" strategy. The final option would see the national firm act as a prime manufacturer or integrator. In this role, it designs, develops, manufactures and finances new airplane projects, with

or without the use of subcontractors or risk-sharing partners (Scott and Creighton, 1994: 67-69).

States may choose different approaches to the industry depending on their historical policy path. Neo-institutionalists would predict that countries would continue along their chosen industrial policy path in the commuter and regional aircraft manufacturing industry once it had been established. With the exception of minor path-dependent incremental changes, crisis and changes in government would not be able to overcome the inertia associated with the historical path. A liberal market economy would be the least interfering and it would utilize those policy instruments that might create a suitable framework for activity in the commuter and regional aircraft manufacturing industry. It would have policies respecting research and development and it may use military procurement and contracts to assist its industry. It would avoid other more interventionist approaches. The policies would be implemented in a neutral fashion and not in favour of building up a national champion firm. If such a firm were to develop in the industry, it would have to do so naturally and without government support. A liberal state would not establish a state owned national champion and use all the direct means at its disposal to support that firm.

A liberal state, such as Canada, is likely to be indifferent to the role played by the nation's firms in the industry. Since a liberal state relies on the market for a response to economic change and pressure, it would be content to let the market decide the role that the country and its firms will play in the industry. If

the market decides that the country, given its endowments, should play the role of parts supplier, the liberal state would not interfere. It would not provide support for national firms in order that they may play a specific role in the industry. During times of change, the market would decide the outcome. In the case of Canada, therefore, we might expect the government to allow market forces to dictate the future of its industry.

A state with a more 'statist' approach to economic policy, such as Brazil, might want to use state power to influence the role that the nation's firms play in the industry. Such a state would utilize all of the policy instruments at its disposal in a deliberate strategy to develop a national champion firm in the regional and commuter aircraft industry. It would not hesitate to establish a state-owned national champion firm, and use all the direct and indirect means at its disposal, such as export financing, R&D subsidies, and directed procurement, to support its national champion firm. Such an economy might utilize domestic market protection to provide an incubation period for the development of the domestic industry. It could also use the demand side, or support for its domestic airline industry, to support the national champion firm.

Once a statist state decides it wants the country to be involved in the industry, it takes action to develop that role. This could mean helping national firms move up the industry ladder from parts supplier to subcontractor to risk-sharing partner to prime manufacturer or multinational champion. It could also mean establishing a state-owned firm to act as a prime manufacturer or

multinational champion participant in international projects. During periods of restructuring, a “statist” state would offer firm support to national champion firms. Such a state would not be content with letting the chips fall where they may. It would utilize all the tools at its disposal to help maintain the national champion firm. If the national champion were a prime manufacturer of aircraft, a statist economy would seek a way to maintain that position. In the case of Brazil, we can expect the Brazilian state to continue its strong support for its national champion aircraft manufacturer during and after its period of difficulties in the 1990s.

Finally, those states with an economic orientation emphasizing social management, such as The Netherlands, would use all the supply and demand side tools at its disposal to develop its national champion firm. The state would not necessarily establish a state-owned national champion, as it would be willing to allow the private sector to fill that role. It would try to protect its position in the industry by managing the response to economic pressures. While it would emphasize the restructuring of the industry, it would be reluctant to see a major downgrading of its industrial firms. For example, such a state would be reluctant to see its national firm move from being a prime manufacturer of airplanes to a subcontractor. It would implement policies to restructure its presence in the commuter and regional aircraft industry and take advantage of new opportunities. It would work to protect the core capabilities of its national champion firm. It could establish a state-owned firm as part of the restructuring process. In the case of the Netherlands, therefore, we can expect the state to

participate in the restructuring of the industry to protect the core capabilities of its national champion and seek out new opportunities in the industry.

This research will focus in on the industrial policy path chosen by three countries, The Netherlands, Brazil, and Canada, with respect to their national champions in the commuter and regional aircraft manufacturing industry. It will look at the question of whether the industrial policy paths chosen are converging towards a neo-liberal, non-interventionist approach to policy. It will also focus on the role of the historically-based policy path to see if it acts to constrain future policy choice. In order to do this, it will have to focus in on those aspects of domestic politics, ideas, institutions, and interests, that help shape the policy path chosen in the sector.

The Cases

The following chapters will show that, since the early 1980s, the Netherlands, Brazil, and Canada have all modified their public policies towards their national champion firms in the commuter and regional aircraft manufacturing industry. These changes were in response to changes in government and a series of financial crisis in the industry, but the policy changes have not all headed in the same direction. The chapters will also show that, contrary to the ideas of the neo-institutionalists, states are not constrained by their historically-based policy paths when making policy decisions. The Netherlands abandoned its previous policy path that supported its national

champion firm in favour of a more neo-liberal strategy that emphasized a subcontractor and risk-sharing partner role in European and international programmes. Brazil and Canada have adjusted their policy paths in a more neo-liberal direction, but they both continue to offer strong state support for the development of their national champion aircraft manufacturers.

These outcomes can be explained by looking at domestic politics, which helped to shape the chosen policy path. Ideas were one important factor that helped shape policy. Neo-liberal ideas helped to influence the path in a more neo-liberal direction, but their impact was sometimes limited by counter ideas, such as those about the importance of high technology to the economy, which pushed in different directions. The performance of the institution of the national champion firm was another crucial factor that helped shaped the path, especially when intertwined with past policy legacies in the sector. A strong performance by the national champion often worked to validate past policies of support and pushed for a path that continued that support. A poor performance by the national champion led to questioning of past support and helped influence policy away from offering further intervention. Pressure from international environment, such as from international institutions and world trade rules, influenced states to move in non-interventionist directions. The importance of the national champion and the sector often appealed to the interests of the state and shaped policy direction. The industry was seen as strategic in terms of high paying jobs, technology, and high value-added exports. In some cases, the firm was also of significant political and military importance. This helped shape the policy path in

the direction of intervention. And finally, past policy failure helped shape the direction of industry policy. In particular, failure of past policies of internationalization played a significant role.

The Netherlands, traditionally viewed as a corporatist state, is an interesting case because its policies toward the regional and commuter aircraft industry underwent a fundamental shift towards a more neo-liberal approach in the 1990s. As we will see in the Chapter on the Netherlands, the country had a long history as a producer of regional and commuter aircraft. Royal Netherlands Aircraft Factories Fokker, one of the world's oldest aircraft manufacturing firms, was established near Amsterdam in 1919 and it was the Dutch national champion in the industry.

For most of the postwar period, the Dutch policy path emphasized support for its national champion firm as a prime manufacturer of commuter and regional aircraft and a strong partner in international ventures. This support was based on the strategic importance of the sector as a high technology industry that created high paying jobs and produced high value added exports. A number of factors combined to change this policy path in the late 1980s and 1990s, and in 1996 the Dutch government abandoned its policy of supporting Fokker. A new government coalition was elected in 1982, and it emphasized neo-liberal ideas, including substantially reduced government support for industry, and this had an impact on the policy path chosen in the sector. A series of financial crisis in the 1980s and 1990s, and Fokker's failure to improve its performance during that

period, helped to undermine the policy legacy of past government support. That legacy was also undermined by the failure of government support policies in other industrial sectors. In addition, the policy path was further influenced in a non-interventionist direction by the failure of past policies that emphasized Fokker's role in international partnerships and the failure on the part of European industry to restructure during the period of industry difficulties in the 1990s. Neo-liberal pressures from the European Union that worked to restrict state support for industry also helped to push the path in a neo-liberal direction. Contrary to the expectations of the neo-institutionalists, the end result was a new policy path in the 1990s that fundamentally changed the role of the Netherlands in the industry - it abandoned its traditional niche and it was no longer home to a prime manufacturing national champion firm. The new path emphasized a shift down the industry ladder, with the Netherlands becoming a home to parts suppliers, subcontractors, and risk sharing partners. This path differs from what the neo-institutionalists would have expected given the Dutch corporatist orientation. The Netherlands gave up on restructuring and did not try to protect the core capabilities of its national champion firm. Rather than shape outcomes, it was more willing to have the industry's future determined by the market.

Brazil, conventionally seen as statist in orientation, is an interesting case because it continues to support its national champion firm, but that support is now in a more neo-liberal direction that reflects the widespread adoption of neo-liberal policies in the country. As the chapter on Brazil will show, Brazil has been involved in the commuter and regional aircraft industry since 1969. At that time,

Embraer was established as a state-owned national champion to enter the industry as a prime manufacturer.

From the late 1960s to the early 1990s, the policy path adopted in Brazil emphasized strong state support for the national champion firm. The industry was seen as strategic in terms of technology, jobs and exports, and it was of particular importance to the military regime that governed Brazil for most of that period. That regime viewed support for Embraer to be part of its strategy to develop industries based on import substitution and to reduce Brazil's dependence on foreign suppliers of military equipment. In the mid-1980s, Brazil made the transition from military to civilian rule, and the new civilian government moved away from the import substitution policies of the past and placed emphasis on neo-liberal ideas. In the early 1990s, Brazil, Embraer and the rest of the Brazilian defense industry experienced a major financial crisis, and this set the stage for the adoption of a new policy path. The main element of this new path was the shift to a privately-owned national champion Embraer. The company's interests pointed in this direction because it needed financing to survive and develop new products. The government pushed in this more neo-liberal direction because it wanted to salvage civilian production from the decaying defense industrial base and relieve itself of the need to directly fund the firm. Despite the decision to sell Embraer, the new policy path continued to offer support for the firm, but in a more neo-liberal fashion. The emphasis was on support for R&D, defense development, and export support. The state pursued a "strategic" path that included intervention because it continued to view the

industry as strategic and the post-crisis performance of Embraer vindicated past policies of support. The policy path chosen with respect to this industry meant that Brazil would continue to be the home of a prime manufacturing firm. This path differs somewhat from neo-institutionalist expectations given Brazil's past statist orientation. Brazil continued its support, but it did so in a less statist, and a more neo-liberal, fashion.

Canada, an example of a 'liberal' state that gives wide latitude to the operation of market forces, is an interesting case because it provides an example of a state that traditionally supported its industry, but formed its national champion firm during a period when neo-liberal policies were dominant. Canada has had a presence in the industry since the late 1920s, when the first of two foreign-owned aircraft firms, de Havilland, was established. The second firm, Canadair, was established later during World War II. These two firms began to produce commuter and regional aircraft beginning in the 1970s.

Despite its liberal orientation, the Canadian policy path has always been supportive of its firms in the aircraft industry. This deviation from the more general liberal norm was justified by the strategic nature of the industry in terms of jobs, exports, technology, and military production. The government was content to keep both of the country's aircraft firms in private sector hands and maintain a relatively "hands-off" approach utilizing indirect instruments, until the government's strategy of shifting towards more civil production was threatened by the industry's foreign ownership. This forced the government to adopt a more

interventionist strategy that included the purchase of both companies in the 1970s. They remained in government ownership until sold by a Conservative government in the 1980s after a period of financial crisis. That Conservative government, which came to power in the mid-1980s and adopted a neo-liberal approach to policy, set out to put the industry on a more neo-liberal path by returning the two firms to the private sector. The poor performance of the two firms had undermined the past policy of state ownership, but it did not undermine the idea of providing state support in general. The two companies lived an independent existence until 1992 when Bombardier, owner of Canadair since 1986, took control of de Havilland, thus uniting Canada's two main aerospace firms under a single owner. The development of the new policy path emphasized a single private-sector national champion and continued "strategic" state support for the industry. The path's continued interventionism was influenced by the failure of past policies of internationalization, and the new national champion's location and significance in the political heartland of the country. It also reflected the continuing strategic importance of the industry at a time when the government was renewing its commitment to ideas surrounding the importance of high technology industry to industrial development. The success of Bombardier in international markets also acted to vindicate past policies of support. The policy path chosen in Canada meant that the country would continue to be the home of a prime manufacturer of aircraft based on one national champion firm. This path differs from what the neo-institutionalists would have expected given Canada's general liberal orientation. Unlike a liberal state, Canada was not willing to let the market determine the future of its

industry, and actually formed its single national champion during a period of neo-liberalism. Its past policies of industry support continued, but in a more neo-liberal fashion.

The focus of this analysis is industrial policy choice in the commuter and regional aircraft manufacturing industry. This chapter has provided an overview of the sector, the role of the state in its development, and the opportunities and difficulties that faced the industry in the 1980s and 1990s. The commuter and regional aircraft manufacturing industry has been a target of state industrial policy, including the use of national champion strategies, and the characteristics of the industry drive the need for state intervention in the sector. The next chapter, the first of the case studies, will look at how domestic politics influenced industrial policy intervention in the Dutch aircraft industry. We will examine how domestic politics shaped the post war industrial policy path that supported the development of Fokker and how politics shaped the response to the crisis of the late 1980s and 1990s. As the chapter will show, policy in the aircraft sector was reshaped in a more neo-liberal fashion in the latter period with dire consequences for Fokker.

Chapter 4

The Netherlands And Fokker: A Change Of Direction

This chapter will examine the development of aerospace policy in the Netherlands with respect to its aerospace national champion Fokker. It will show how the Netherlands, as a socially managed organized market economy, adopted a policy path between 1919 and 1996 that supported the development of its national champion firm. This support did not imply an inward looking strategy as the Dutch government believed that a small country would have problems surviving in this costly and risky industry. Therefore, it continually pushed its national champion to enter international collaborative ventures.

As this chapter will show, in the mid-1980s, Fokker entered a period of financial crisis that turned the company into a “troubled firm”. This occurred at a time when the post war Keynesian economic policy paradigm was in crisis and as the neo-liberal policy alternative began to emerge. Neo-institutionalists would predict that the Dutch government would continue with a policy path that supported the national champion Fokker. This was the case up until the mid-1990s as the Dutch government, despite its neo-liberal orientation, continued to offer support to Fokker. As this chapter will document, however, there was a major break with the historic policy trajectory in 1996 when the government abandoned its support for Fokker. As we will see, this break with the past did not happen overnight as elements of the old approach persisted for several years. The result of the policy path change was the disappearance of Fokker as a national champion firm, the

disappearance of the Netherlands as a manufacturer of regional and commuter aircraft, and the reorientation of Dutch aerospace industry onto a new policy trajectory that emphasized the role of the Netherlands as a sub-assembly, component, and parts supplier and risk-sharing partner in international collaborative aircraft ventures.

While neo-liberalism played a role in the decision to change the policy trajectory, that role was not decisive. As we shall see, Dutch industrial policy often provided financial support to troubled firms, such as Fokker, without pushing for management changes or new strategies to improve performance. The resulting bad performance contributed to the negative legacies of past episodes of defensive industrial policy. Both the firm's poor performance and policy legacies played an important role in the decision to change policy direction. There was also a failure of strategic ideas focusing on international partnerships. Despite the belief that such partnerships would strengthen Fokker, all of the major international partnerships entered into by Fokker ended in failure and setbacks for the firm. Closely linked with this was the inability of the European commuter and regional aircraft industry to rationalize and adopt a more strategic approach due to the conflicting nationally based interests in the industry. As a result, the European Union was unable to play a key role in the sector, and many of its policies worked against the provision of continuing state support to national champions such as Fokker.

1919 to 1980: Building Up The National Champion

The period from 1919 to 1986 can be characterized as the time during which Nederlandsche Vliegtuigenfabriek Fokker (Fokker) was built up into the postwar Dutch national champion firm in the aircraft industry, designing two generations of turboprop and jet commuter and regional aircraft, and becoming one of the world's major suppliers of such aircraft. As this section will show, during the interwar period, the Dutch state set out on this policy path. In that period, it began to break from its liberal policy orientation, subsidizing the operations of key firms like Fokker. It was also then that the Dutch state helped to establish the institutions that would form the core of the Dutch aerospace cluster. The postwar policy path continued that support as part of a larger policy turn toward a socially managed market economy. As we shall see, the Dutch state played a major role in promoting the company's development through the use of industrial policy tools such as military procurement and research and development subsidies. The various members of the Dutch aerospace cluster, including the NIVR, the NLR, KLM, and supplier firms, also contributed to the development of the national champion firm. Alongside this support was another crucial element of the policy path, international partnerships, designed to overcome the disadvantages of having an aircraft industry in a home country with a small market.

Although we characterised the Dutch regime as a “socially managed market economy”, this marked a turn from a traditionally liberal economic policy stance. In the sixteenth and seventeenth centuries, Dutch policy emphasized an open

economy and free trade. Such a liberal policy environment would continue into the early twentieth century, the period when the nascent Dutch aircraft industry emerged. Aircraft were first produced in the Netherlands in the early 1900s. The country's first aircraft manufacturing firm, N.V. Maatschappij voor Luchvaart, was established in 1911. Between 1911 and 1918, several firms¹ were established to make aircraft, but most had short lives² (NIVR, 1997: 8).

The experience of World War I pushed the government to intervene more in the economy and, in the interwar period, Dutch policy assumed a clearly defensive stance, as the government tried to combat unemployment and prevent declines in industrial production. Tariffs were used for the purposes of protection and as a source of state revenues. While there was no grand strategy for industrial support, the government was willing to provide assistance to traditional strategic industries such as steel, coal, and salt (van Zanden, 1999: 177-182). It was during this period that the aircraft manufacturing industry started its sustained development. In 1919, three institutions were established that were to play a crucial role in the future development of the Dutch aircraft industry. Fokker, the first aircraft manufacturer to survive more than a couple of years, was established in 1919 near Amsterdam³. That same year saw the establishment of Koninklijke

¹ N.V. Maatschappij voor Luchvaart (1911), N.V. Van Meel's Vliegtuigenfabriek (1914), Nederlandsche Vliegtuigenfabriek (1914), Hollandsche Vliegtuigenfabriek Avia (1918), and N.V. Maatschappij Tot Vervaardiging Van Snijmachines Volgens Van Berkel's Patent (1918).

² The 1920s saw increased activity in the aircraft sector. Several significant aircraft firms were established during this period as well as several firms that had short lives. N.V. Koolhoven Vliegtuigen was established in 1926, and the firms N.V. Maatschappij Voor Vliegtuigbouw Aviolanda and De Schelde were established in 1927. In the 1930s, an effort was made to rationalize the industry. A Committee for the Promotion of the Aero Industry was established by the government in 1934, and two years later it recommended that the industry in the Netherlands focus around two firms: Fokker and Koolhoven. The recommendations were not implemented and the Netherlands entered World War II with four aircraft firms. These firms were Fokker, Aviolanda, Koolhoven, and De Schelde (NIVR, 1997: 9-10).

³ Anthony Fokker established his first aircraft factory, known as Fokker Avitiek GmbH., in Germany in 1912. During World War I, Fokker produced close to 4000 aircraft of various types for the German military. Fokker aircraft became famous during the war, and the company became known for its light and maneuverable aircraft. Fokker aircraft were also produced in factories in

Luchtvaart Maatschappij, commonly known as the airline KLM, under the leadership of Albert Plesman. Both KLM and Fokker benefited from government support to their industries (van Zanden, 1999: 181). This was the precursor to a future policy path that emphasized state support for the national champion Fokker. Finally, the government supported key aeronautical research that was crucial to the development of the industry, including Fokker, through the establishment of the Rijksstudiedienst voor de Luchtvaart (RSL) or the Government Service for Aeronautical Studies. This organization, which would become known as the National Aerospace Laboratory (NLR) in 1961, conducted aeronautical research and inspected aircraft. These organizations would eventually form the basis of the Netherlands Aerospace Cluster. In addition to Fokker, KLM, and the RSL, the cluster would grow to include the Dutch Civil Aviation Authority (RLD), the Netherlands Agency for Aerospace Programmes (NIVR), the educational institutions related to aerospace such as Delft Technical University, and the many aerospace supplier firms in the Netherlands.

Prior to World War II, Fokker designed 29 commercial aircraft, though many never made it beyond the design stage. From the beginning, KLM was seen as a target customer for the 4-seat Fokker F II, and the airline ordered two aircraft in July 1920. The purchase of these aircraft marked the beginning of a long period of close co-operation between Fokker and KLM, two crucial elements of the Dutch aerospace cluster. As van der Klaauw notes, "During the 1920s and early 1930s

Austria and Hungary. After the war, Anthony Fokker decided to return to the Netherlands. There he established a new company, N.V. Nederlandsche Vliegtuigenfabriek in Amsterdam. The main factory was established in North Amsterdam and another one was established in the town of Veere. In 1925, activities were consolidated in Amsterdam. "Over the next 20

the Fokker/KLM combination proved to be extremely successful. With a range of Fokker airliners, from the F.II onwards, KLM was able to build up good and reliable air services" (van der Klaauw, 1995: 217). In the early 1930s, KLM was looking to expand its services from Amsterdam to the Dutch East Indies, using a larger, faster, and more comfortable aircraft to attract passengers away from KLM's main rival, Imperial Airways. KLM had already ordered a new 3-engined, 12 passenger Fokker aircraft⁴, and one was built and in service. It now entered into negotiations with Fokker and the result was two new aircraft seating 22 and 32 passengers.⁵ In November 1932, KLM and Fokker reached an agreement on an order for the two larger aircraft.

Yet changes in aircraft technology would soon challenge this relationship (van der Klaauw, 1995). Most of Fokker's pre-war aircraft were constructed using the company's traditional approach utilizing a fabric covered welded tubular steel frame structure for the fuselage and a wood wing box covered with plywood for the wing⁶ (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1994: 13). Major developments in the design and construction of commercial aircraft were occurring in the United States during the 1930s that would soon render this technique obsolete:

The American aircraft industry which was scarcely significant before the end of the 1920s, at least in the civil sector - began the advance that was to carry it to the unassailable position it occupies today.

years, this plant was to produce numerous civil and military aircraft which, due to their solidity and reliability, won a world wide reputation" (Interavia, October 1969: 1627).

⁴ F. XX.

⁵ The Fokker F.XXXVI was a new 32-passenger, 4-engined aircraft design. A smaller version, known as the F.XXII, carried 22 passengers.

⁶ Fokker did break with the traditional approach in 1922 when it designed the Fokker F.V, a single-engined 8-passenger aircraft. It utilized plywood for the inner and outer skins. Vibration in the cabin led to a reversion to the traditional approach for subsequent designs (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1994: 34-35).

This success was based on two factors: manufacturing techniques and design concepts. In contrast to the individual construction of aircraft with outstanding craftsmanlike finish that was the rule for Fokker and most other European aircraft builders, the American's used production lines which achieved a considerably higher output and more rationalized construction. The heavy investment needed for such an operation was an obstacle which the financially weak Europeans found difficult to surmount. In addition, the American firms - in particular Douglas and Lockheed - were marketing all-metal aircraft which outclassed the Fokker designs in their very own special characteristics of reliability, ruggedness and economic operation (Interavia, October 1969: 1628).

Locked into its own competitive challenges, KLM was quick to seize the advantages that these innovations offered. In October 1933, a KLM representative was sent to the United States to examine progress in night flying and to look at an all-new metal aircraft, the DC-2, designed and built by Douglas Aircraft. Fokker experienced problems with its new larger aircraft⁷ and they could not match the performance of the DC-2. KLM ordered the Douglas aircraft, and the large Fokker aircraft were sold or retired by 1939⁸. KLM's shift to American aircraft had major implications for Fokker. "The company did not just lose its status as a leading producer of civil airliners, it actually disappeared from the market"(van der Klaauw, 1995: 217).

The company's inability to adjust to techno-economic changes might have cost it its existence had the Dutch government not embraced a national champion policy as part of its postwar "socially managed" reconstruction strategy. Politics played an important role here. From 1945 to the end of the 1950s, the Dutch government was formed by a coalition government consisting of the Catholic

⁷ The Fokker FXXXVI and the F.XXII

People's Party and the Labour Party. The social democratic element of the coalition helped to support the re-establishment of corporatist institutions⁹ to oversee the economy and helped to push for a concerted effort to rebuild both the country and the economy (Gladdish, 1991: 33-38). This was needed because the Netherlands ranked second among Western European countries in terms of the severity of destruction caused by the war, which had destroyed most of the infrastructure and industrial capacity.

In the late 1940s and early 1950s, the government was thus faced with an economy with a low level of per capita income, a high level of taxation, an unfavourable balance of payments, and a high level of unemployment (de Klerk and Lutz, 1981: 193). In order to tackle the unemployment and balance of payments problems, the government set out on a policy of encouraging industrialization and exports. Many other countries adopted such policies in the early Keynesian period, but the Dutch went beyond the liberal macro-economic stance of the Anglo-American countries to embrace industrial policy. In 1949, Minister of Economic Affairs Van Den Brink argued that the creation of a proper economic environment

⁸ Only one F.XX, four F.XXII, and one F.XXXVI were built.

⁹ One of the efforts launched after the war involved the reconstruction of the corporatist institutions that helped govern the economy. Corporatism in the Netherlands can be traced back to the interwar period. In 1933, an Industrial Councils Act was passed that established a series of consultative bodies, composed of equal employer and employee representation, in all the major branches of industry (Gladdish, 1991: 34). After the war, the government set out to reconstruct the system. In 1945, the Central Planning Bureau was established. While this body did not become a central planning agency, it did provide the government with crucial economic forecasts and advice. Alongside the Bureau, was the Foundation of Labour that was a body that grew out of the war to foster cooperation between business and labour. This body took on an advisory capacity on matters of social policy (Gladdish, 1991: 35; de Vries, 1978: 102-104). In 1950, a bill, the Statutory Trade Organization Act, was passed which called for the setting up of various statutory trade organizations for different branches of trade under a Social and Economic Council. While bodies were established in agriculture and commerce, most branches of industry did not form such organizations. The Social and Economic Council, made up of representatives of business, labour and government, did acquire a major role in advising the government on economic and social policy. Its policy proposals and recommendations were fed directly to cabinet and it became a major source of socio-economic policy proposals until the 1960s (de Vries, 1978: 102-103; Gladdish, 1991: 33-36; Scholten, 1987: 124-125).

was an important element in encouraging industrialization, but the government also needed to take a more hands-on role. The policy emphasized certain priority sectors based on the employment benefits, the size of investment, and the prior experience in the Netherlands in that sector (Ruijter and Batten, 1999: 2). To reduce unemployment and the trade gap, “it was considered necessary to transform the industrial structure, the emphasis being placed on heavy industry, engineering products, (petro) chemical industry, transport and construction, and energy supply”(de Klerk and Lutz, 1981: 203). A series of “Industrialization Plans” were produced in the late 1940s and 1950s, which included targets for production, employment, and investment. These plans were mainly indicative in nature and did not involve the imposition of central planning upon industry (de Vries, 1978: 104-105). The government’s role mainly focused on conditions for encouraging growth:

Industrial policy in the Netherlands began in the post-war period of reconstruction with heavy emphasis on industrialization. However, while the Government voted eight “industrialization bills” containing “targets”, these were solely indicative in character. The government’s role was limited to creating conditions which would foster economic growth. Considerable emphasis was placed on wage and price policy to ensure a strong competitive position for the Dutch economy (Organization for Economic Cooperation and Development, 1986: 23).

One of the main elements of the government’s policy was wage moderation aimed at controlling labour costs and maintaining the competitiveness of the Dutch economy. The presence of a social democratic party in the governing coalition helped make this possible.

Fokker fit into the government's "industrialization" and "growth and structure" agendas because of the research and development intensity of aircraft production and its ability to generate export sales. As we have seen, the Netherlands had an early presence in this technologically advanced industry, and it had had some strength in the pre-war industry primarily due to Fokker. The government considered the aircraft industry to be an essential one, and it indicated its willingness to support the development of the industry by establishing a committee to look into its future. Reporting in 1946, the committee found that a national aircraft industry was a necessary part of the process of encouraging industrialization. A national industry would reduce the currency outflow associated with the purchase of imported aircraft and it would reduce dependence on foreign suppliers. Some felt that the future of the Dutch industry would be as an assembler of aircraft under license (NIVR, 1997: 11-12), but the committee recommended that the government fund the development of new aircraft. It also proposed that a new organization be established to manage the public funds provided for aircraft development (NIVR, 1997: 12). This recommendation was to prove crucial in the establishment of the post-war policy path and in helping Fokker re-establish itself as a player in the world aircraft industry in the post-war period.

The government accepted the committee's recommendations. In 1946, the Nederlands Instituut voor Vlieguitontwikkeling (NIV)(Netherlands Agency for Aircraft Development) was established to manage the public development funds provided to the industry. In 1971, the NIV became the NIVR or Netherlands Agency for Aerospace Programmes. The mandate of the NIV was to advise the

government on policy matters related to industrial activities in aerospace, to initiate and monitor aerospace development programmes to be funded by the NIV, to initiate and monitor aerospace research and technology programmes, and to represent the government in international programmes that are funded by the Agency. The establishment of the Agency added another important element to the Dutch aerospace cluster (NIVR, 1997: 12).

Aircraft projects in the Netherlands were funded through three components, and these were a state guaranteed loan, a NIV loan, and a company contribution. Interest to be paid over the life of the state guaranteed loan was pre-financed with another NIV loan. All NIV loans were repayable based on contractual arrangements made between the NIV and the company concerned. The NIV loan fund operated on a revolving fund basis. The fund was initially set up by the government and repayments by firms were used to fund future loans to industry. The government did make available supplementary funds to the NIV when needed (Goelma and Kooijman, 1996: 1-2). The public funds made available through the NIV were to become an important source of state support for Fokker's aircraft development efforts.

Military procurement proved a valuable instrument for supporting the development of Fokker as a Dutch aerospace national champion. In the early years, the Dutch military was to provide a major source of business to keep Fokker's aircraft factories humming. The company's first postwar aircraft activities involved the repair and overhaul of military aircraft that would allow the Royal

Netherlands Air Force to reestablish itself. Conversion of military C-47s into civilian DC-3s provided a steady stream of activity for the company. One of Fokker's early projects¹⁰ was a two seat primary trainer known as the S.11 which became the initial training aircraft for Dutch military pilots. Fokker's first jet aircraft design, the S.14 Mach trainer, was produced for the Royal Netherlands Air Force¹¹ (Royal Netherlands Aircraft Factories Fokker, 1961: 2-5)

The government would continue to use military contracts throughout the postwar period to assist its national champion Fokker. Fokker produced several military aircraft under license for the Royal Netherlands Air Force and other European air forces. For example, Fokker produced 25 British Hawker Sea Fury fighter aircraft under license for the Royal Netherlands Navy between 1948 and 1951. In 1949, Fokker received a contract to produce 330 Gloster Meteor fighters under license for the Dutch and Belgian air forces, and it was later awarded a contract in 1953 to produce 460 Hawker Hunter fighters under license for the same air forces (Royal Netherlands Aircraft Factories Fokker, 1961: 4-5). In the 1960s, Fokker produced the Lockheed F-104G Starfighter in collaboration with other Dutch and German companies for the Dutch and German air forces. The company also produced major components for the Breguet Atlantic Maritime Patrol Aircraft in cooperation with French, Belgian, and German firms. In the late 1970s and 1980s, Fokker had a major share in the European manufacturing program for the General Dynamics F-16 fighter. It produced components and undertook assembly

¹⁰ The company's first new aircraft project was a small air taxi based on a pre-war design. The first post-war Fokker designed airplane to fly was the F.25 Promotor, a 4-seat business and touring airplane. Its first flight took place in 1946 (Royal Netherlands Aircraft Factories Fokker, 1961: 2-5).

¹¹ 20 of the trainers were produced and delivered to the Royal Netherlands Air Force by 1955.

of the aircraft. In addition to this manufacturing activity, Fokker also played a role in the maintenance, overhaul, repair and modification of military aircraft for the Dutch air force.

State support for Fokker's first generation of commuter and regional aircraft occurred during this period. Despite the signs of some difficulties in the domestic economy, the period of strong worldwide economic growth of the 1950s and 1960s provided a favourable environment for Fokker to re-renter the civil aviation market. Fokker's entry into the post-war regional and commuter aircraft market came with the F-27, a 28-passenger twin-turboprop aircraft with an 800-kilometer range. In early 1948, Fokker, in consultation with its cluster partners KLM and the NIV, undertook a number of preliminary studies of future civil aircraft projects. Later, the NIV commissioned Fokker to undertake design and feasibility studies for a medium-sized airliner. In 1952, the NIV, KLM, and Fokker agreed on the technical aspects of the project, and on July 30, 1952 the NIV decided to submit the proposal for the F-27 to the government. In the fall, the government accepted the proposal, and it was approved by Parliament in May 1953. The first aircraft was completed in the spring of 1955 and it first took to the air on November 24th 1955. Fokker would go on to develop several variants of the F-27.¹²

The finance required to develop the new aircraft came in part from government loans, in line with the 1946 committee recommendation that the

¹² Fokker went on to develop several variants of the F-27. The original version, the MK100, seated 40 passengers. The MK 200, with more powerful engines, seated 48 passengers. The MK 300 was a passenger and freight combination version, and the Mk 300M was a military version known as the "Troopship". Other specialized versions included a VIP aircraft and the F27

government provide public funding for new aircraft development. As we shall see, such loans would become a crucial instrument in the postwar policy path that supported Fokker as a national champion in this area. The government, through the NIV, made available a total of NLG 25 million for the development of the F-27 and for the tooling necessary for series production. The loans were to be repaid on a payment per aircraft basis. After the loans were repaid in full, a royalty had to be paid to the government on all further aircraft sold. In total, the government received back NLG 75 million, a 300% percent payback on the government investment. This return reflected the commercial success of the project (Goelema and Kooijman, 1996: 5; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1994: 148).

When sales of the F-27 began to stall, the government came to the aid of its national champion through military procurement. Fokker had sold more than 30 aircraft by April 1956. After this initial promising start, the order book stalled and by the beginning of 1958 management at Fokker began to contemplate closing the production line. No orders were received over a 14-month period. The Dutch government assisted the company by placing an order for 12 aircraft for the Royal Netherlands Air Force and one aircraft for the Dutch royal family. This order ensured production of the F-27, and a rebound in orders meant that production of the aircraft would continue (Becker, 1988: 15; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1994: 151; Roach and Eastwood, 1998: 349). In production from 1958 to 1986, the F-27 became a very successful aircraft and

Maritime. The Maritime was a military maritime surveillance aircraft. A stretched version of the F-27, the MK 500, was

“more F-27s have been built than any other turboprop in the Western World”(Becker, 1988: 15).¹³

While the government supported Fokker and the development of the F-27, it did not advocate an autarkic approach to industry development. The Dutch aerospace policy path in the post-war period also placed special emphasis on international collaboration and partnerships. The Dutch government consistently believed that the small domestic market for aircraft, and the country's small capital base, hindered development in an industry that was capital intensive and required a high level of sales to gain scale economies and benefit from the learning curve. These limitations pushed both the Government and Fokker to seek international partners to develop the industry. The Dutch were “ambivalent” towards European collaboration, however, because they feared a loss of independence. Thus, the Dutch only became an associate member, rather than a full partner, in the Airbus consortium. Nevertheless, realities forced the Dutch to think in collaborative terms (Hayward, 1986: 44, 107-110). The government, therefore, encouraged Fokker to enter international partnerships and this was reflected in the F-27 project. Fokker looked for partners when it was initially considering the development of the F-27, but it received little response from North American and other manufacturers. Production of the F-27 did, however, utilize various international subcontractors. Thus parts of the fuselage were subcontracted to Dassault-Breguet of France. Later, various components were subcontracted to VFW in Germany and SABCA in

developed in the 1960s.

¹³ The F-27 was in production between 1958 and 1986. During that time, 580 aircraft were made by Fokker in the Netherlands and 207 were built in the United States under license by Fairchild. The F-27 was sold to 168 different customers in 63 countries.

Belgium. The international dimension of the F-27 was strengthened in 1956 when Fairchild Engine and Airplane Corporation, a US-based manufacturer, signed a contract with Fokker to produce the F-27 under license at a plant in Hagerstown, Maryland. Fairchild and Fokker had first discussed licensed production in 1952. The F-27 and the stretched FH-227 were both produced in the United States

Even with strong economic growth, structural problems in the economy became evident in the 1960s. High levels of capital investment and the development of new techniques of production led to large increases in labour productivity. An expanding service sector absorbed the labour that was shed from the industrial sector. Problems did become evident in a few sectors such as shipbuilding and coal. The government did get involved with the restructuring of several troubled sectors, such as shipbuilding and textiles, on an ad hoc basis, mainly to protect employment (de Klerk and Lutz, 1981: 205; Ruijter and Batten, 1999: 3). Towards the end of the decade, the favourable wage-price performance of the Dutch economy began to break down. An overheating economy led to a wage explosion where wages rose faster than productivity. Structural problems would become more evident as the economy moved into the 1970s (Gladdish, 1991: 139-140; Organization For Economic Cooperation and Development, 1986: 23), but government support in the 1960s helped Fokker to thrive.

It was in this period that Fokker began to turn its attention towards the development of a jet-powered successor or complement to the F-27. Jet engines began to be used on military aircraft in the mid 1940s, but it was not until the 1950s

that the technology was developed to the point where it was reliable and economical for use on civil aircraft. The first applications were on long-range transports. In the 1960s, attention began to be focused on jet-powered aircraft for short-range routes. As Fokker turned its attention towards a jet powered aircraft, it again received support for the conceptualization and development of the aircraft, in a fashion similar to the F-27, from its partners in the Dutch Aerospace Cluster. In 1961, the NIV commissioned Fokker and the NLR to undertake an initial study of a jet powered aircraft about the same size as the F-27, and that preliminary study was completed in early 1963. The F-28 was originally planned as a 44-seat aircraft, but detailed analysis quickly showed that an aircraft with a minimum seating capacity of 60 seats would be required for economical operations. The initial version of the F-28 eventually evolved into a 65-seater optimized for short haul operations.¹⁴

Just as it did with the F-27 project, the government used loans to support the development of the F-28. The development costs for the aircraft were estimated to be NLG 225 million. Fokker could not finance the development solely out of its own resources, so it looked to the Dutch government for support. In March 1963, after completion of the initial study, the NIV submitted a proposal on the F-28 to the Dutch government. The Minister of Transport and Public Works announced the government's willingness to contribute to the development of the

¹⁴ Similar to its experience with the F-27, Fokker decided to launch a series of variants of the basic F-28 model. "In the effort to extend the market and to remain competitive, Fokker-VFW has evolved a family of F-28 variants in the course of the Fellowship's first decade - six different combinations of fuselage length, wing design, and power plant have been offered ..." (Air International, May 1977: 231). The basic models included the F28-1000 that seated 65 passengers, the -2000 that seated 79 passengers, and the -4000 that seated 85 passengers. The additional development costs associated with the variants raised the break-even point for the F-28 from 125 to 200 units (Air Enthusiast, February 1973: 63).

aircraft in November 1963. This time two important conditions were applied: that “Fokker would have to make satisfactory arrangements to cover the production risks without government involvement, and that Fokker would have to develop the F28 in cooperation with aircraft manufacturers in other countries”(NIVR, 1997: 52). The government clearly still had the view that Fokker could not support the development of new aircraft projects out of its own resources, and it required international partners to help shoulder the risks and costs of aircraft development. In February 1964, the government announced its decision to provide government support, through the NIVR, for 50% of the development costs of the aircraft and a loan guarantee to cover the remainder (Aviation Week and Space Technology, 24 February 1964: 47). The F-28 was not as commercially successful as the F-27¹⁵, and the aircraft did not repay all of the development credits granted by the Dutch government. The remaining amount was added to the development finance of successor aircraft projects. (Flight International, 10 December 1983: 1513; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 2).

To spread the costs of F-28 development and to meet the government requirements for international cooperation in the development of the aircraft, Fokker set out to establish a consortium of European aircraft firms to design and

¹⁵ The aircraft remained in production for twenty years from 1967 until 1987. During that time period, 243 aircraft were produced. In February 1967, Fokker signed an agreement with Fairchild-Hiller of the US, the same company that produced the F-27 under license, for the licensed production of a shorten version of the F-28 which was to be known as the F-228. This shortened version of the F-28 would be built using components from the F-28. Components utilized from the F-28 would include the tail assembly, a shorten fuselage, part of the wing structure and some system components. The use of these components would lead to a substantial savings in development time. The components would be made in European factories and shipped to the United States. Fairchild-Hiller would be responsible for building about one half of the airframe. The agreement between Fokker and Fairchild Hiller provided that the latter would sell the F-28 and F-228 in the Western Hemisphere. Both aircraft would be sold by Fokker in the rest of the world. Fairchild Hiller foresaw a demand for 600 to 800 F-228's worldwide and a market of 250-450 in the United States. The break-even point was 225 aircraft. Fairchild-Hiller's early optimism was tempered by later studies which indicated a small market for the F-228 in the United States. The agreement for licensed production was canceled. The market for small airliners in the US would not open up, and provide sales opportunities for Fokker, until the market was deregulated in the late 1970s and early 1980s.

manufacture the aircraft. Other European aircraft firms were invited to participate, and talks were held with Hawker Siddeley in Britain, Sud Aviation in France, and Hamburger Flugzeugbau in Germany. In 1964, a consortium was established that consisted of Hamburger Flugzeugbau, VFW of Germany, and Short Brothers of Ireland¹⁶. The German and British governments provided support amounting to NLG 122 million. Hamburger Flugzeugbau was responsible for the rear fuselage, VFW built the tail section, and Short Brothers built the outer wing sections¹⁷. Fokker was responsible for 56% of the development and production of the aircraft, and the three other European firms were responsible for the other 44% (Aviation Week and Space Technology, 14 June 1965: 249).

As Fokker entered the 1970s, it began to think about future plans, but it would do so in quite a different economic environment. A recession in the international economy was having a major impact on the business environment, including aircraft sales. In the Netherlands itself, structural problems in the economy had become more evident. The country's economic performance had declined sharply. The overheated economy of the 1960s had led to a wage explosion and rising prices, resulting in a sharp drop in profits. The country also faced large increases in the price of oil following the Middle East crisis of 1973. Several revaluations of the guilder, made possible by natural gas exports, further reduced the competitiveness of the Dutch economy. Increased competition in

¹⁶ This consortium was based on a consortium formed by the same companies to produce the Breguet Atlantic turboprop and the Lockheed F104G military aircraft (Aviation Week and Space Technology, 14 June 1965: 249).

¹⁷ Originally, Sud Aviation of France was supposed to be a member of the consortium and was responsible for the wing sections, but it pulled out of the consortium because the French government wanted it to support a competing French design that was to be built by Dassault and was known as the Mercury. Short Brothers was brought into the consortium to do the wing work (Aviation Week and Space Technology, 14 June 1965: 249).

international markets added to the difficulties that faced the Netherlands as its competitive position deteriorated. As in many other industrialized countries, unemployment and inflation became major problems. Employment in industry continued to decline, and it combined with structural unemployment to substantially raise the unemployment rate. The government also began to experience a growing deficit in public finance. Problems in numerous industrial sectors, previously hidden by strong economic growth, became more evident in the 1970s (de Klerk and Lutz, 1981: 205-206; de Vries, 1978: 121-122; International Monetary Fund, 2001: 760-761; Ruijter and Batten, 1999: 3).

Like many other OECD countries, the Netherlands' initial response was to turn to a more interventionist approach to policy in the mid-1970s. To some extent this meant efforts to restructure traditional industries, but it also meant continued support for Fokker and the aircraft industry. The general aims of Dutch industrial policy focused on the maintenance of an industrial sector that could provide good quality jobs while taking into consideration the needs of the environment, the need to conserve raw materials and energy, and the need to open up opportunities for developing countries. The emphasis was to be on the development of high technology, non-polluting industries and the scaling back of industries, like textiles, where third world countries had achieved a level of economic competitiveness (de Klerk and Lutz, 1981: 206-207; Organization For Economic Cooperation and Development, 1986: 23). The policies introduced by the Minister of Economic Affairs aimed at "improving the quality of the supply of labour, stimulating full employment, increasing productivity, stimulating technology and innovation,

stimulating investments, attracting risk capital, efficient energy use, development cooperation and expanding exports” (Ruijter and Batten, 1999: 32).

In fact, the deteriorating domestic and international economy led the government to encourage mergers and other supports for industry. Industrial policy in the Netherlands came to be dominated by support to declining industries and leading firms, encouraging them to restructure, often through mergers. The goal was to create larger and more competitive firms, while eliminating excess capacity. The government strongly believed in the importance of economies of scale to business performance and it actively encouraged mergers and acquisitions through, for example, the newly created corporation, Nehem. Firms and sectors in difficulty also had access to two major programmes. One program emphasized the orderly contraction of certain uncompetitive industries, mainly labour intensive ones that faced strong international competition or industries with substantial overcapacity. The other program focused on direct financial aid to firms in difficulty. Initially, the government had emphasized sectoral restructuring plans, but as the economy deteriorated there was an increase in the use of more ad hoc measures to support industry. For example, financial support for individual firms rose from NLG 73 million in 1974 to NLG 800 million in 1979 (Organization For Economic Cooperation and Development, 1986: 25; Ruijter and Batten, 1999: 3; Schenk, 2000: 5; van Zanden, 1999: 185-186). These ad hoc measures were justified based on the view that the troubles facing the individual firms were due to the length and depth of the recession. In the long run, these firms would be viable. As the 1970s progressed, more programs were introduced, and about 125

programmes existed by the early 1980s (Organization For Economic Cooperation and Development, 1986: 23, 27-29; Schenk, 2000: 5).

Despite evidence of management failures, the government did not push for management changes at firms receiving financial support. This reluctance to override “managerial prerogative” had characterised Dutch industrial policy from the outset (Schenk, 2000: 5; Huslink and Schenk, 1998: 243). While such reluctance is common in fellow “corporatist” countries (Katzenstein, 1985: 68-69) and also in liberal countries, other corporatist regimes like Germany had other instruments at their disposal, notably the close working relationship between investment banks and goods-producing firms, which the Dutch lacked. As we shall see, this would hamper the government’s ability to maintain a viable national champion right through to the 1990s.

In the 1970s, the Dutch government applied the merger strategy to Fokker, which was encouraged to merge with a European partner - VFW of Germany - to improve its competitiveness and performance. The merger took place in 1969 after several years of discussions between the two companies. The governments of both countries had been urging their respective industries to merge to become more competitive, and the two firms had complementary capabilities, with Fokker’s emphasis on civil production and VFW’s emphasis on the military side. The two companies had worked together on the F-28 and the VFW-614¹⁸, and now the new

¹⁸ The origins of the merger between Fokker and VFW can be traced back to the early 1960s. At that time, three north German aircraft manufacturers, Focke-Wulf, Weser Flugzeugbau, and Ernst-Heinkel Flugzeugbau, set out to develop Germany’s first post war civil aircraft. Studies focused on the need for a small, low cost aircraft that could be used in the less developed parts of the world. Full details of the project were announced in 1963. During its later development, the aircraft,

partnership took over responsibility for the Fokker F-27, F-28, and the VFW-614, which was still under development. They also took responsibility for several military programs. A new company, VFW-Fokker Zentralgesellschaft, was formed, with Fokker and VFW each owning 50% of the Zentralgesellschaft. The merger was seen by many Europeans as a sign of things to come as the European industry was rationalized on a transnational basis (Hayward, 1986: 107-108; Business Week, 17 May 1969: 38; The Economist, 17 May 1969: 73-74). As we shall see, however, a viable “European option” never did emerge in this sector, as national interests remained paramount.

Unlike previous efforts by Fokker and the Dutch government to develop viable international partnerships, this one involved a change in ownership of the national champion firm. In effect, Fokker was (temporarily) transformed from a Dutch national champion firm into a component of a potential European champion firm. This changed the institutional setting for Dutch civil aerospace policy, introducing a German element into the Dutch aerospace cluster. The interests of a foreign firm and a foreign government could, therefore, now more directly influence Dutch aerospace policy and development. The story of this merger episode nicely illustrates the difficulties of Europeanizing a national champion’s activities.

that would subsequently become known as the VFW-614, evolved from an aircraft aimed at less developed markets into a jet airliner for the commuter airline industry. By 1965, the project had been reoriented to focus on the development of a 40-44 seat passenger aircraft. The aircraft would feature a large cargo door at the aircraft nose, a small passenger cabin in the rear of the fuselage, low landing gear to allow for easy loading, and engines mounted above the wings to minimize the chances of foreign object ingestion on unpaved runways. The aircraft’s promoters saw the VFW-614 as a project that could re-establish the German civil aircraft industry. In order to meet the remaining 40% of development costs, VFW sought out a group of risk sharing partners and the search for partners lasted two years. After lengthy negotiations involving various aircraft manufacturers, five firms were eventually involved in the VFW-614 project. The Dutch national champion Fokker became a major participant in the project with a 15% share. The other firms involved were the German firm MBB with a 9% share, SABCA and Avions Fairey of Belgium each with a 2% share, and Rolls Royce of the U.K. with a 2 percent share (Air Enthusiast, December 1971: 370; Aviation week and Space Technology, 14 June 1965a: 252). Fokker originally wanted to participate to the extent of 30%, but the Dutch government wanted the company’s share limited to 20%. In the end, Fokker had a 15% stake in the project (Air Enthusiast, December 1971: 370).

Fokker-VFW started exploring the market for a successor to the F-28. The new aircraft, initially designated as the F-28-315, would seat from 115 to 130 passengers in a five abreast layout¹⁹. No competitors were planning to enter the same market as the Super F-28 and the company expected to start delivering the aircraft in the early 1980s. Fokker did not believe that future orders and options would be sufficient to fund the development of the project, and it indicated that it would need government support to help with the estimated \$400 million cost of developing the aircraft. Thus it expected the government's policy of providing financial support for aircraft development to continue. As with its previous aircraft projects, Fokker received support for the development of the aircraft from two of its cluster partners, the NIVR and NLR, when both organizations launched a research program in 1974 to help develop technologies for the new aircraft. Fokker also sought a \$125 million loan and a loan guarantee of \$155 million from the Dutch government. The company would pay the government back a certain amount on each aircraft sold until the break-even point was reached, and then would pay a percentage of sales after that point (Aviation Week and Space Technology, 20 December 1976: 29-31; Aviation Week and Space Technology, 4 September 1978: 159-164; NIVR, 1997: 64).

VFW-Fokker's main development efforts, however, concentrated on completing the VFW-614 project, which was to pose major problems for the new

¹⁹ It would utilize a stretched F-28 fuselage with a new wing and new high by-pass engines. It would also make use of weight saving composite materials. Fokker-VFW estimated the market for this aircraft, which later became known as the Super F-28, as 1,200 aircraft over the 1978-1990 period.

firm. Rising development costs for both the airframe and the engines, a crash of the prototype aircraft, and limited demand, hung a cloud over the future of the aircraft. Even so, approval to start series production of the aircraft was given in late 1972 (Aviation Week and Space Technology, 18 December 1972: 36).

Despite support provided by the German government, sales of the VFW-614 were very limited. Various German government officials accused Fokker of deliberately sabotaging VFW-614 sales because it favoured its own F-27 and F-28. Fokker, responsible for all VFW-Fokker civil aircraft marketing, denied the charges, but was prepared to hand over responsibility for marketing the VFW-614 to VFW (Aviation Week and Space Technology, 2 January 1978: 29). Other conflicts also arose within the merged firm over the sharing of work between the Dutch and German factories²⁰. Regional politicians in Germany began to call for a reorganization of the German industry along national lines (Business Week, 28 March 1977: 37-38; The Economist, 16 February 1980: 89-90).

The costs associated with the VFW-614 program threatened to force the VFW side of VFW-Fokker into bankruptcy. During the second half of 1977, VFW went to the German government for financial assistance and the government agreed to provide financial aid on two conditions. One required the discontinuation of the VFW-614 program and the other required VFW to begin merger discussions

²⁰ Fokker's civil aircraft work was expanding while the military activities at VFW were in decline. Fokker was adding jobs as sales of the F-27 and F-28 were healthy, while at VFW jobs were being shed as sales of the VFW-614 and military sales were languishing. This led to accusations that the German-Dutch company was neglecting the German half of the organization. Germany was not offered work on the F-16 fighter that was being built by VFW-Fokker for Belgium, Denmark, Norway and the Netherlands. The company was going to spread the work among its Dutch and German plants, but the Dutch government ordered that all work remain in the Netherlands. The government argued that the German factories were not entitled to any share of the work on the aircraft because Germany was not purchasing the aircraft. The Germans wanted some of the work on the civil F-28 moved to German plants to compensate, but the Dutch refused (Business Week, 28 March 1977: 37-38; The Economist, 16 February 1980: 89-90).

with another German company, Messerschmitt-Boelkow-Blohm (MBB). The latter condition would have a major impact on Fokker. The government agreed to provide VFW with about \$250 million in assistance while the company restructured its operations. In mid-December 1977, the supervisory board of VFW-Fokker announced that production of the VFW-614 would cease at the end of the year²¹, which met one of the conditions for German government financial aid (Aviation Week and Space Technology, 2 January 1978: 29-30). VFW was free to meet the second condition after an agreement was reached in February 1980 on the dissolution of VFW-Fokker.²²

The separation of VFW and Fokker showed the difficulties of engaging in internationalization in the face of nationally based interests. The divorce was driven by the industrial policy of the German government and that government's desire to see its aerospace industry merged along national lines. The joint company also faced an unwillingness on the part of the governments involved to allow the companies to operate as a fully merged entity (Flight International, 23 February 1980: 534). Henceforth, Fokker saw its future in European or international consortia, like Airbus, which permit strong national industries to cooperate on projects without merging national firms (Aviation Week and Space

²¹ Only 12 VFW-614 aircraft were actually built.

²² After a long period of negotiations that centred on how to split up the company, the government backed loans and loan guarantees, and the related asset values of each firm, the agreement spelled out the divorce terms that were retroactive to January 1, 1980. Fokker would not have any obligations for the 280 million DM loan guarantee provided by the German government and the city of Bremen for production of the 614, but it would have to pay back half of the loan provided by the German government to cover the costs of terminating the project. A maximum of 110 million DM had been made available, but only 83.6 million DM had been used. Fokker therefore had to pay back half this amount, or 41.8 million DM, from its profits between 1978 and 1987. Fokker also made a payment to VFW on account of the changed asset values of the firms. The joint company was to be dissolved by Fokker turning over its 50 percent share of the Zentralgesellschaft for the latter's 100 percent holding in Fokker-VFW of Amsterdam (Aviation Week and Space Technology, 18 February 1980: 24; Flight International, 23 February 1980: 534; Interavia, April 1980: 278).

Technology, 18 February 1980: 24; Flight International, 23 February 1980: 534; Interavia, April 1980: 278).

As German government pressure to restructure its aircraft industry along national lines became evident, Fokker began to plan for a future without VFW. Both the company and Dutch government officials saw closer ties with the French aircraft industry as a possibility²³. Fokker pinned its future on the development of a new short-to-medium range transport and continued production of the F-27 and F-28 (Aviation Week and Space Technology, 30 October 1978: 31). Fokker's future as a national champion in the commuter and regional aircraft industry really depended on its new short to medium range aircraft. As previously mentioned, Fokker had originally focused on a stretched F-28 that became known as the Super F-28. Subsequent market analysis indicated the need for a larger aircraft, and Fokker began to alter its plans to focus on a 132-seat aircraft that became known as the F-29²⁴. The cost of developing this new aircraft was set at approximately \$750 million. Fokker expected to form an international consortium to build the aircraft, with participants from Europe, Asia, and North America²⁵. Intent on keeping its position as a full-fledged aircraft manufacturer, Fokker

²³ Fokker proposed French participation in Fokker's new short to medium range airliner and Fokker participation in the Airbus A310. Fokker already had a 6.9% share of the Airbus A300 program. Fokker also wanted to participate with Dassault/Breguet in the Atlantic maritime patrol aircraft program which the Dutch navy was considering as a replacement for existing maritime patrol aircraft (Aviation Week and Space Technology, 30 October 1978: 31).

²⁴ This aircraft featured 6 abreast seating and a range of 1,500 nautical miles. A stretched version could hold 156 seats. Unlike the F-28 and Super F-28, which had the engines mounted at the rear of the fuselage, the F-29 was to feature wing mounted engines. The market for the F-29 was estimated at 1,500 to 1,600 aircraft over the 1985-1993 period (Aviation Week and Space Technology, 12 November 1979: 133; Flight International, 1 December 1979: 1814).

²⁵ As the push to get the F-29 launched got under way, Fokker undertook a major effort to find international partners. It signed an agreement in principle with Boeing for the latter to manufacture fuselage sections for the F-29. The F-29 fuselage cross-section was based on that of the Boeing 737. It also met with Japanese industry and government officials to promote Japanese participation in the project. Fokker wanted Japanese industry to be responsible for wing design and production, a task that would represent about one-third of the development costs. Fokker also held discussions with other U.S.-based aerospace firms. Fokker was hoping to have the F-29 launched by early 1981 (Flight International, 17 November 1979: 1641; Flight International, 9 February 1980: 363).

intended to maintain control over the design and marketing of the aircraft (Aviation Week and Space Technology, 12 November 1979: 133; Flight International, 1 December 1979: 1814).

Fokker continued to develop its proposals for the F-29, but the Dutch government had set down finding an international partner as one of the requirements for public funding of a new 150-seat aircraft²⁶. By May 1981, Fokker had fulfilled this requirement, announcing plans for the establishment of a partnership to design and produce a new 150-seat aircraft with McDonnell Douglas that would be known as the MDF-100²⁷. The agreement provided for an equal sharing of the financial requirements of development, but the project was open to other risk-sharing partners²⁸. Preliminary design work and market studies would be undertaken, but the decision to go ahead and produce the aircraft would not be made until sufficient orders were received. It was hoped that the aircraft would enter service in 1986. Fokker hoped that partnering with McDonnell Douglas would provide the requisite sales through access to the US market. Up to the time of the partnership announcement, Fokker had spent about \$75 million on development studies for the F-29, including \$50 million provided by the Dutch government. Satisfied that the requisite international partnership had been

²⁶ Early in 1980, Airbus approached Fokker about submitting a joint project for a new narrowbody to the Japanese. Airbus was presenting its proposal for a new 130-160 seat SA series narrowbody, later to become the A320, to the Japanese at the same time Fokker was putting forward its proposals for the F-29. But Fokker's attention was more focused on both the Americans and the Japanese. Instead of just supplying fuselage sections as a subcontractor, Boeing was considering moving towards becoming a full partner in the F-29. Its own proposal for the same market, a derivative 737 model known as the 737-300, was in some doubt and Boeing was looking at the F-29 as an alternative. Fokker presented a tripartite Dutch-U.S.-Japanese proposal for the F-29 to the Japanese in the fall of 1980 (Flight International, 30 August 1980: 849-852; Flight International, 15 November 1980: 1845).

²⁷ The two companies were searching for international partners for their new aircraft programs in the 150-seat category: The Fokker F-29 and the McDonnell Douglas DC-11 (Aviation Week and Space Technology, 11 May 1981: 33)

²⁸ Program offices would be established by both companies, with a supervisory board with equal representation from both firms.

achieved, the Dutch government announced its willingness to fund a portion of the \$1 billion Dutch investment for the MDF-100 using a combination of guaranteed loans and credits (Aviation Week and Space Technology, 11 May 1981: 33; Aviation Week and Space Technology, 8 February 1982: 51, 55).

In early February 1982, the difficulties Fokker faced with international collaboration once again became evident as Fokker and McDonnell Douglas announced the termination of the MDF-100 program. A disagreement over cabin layout, the costs of developing the aircraft, the depressed commercial aircraft market, and a lack of orders all contributed to the cancellation of the project. The unavailability of a new fuel-efficient engine in the near future and lower than expected fuel prices also contributed to the decision to end the project. Fokker was expecting launch orders for about 50 to 100 aircraft before giving the final go-ahead for the new aircraft. It wanted to avoid a repeat of the VFW-614 where design and production were undertaken with few sales prospects. Fokker could afford to write off the \$77 million invested in the MDF-100 up to the time of cancellation, but it could not afford to write off the hundreds of millions that would have been committed to build the aircraft (Aviation Week and Space Technology, 15 February 1982: 34; NIVR, 1997: 62-65). Like the VFW merger adventure, the failure of the McDonnell Douglas partnership left both Fokker and the Dutch government facing major questions about the future of the national champion.

1980 to 1996: The Netherlands, Neo-Liberalism and Fokker in Crisis

The crisis of the Dutch economy, that had become all too apparent during the 1970s, laid the basis for a break from the socially managed market economy model embraced during the postwar years. According to some observers, in fact, the crisis opened the way for the adoption of a liberal policy paradigm in the early 1980s (Foppen, 1989; Hulsink and Schenk, 1998; Mccann, 1993). Neo-institutionalists would, however, look for continuities and to some extent they would find support in the Fokker case. As this section will show, the new government did not adopt a new-liberal position with respect to Fokker until 1996. As the crisis developed, and Fokker was transformed into a “troubled firm”, the government acted financially to rescue its national champion. In fact, government intervention reached its peak in 1987 when the government acquired an ownership interest in Fokker. This is consistent with the neo-institutionalist emphasis on path-dependent incremental change in the policy path. Nevertheless, signs of a new policy approach began to emerge as early as 1993, when the government permitted the takeover of Fokker by the German industrial giant Daimler-Benz. It culminated in a 1996 decision by the Dutch government not to extend financial assistance to Fokker in the light of a major financial crisis. The 1996 crisis, rather than the earlier shift in general economic policy, marked a break with the historical policy trajectory that would prove fatal to Fokker.

As Fokker contemplated its future options, a new government was coming to power in the Netherlands. The election of this new coalition government would

lead to a major shift in the economic policy paradigm, as the government was committed to instituting neo-liberal policy reforms. The new policy approach was a response to the recession of the early 1980s, which was very severe in the Netherlands. The government felt that most of the unemployment was due to structural factors and thus set out on a policy of change. "The policy aimed at strengthening the economic structure consists of reliable and healthy public finances (partly to support wage cost moderation), social security reforms, investment in public infrastructure (including the knowledge infrastructure) and...the improvement of market functioning" (Department of Economic Affairs, 1998: 1.19). The new policy direction was to adopt an approach that the new government felt was clearly more suitable for the challenges associated with the new techno-economic paradigm.

Prior to the election of the new government, the previous Dutch approach to industrial policy had come under attack. One government advisory body, the Scientific Advisory Council on Government Policy, put forward the view that the government was subsidizing the wrong firms, and it should reorient its focus from declining industries towards the sunrise industries. Others argued against subsidies because they inhibited the market mechanism from weeding out inefficient firms (Schenk, 2000: 6-7; van Tulder, 1984: 345). In response, the government appointed a "Commission on Advice on Industrial Policy" to examine the issues surrounding industrial policy, which reported in 1981. The Commission, headed by former Shell chief executive, G.A. Wagner, and dominated by business interests, recommended an approach to reindustrialization based on a sound

macroeconomic environment, with an emphasis on low employment and social costs. It urged increased labour market flexibility and lower energy prices. The report was critical of government support for declining industries and firms, and it urged the government to focus on more offensive policies such as developing knowledge infrastructure.

As Schenk argues, the Commission marked an important break with postwar Dutch policy as it “started to lead the Dutch away from the traditional corporatist way of consensus building, and towards Anglo-Saxon veneration of deregulation and privatization” (Schenk, 2000: 7). Van Tulder agrees: “The institution of the commission marked a new period in which the emphasis in the policy of the government gradually shifts from defensive to offensive, from domestic to export-oriented, from central to decentralized control, from institutionalized (neo)corporatism to so-called neutral and independent ‘commissions of experts’” (van Tulder, 1984: 345-346). As we shall see, the Commission was to have a major influence on the direction of Dutch industrial policy (Ruijter and Batten, 1999: 4; Schenk, 2000: 7; van Tulder, 1984: 345-346).

At the same time as the Commission was conducting its work, the policies of the previous decade had come in for increasing public criticism for their unwillingness to tackle the managerial problems of firms receiving government support. Unlike “neo-mercantilist” regimes or other socially managed economies such as Germany, the Dutch industrial policy tool kit lacked a means for becoming actively involved in the management and strategies of companies receiving

financial support. The government would provide assistance and encourage mergers, but it had been unwilling to take action to change management or have management institute new plans to improve performance. This lack of management and strategic innovation often resulted in continued poor performance by the troubled firms (Hulsink and Schenk, 1998: 243-244). As we shall see, although the government supposedly adopted new policies in light of these criticisms, its stance toward Fokker repeated the old errors. The government remained content simply to prod Fokker to make limited business strategy changes, and its attempt to improve management through the DASA merger would end in disaster. Other criticisms touched on the lack of solid criteria for the granting of support to industry, the lack of financial controls over funds spent, and the small employment impacts that the support was generating. In addition, support often went to firms that were not viable in the long run (Organization for Economic Cooperation and Development, 1986: 23, 26).

The new (1982) coalition government shared this critical interpretation of past economic policies, and thus instituted a major re-orientation of economic and industrial policy, based on a neo-liberal interpretation of the above debates. The new government adopted a three-track strategy designed to reverse the fortunes of the Dutch economy. One track emphasized a major reorganization of public finances to reduce the deficit, lower interest rates, and lower inflation. In 1982, the government was faced with an overall central government deficit of NLG 26.9 billion and the total national debt stood at NLG 144.7 billion (International Monetary Fund, 2001: 760-761). A second track emphasized an improved

business environment through a restoration of firm profitability, with an emphasis on reducing labour costs, industrial restructuring, and a reduction in regulation. The final track of the new government's program emphasized work sharing, to be achieved without any additional costs being imposed on business, as a solution to unemployment (Visser and Hemerijck, 1997: 100). Previous employment policies were rejected because such efforts could not overcome structural disadvantages such as high employment costs (Ruijter and Batten, 1999: 3).

In the area of industrial policy, the new government made a strong shift away from defensive support towards a more future oriented approach to policy. This move came at a time when negative policy legacies of past subsidy and merger policy had really come to the fore, as a result of scandals such as the RSV case. In 1971, after a period of major subsidies to the shipbuilding industry, the Dutch government encouraged a merger of many small troubled firms in the industry into one large firm known as RSV²⁹. Continuing difficulties at the new firm led to new subsidies, the total of which amounted to NLG 2.7 billion by 1981. When RSV came to the new government for more funding, the latter made it clear that there would be no further subsidies. With the company close to bankruptcy, a parliamentary inquiry was established to look into the RSV affair (Schenk, 2000: 5-6; van Zanden, 1999: 187; Strath, 1987: 155-156, 178 - 180). The inquiry, which "showed the lack of planning of government and RSV management and the absence of control of the spending of large government funds" (van Zanden, 1999: 187), provided ammunition to those opposed to industrial subsidies. "The RSV-

²⁹ Rijn Schelde Verolme

case became standard 'proof' of the impossibility of specific industrial policy and was invoked time and again to criticize ongoing, or preclude requested support measures" (Schenk, 2000: 5-6).

The aim of the new neo-liberal approach was to make policy more offensive with the objective of stimulating technology and reindustrializing the economy in accordance with the new techno-economic paradigm. The government hoped to reduce the decline of industry by improving business profitability and the business environment rather than through the old policy of grants and loans. The level of support and programs available to industry were substantially reduced. Remaining programs were redirected, with an emphasis on future oriented areas such as research and development. Ad hoc policies of the past were replaced by policies that focused on the adaptability and rapid adjustment of the market sector (Organization for Economic Cooperation and Development, 1986: 26; van Zanden, 1999: 189).

Defensive programs were reduced substantially, as the government eliminated most of the aid aimed at declining firms or sectors. This type of aid, now known as recovery financing, was reorganized and new direction was provided by a committee of business people who required evidence of future firm viability before they would agree to the granting of aid. Aid to several sectors, including steel and shipbuilding, was gradually phased out, and spending on defensive programs was reduced to a small percentage of total spending on

industry. New programmes for defensive purposes were only set up in exceptional circumstances (Organization for Economic Cooperation and Development, 1986: 29; Ruijter and Batten, 1999: 3). As we shall see, Fokker would experience increasing financial difficulties due to its two new aircraft projects and would become one of these exceptional cases.

There was also room for some more forward looking industrial programmes in the new coalition's policy agenda, many of them in line with an "innovation policy" approach. For instance, the government was seen to have a role as a catalyst in the formation of inter-firm alliances to develop new high technology products, and this also filtered through to its policy vis-à-vis Fokker. As we shall see, in order to help the company develop new aircraft, the Dutch government prodded Fokker into an international merger. There was also a role for government in increasing the flow of information on new technologies to smaller firms and in helping such firms undertake research and development. It could provide aid to risky product development projects where there were clear benefits, private sector finance was partly available, and where it could be shown that government support was essential if development was to proceed. Fokker's aircraft development projects clearly fell into that category. The government established programmes to assist firms in the pre-competitive stage of new product development, and to help firms in priority areas to undertake research and development and fund new technology and risky projects. The government also introduced policies to create an environment more favourable to research and development. This included a reorientation of the country's technological

infrastructure, including university research, towards the needs of the business sector. It has also introduced more selective policies aimed at specific problems, such as product quality or the introduction of information technology (Organization for Economic Cooperation and Development, 1986: 29-31).

A final element of the new government's agenda was the divestment of government holdings in government owned commercial and industrial corporations. "Based on the principle that the state is not an entrepreneur, successive governments during the last 10 years have had a policy of divesting shares in both newly and already established state NVs where and when there has no longer been any policy reason to maintain a shareholding" (van de Ven, 1998: 259-260). This policy would have a future impact on Fokker - but only after the government had assumed an ownership share precisely in order to save the ailing national champion.

These policies were built upon by successive governments. The Minister of Economic Affairs during the 1989 to 1994 coalition government of Social and Christian Democrats, reintroduced some financial support for industry. He was prepared to offer some support for firms in sectors that were high value added, emphasized know-how and technological development, and that maintained important positions in industrial clusters. This would include a firm like Fokker. With the assistance of the large banks, he also helped establish a fund to provide venture capital to Dutch firms. His successor, a member of the coalition government of Social Democrats, Liberals and Progressive Liberals, shifted the

emphasis more to “knowledge” as the critical factor in the competitive success of Dutch firms. The government wanted to create the right conditions for knowledge development and act as a stimulator of such development through its procurement practices (Ruijter and Batten, 1999: 4; van Zanden, 1999: 190-191).

These policy changes did not prevent large firms that were important in the Dutch economy from gaining government support. Firms like Hoogovens in steel, Volvo in automobiles, DAF in trucks, and Philips in electronics were able to call on government support. Even with the shift to technology policy, the largest firms took the majority of the funds under the technology programs (Hulsink and Schenk, 1998: 243; Schenk, 2000: 7; van Tulder, 1984: 347-348; van Zanden, 1999: 190). As we shall see, Fokker was able to count on this support, but not on an indefinite basis.

As the government moved into the 1980s and 1990s, the Dutch aircraft industry would require continued attention. The industry benefited from the fact that it represented a high technology industry of some importance to the Dutch economy. The aircraft industry in the Netherlands was important in terms of production, employment, R&D expenditure, and trade. In the eighteen years between 1978 and 1996, average annual production in the aircraft industry was NGL 2.8 billion per year. During that same period, an average of 100,000 people were employed in the industry, exports averaged NGL 2.9 billion per year, and imports averaged NGL 3.2 billion. Industry production reached its peak in 1992 at NGL 4.6 billion or the equivalent of 1.5 percent of total manufacturing production.

Industry employment reached its peak in 1991 at 124,000 workers or 1.3 percent of total manufacturing employment (Organization for Economic Cooperation and Development, 1999: 240-253).³⁰ Over the 10-year period from 1988 to 1997, aircraft industry business enterprise expenditure on research and development averaged NLG 119 million per year. In fact, the peak years occurred in 1988 and 1997 when NLG146 million was spent on R&D, equivalent to 2.6 percent and 2.3 percent, respectively, of total manufacturing business enterprise expenditure on R&D (Organization for Economic Cooperation and Development, 2000: 104-105)³¹.

The election of a neo-liberal government came just at the time when Fokker was deciding on its options for new aircraft development. The demise of the MDF-100 was a major setback for Fokker's expansion plans. As one observer noted, "Fokker had lost valuable time and now had to take important strategic decisions in a very short space of time" (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 3). To sustain the company's long-term future, Fokker needed to develop new products, and it decided to concentrate its efforts on updating the company's F-27 turboprop and its F-28 jet. The F-28 upgrade, to become known as the F-100, would involve a fuselage stretch and feature new engines and a digital cockpit. Two thirds of the \$300 million in development costs would be required for the development and pre-production costs of the F-100. The F-27 upgrade, to be known as the F-50, would involve the addition of new engines, the related structural changes, and a new digital cockpit (Aviation Week and Space

³⁰ OECD estimates.

Technology, 5 December 1983: 32; Flight International, 10 December 1983: 1513). In the fall of 1982, Fokker's supervisory board gave its general approval to this effort and this became known as the "twin track decision". Fokker's initial estimate of its own share of development costs for the two aircraft was NLG 70 million. The board also indicated that Fokker would maintain a family of aircraft of three different types, and this would require the development of a new aircraft. Fokker was open to another joint project, but only if the company was the lead member of the group (Aviation Week and Space Technology, 6 September 1982: 278; NIVR, 1997: 68, 72; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 4-8).

Once again, the NIVR stepped in to help Fokker. It funded feasibility studies for the F-27 and F-28 upgrades. It also looked at options for another joint venture 150-seat project and instituted a technology development program in 1986 to maintain industry expertise (NIVR, 1997: 65). The firm also needed help with the development costs, however, and here it looked to government for support, expecting the same terms as had been offered in the past, with the Dutch government providing 45% in direct funding, 45% through government guaranteed loans, and the remainder financed by Fokker itself. Direct government aid would be repaid based on royalties on each aircraft sold (Aviation Week and Space Technology, 5 December 1983: 32; Flight International, 10 December 1983: 1513). Without this state support, Fokker's future as an aircraft builder was threatened because it could not provide all of the funding from its own resources.

³¹ OECD estimates.

Despite the ruling coalition's aversion to providing financial support for industry, the government decided to support Fokker. In late 1983, the NIVR submitted plans for the development of the Fokker 50 and 100 to the government. In 1984, the Ministry of Economic Affairs approved a financing arrangement on the same terms as in the past. The approved budget for the Fokker-50 was NLG 383 million and for the Fokker 100 it was NLG 488 million. Fokker, therefore, had to fund NLG 87 million from its own sources, somewhat higher than its original estimate, and any cost above the budgeted limit would also have to be met by Fokker. In 1986, the government increased its contribution to the F-100 to NLG 521 million (NIVR, 1997: 68, 72; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 8). Fokker's cluster partner KLM would also assist the company by becoming the second customer for the F-100, after the Dutch Transport Minister decided on the purchase of 10 of the aircraft (Aviation Week and Space Technology, 3 June 1985: 71). The government could justify such support on its forward-looking high technology agenda, which permitted state financial assistance for risky technology projects, where the private sector provided some of the funding and the project required state support to proceed. Thus, the old policy path that emphasized support for the national champion Fokker and its aircraft development projects continued, at least initially, with the new government.

However, the Fokker 50 and 100 programmes were plagued with financial problems. In part these stemmed from the fact that Fokker underestimated the extent of innovation required and thus the costs. Since the aircraft were derivatives, Fokker expected to reach break-even on the two projects rather

quickly (Aviation Week and Space Technology, 5 December 1983: 32; Flight International, 10 December 1983: 1513). It soon became clear, however, that the simple derivative upgrade strategy would not be enough to meet airline needs. Fokker needed to develop two essentially new aircraft. For the Fokker 50, for example, instead of having only 20 percent new parts, 80 to 90 percent of the parts had to be new or substantially modified³². Major changes were also required to develop the Fokker 100. The idea that the new aircraft could evolve from the older types with minimum changes was not sustainable (Flight International, 10 December 1983: 1513; Aviation Week and Space Technology, 26 August 1985: 34-37; Aviation Week and Space Technology, 16 September 1985: 44-47).

Fokker's lack of recent experience in developing a new aircraft and producing parts for a new aircraft meant that the development process was also slower than expected and delays in development led to delays in series production. The cost of customer-demanded modifications further delayed production and boosted costs. In order to recover the costs of development and start-up, Fokker needed to achieve a high level of production and this required large orders from major airline customers. It was hard for Fokker to negotiate a solid price with such customers in a highly competitive market. With aircraft sales prices set in dollars, Fokker was also hit by a falling dollar. The result was that the revenue generated per aircraft sold was below the average total cost to produce the aircraft, resulting in substantial deficits for both programmes. Development

³² For example, Fokker had to utilize an advanced digital cockpit, switch from pneumatic to hydraulic systems, and it had to undertake a major redesign of the fuselage. There was also a major increase in the use of composite materials to save weight (Aviation Week and Space Technology, 26 August 1985: 34-37; Aviation Week and Space Technology, 16 September 1985: 44-47).

costs and series start up costs were capitalized and this led to a continuously rising breakeven factor. In the end, Fokker's share of the development costs for the Fokker 100 and 50 was more than 10 times higher originally expected³³ (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 15-35).

By 1987, the deteriorating position at Fokker had become evident.³⁴ To make the company more cost competitive, management at Fokker restructured the organization in 1986,³⁵ but by then the company was on the brink of bankruptcy. The government was faced with the prospect of funding a bailout of its national champion. In late 1987, Fokker reached an agreement with the Dutch government and the banks on a financial restructuring of the company. This would be the first of several such episodes (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1987: 24, 34; Aviation Week and Space Technology, 7 September 1987: 49; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 64).

³³ By the end of 1983, Fokker had budgeted \$300 million to launch upgraded versions of the F-27 and F-28 aircraft. (Aviation Week and Space Technology, 5 December 1983: 32; Flight International, 10 December 1983: 1513). Fokker initially estimated that its own development costs for the two projects would amount to some 70 million NLG (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 7-8). In the end, Fokker's share of the development costs for the Fokker 100 and 50 were more than 10 times higher than what was originally expected. Instead of the original figure of NLG 70 million, the actual development costs that had to be born by the company amounted to NLG 755 million (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 15-35).

³⁴ In the first six months of 1987, Fokker lost \$1.65 million and was heading for a overall loss for the year. The rising costs of development for the F-100 and F-50 and delays in bringing them into production were the major factors contributing to the loss. Aircraft sales were lower as sales of both the F-27 and F-28 were being wound down. Fokker's subcontract work, for example, for Airbus, and its work on the F-16 were profitable (Aviation Week and Space Technology, 7 September 1987: 49).

³⁵ As of January 1, 1987, Fokker would consist of a corporate centre and six operating companies. N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker would form the main holding company. Fokker B.V. was split up into five operating companies: Fokker Aircraft Company (aircraft integrator and component manufacturer), Fokker Aircraft Services (aircraft overhaul and maintenance), Fokker Space and Systems (space Products), Fokker Special Products (industrial products), Avio-Dieppen (technical trading company). Aircraft Finance and Trading, which was previously a subsidiary of the company, made up the sixth operating company. The changes were designed to allow the operating companies a high degree of independence in their day to day operations and thus improve overall performance (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1987: 24, 34).

Despite the government's neo-liberal orientation and aversion to company bailouts, intervention reached its peak at this point as the government decided to take an equity stake as part of the restructuring process. This stake was designed to provide a signal to investors that the Dutch government felt that Fokker had a future as an airplane manufacturer (van Kooten, 6 November 2000). Here we see evidence, despite the government's neo-liberalism, of the persistence of the old policy path emphasizing state support for Fokker. In fact, the move by the government to buy an equity stake in Fokker marked a shift in the direction of a more interventionist approach than was present in past policy where Fokker was totally privately owned.

The government granted an additional NLG 212 million to the company to cover the development costs of the Fokker 100 and Fokker 50. Part of the money was to be used by the Dutch government to acquire an ownership interest in the company by way of a rights issue. Fokker was to initiate a rights issue, and any shares not taken up by shareholders would be bought by the government. If no one purchased the shares offered, the government would have acquired a 49% stake in Fokker. The remainder was to be made into a convertible subordinated loan that was free of interest. Under the deal, the government would also acquire 26 of the 50 priority shares of the company. Development funds³⁶ from the NIVR would be converted into a convertible subordinated loan owed to the government. The conversion right attached to this loan could only be exercised if Fokker was faced with a foreign takeover or a merger with another company. Government

³⁶ NLG 433.2 million.

guaranteed development funds³⁷ were changed into a conditional subordinated loan. Repayment of both loans would be based on aircraft deliveries. Credit with the banks was to be increased to NGL 550 million for short-term credit and NLG 275 million for mortgage loans. The government also obtained some control over the membership of the Supervisory and Executive Boards, obtained the right to periodic reports from management, and it obtained access to the company accounts. The firm was required to reduce costs by NLG 200 million by 1990 and make an effort to find an industrial partner (Aviation Week and Space Technology, 2 November 1987: 44; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1988: 11; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 126-127).

Some of these conditions represented the government's attempt to prod Fokker into adopting a production and management approach that was more in line with the emerging post-Fordist techno-economic paradigm. Fokker management was not entirely happy with the restructuring arrangement (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1988: 11), but the rights issue took place in May 1988. Shareholders acquired 70 percent of the shares issued and the government bought the remaining 30 percent. This gave the government only a 16 percent share in the company, but it wanted a larger share. It insisted that Fokker have a second rights issue, and this issue increased the government's ownership stake in the company to 31.83% (AirFinance Journal, September 1988: 36; Aviation Week and Space Technology, 2 November 1987: 44; Aviation Week

³⁷ NLG 491.7 million

and Space Technology, 24 October 1988: 79; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1989: 9).

Under government pressure to find a new industrial partner, Fokker launched a series of discussions that once again showed the difficulties in establishing such international partnerships. Fokker made repeated and unsuccessful attempts to enter into an arrangement with Boeing. Fokker also discussed collaboration with ATR, the Franco-Italian aircraft consortium, and British Aerospace. Both of those efforts failed because of national industrial concerns which would continue to hinder the rationalization of the European commuter and regional aircraft manufacturing industry. Fokker and ATR could have brought together the former's regional jets with ATR's turboprops, but Fokker refused to drop its own Fokker 50 turboprop that competed with the ATR 42 and 72. Fokker and British Aerospace had competing jet and turboprop programmes³⁸ and neither firm was willing to drop one of its programs. At this point, Fokker started discussions with Deutsche Aerospace (DASA) with whom it planned to cooperate in the development of the F-100, but this alliance, too, was fated to fall apart (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 98-101).

Despite the growing financial difficulties with its two new aircraft programmes, Fokker began to examine the possibility of adding stretched versions

³⁸ Fokker produced the Fokker 70 and Fokker 100 jets which competed with British Aerospace's Bae 146/RJ family of regional jets. Fokker produced the Fokker 50 which competed with the British Aerospace ATP/Jetstream 61.

of both the F-50 and F-100 to its aircraft line³⁹. In late 1990, Fokker moved closer to launching the F-130, a larger derivative of the F-100 than had previously been planned. The F-130, seating 130 passengers, would be part of a Fokker family of jets that would include the F-100 and a smaller 70-80 seat derivative. Fokker expected that the government would cover half the costs through loans from NIVR, in line with the past policy direction. A launch decision was expected in the fall of 1991, but in October, Fokker announced its intention to first go ahead with the smaller 70-seat derivative of the Fokker 100 (Aviation Week and Space Technology, 15 February 1988: 110; Flight International, 7-13 November, 1990: 5; Aviation Week and Space Technology, 26 November 1990: 111; Flight International, 16 - 22 October 1991: 4- 5; Flight International, 4 -10 March 1992: 4).

Fokker's decision to launch a family of regional aircraft put it into conflict with DASA. DASA's MBB subsidiary had previously been involved in talks with the Chinese to develop an 80-seat regional jet aircraft that was known as the MPC75. In late 1990, DASA announced its intention to develop an 80 to 130-seat family of regional aircraft that would become known as the Regioliner, in partnership with other European companies. The intention was to form a consortium with Aerospatiale of France and Aeritalia of Italy. If DASA went ahead and launched its family of regional aircraft, this would cause major problems for the F-100. DASA's new aircraft family would compete directly with the Fokker family of regional jets. Fokker wanted to keep DASA as a partner, but it wanted DASA to make a decision

³⁹ The F-50 was designed to accommodate a future stretch and Fokker was looking at a 62 passenger version that was known as the F-50-200. Fokker was also examining the possibility of stretching the F-100 so that it would accommodate 115 to 120 passengers (Aviation Week and Space Technology, 15 February 1988: 110).

between the Fokker programmes and the Regioliner program (Flight International, 7-13 November 1990: 5; Flight International, 7-13 November 1990a: 5; Flight International, 14-20 November 1990: 26; Flight International, 16 - 22 October 1991: 4-5; Flight International, 4 -10 March 1992: 4; Aviation Week and Space Technology, 19 November 1990: 32; Aviation Week and Space Technology, 3 December 1990: 34; Flight International, 5-11 December 1990: 5; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 133).

By early 1992, it had become clear that DASA's strategy for the regional jet market had shifted when it began exploratory talks with Fokker over a more strategic relationship in the sector. Both companies saw the rationalization of the European regional aircraft industry as the goal. The regional aircraft market could not support the development of two regional jet families, so joining forces on one family made economic sense (Flight International, 11 - 17 March 1992a: 4; Flight International, 25 - 31 March 1992: 6; Flight International, 6 - 12 May 1992: 11). By May, it became clear that DASA was proposing to acquire a majority interest in Fokker. Fokker had moderated its position on the Regioliner issue by suggesting that DASA only delay the aircraft family by three years. In July, the two companies appeared to agree on certain management issues, the key one being Fokker's role, within the DASA group, as the lead in the development of aircraft in the 65 to 130 seat market. In July, the Dutch government indicated that it was not happy with the deal that was being negotiated. It was concerned about DASA's proposed majority stake. The government wanted the Dutch firm to have the lead role within the group in the regional aircraft market, and it also wanted to ensure

that Fokker's capability to design, manufacture, and market regional aircraft would be maintained. The government sought guarantees from DASA on these issues (Flight International, 13 - 19 May 1992: 4; Flight International, 24-30 June 1992: 8; Flight International, 22 - 28 July 1992: 5).

Between July 1992 and April 1993, Fokker, DASA, and the Dutch government entered into a series of negotiations that would eventually lead to DASA taking a majority stake in Fokker. In late July, the three parties reached a general agreement whereby a new holding company would be established that would own 51% of Fokker. DASA would then own 78 percent of the new holding company. The Dutch government would sell its shares in Fokker to the new company, and would then use some of the money from the sale to buy a 22 percent stake in the new holding company, with the intention of selling these shares within three years. A new supervisory board with nine members would be established at Fokker, with five of the members coming from the new holding company. Dutch shareholders would select the remaining members to include a government representative exercising veto rights for three years. Other partners, such as Aerospatiale and Alenia, were free to join the group as long as they were prepared to abide by the terms of the agreement. Fokker was to remain a full aircraft manufacturer with development, manufacturing, and marketing responsibilities for regional aircraft in the 65-130 seat category (Aviation Week and Space Technology, 3 August 1992: 34; Flight International, 29 July - 4 August 1992: 4; Flight International, 5 - 11 August 1992: 6.; Flight International, 5 - 11 August 1992a: 22).

The Fokker 50 was not included in the agreement⁴⁰, but later in the negotiations, the Dutch government unexpectedly raised the issue, seeking guarantees from DASA on the future of the aircraft. Here again, the old policy direction becomes evident as the government worked to protect the position of its national champion. The Dutch government wanted the production of the Fokker 50 maintained until the year 2000. DASA, however, felt that the aircraft had a limited future, and it wanted to concentrate its efforts on a stretched version of the 32-seat Dornier 328 produced by DASA's Dornier subsidiary (Flight International, 9 - 15 September 1992: 15; Flight International, 21-27 October 1992: 4). The Dutch government ultimately backed down on its demands for the Fokker 50, however. The two parties agreed that the F-50 could be discontinued in the future as long as it did not threaten the viability of the company (Aviation Week and Space Technology, 2 November 1992: 19; Avmark Aviation Economist, November 1992: 2; Flight International, 4 - 10 November 1992: 5).

By October, the three parties agreed in principle on the specifics of the takeover, including the shares to be purchased and their price⁴¹. As the government remained concerned about giving up complete control over its national champion to a foreign merger partner, it put in place several measures to maintain some control over its national champion, at least for the initial period. DASA would

⁴⁰ If Aerospatiale and Alenia were to join the group, the future of the Fokker 50 would be in doubt because of its conflict with the ATR-42 which was manufactured by the former two firms (Aviation Week and Space Technology, 3 August 1992: 34)

⁴¹ DASA was to purchase Fokker's shares at NLG 37 per share. The new holding company would purchase 51 percent of Fokker shares by buying the Dutch government's 10.6 million shares and by purchasing 13.2 million new shares. The total value of the deal was NLG 880.6 million (Aviation Week and Space Technology, 2 November 1992: 19; Avmark Aviation Economist, November 1992: 2; Flight International, 4 - 10 November 1992: 5).

appoint 5 of the 9 supervisory board members, but a majority of seven votes would be required for major decisions. In order to protect Fokker, the Dutch government would nominate one of the four independent board members until the year 2000, and it also retained veto power over major changes to the agreement for three years. The agreement safeguarded Fokker's role as the lead role in the 65 to 130-seat aircraft market. The government achieved one of its major objectives, which was to safeguard the position of its national champion as a designer, manufacturer and marketer of regional aircraft (Aviation Week and Space Technology, 2 November 1992: 19; Avmark Aviation Economist, November 1992: 2; Flight International, 4 - 10 November 1992: 5). In February 1993, the three parties finally concluded the details of the agreement that allowed for DASA⁴² to assume control of Fokker⁴³. DASA would buy the government stake in Fokker in two phases with one-half purchased immediately and the other half in 1996. The new holding company would issue bonds for NLG 334 million. DASA would purchase 51 percent of the bonds and the remainder would be publicly sold, backed by a government guarantee (Aviation Week and Space Technology, 22 February 1993: 27; Flight International, 24 February - 2 March 1993: 6).

The definitive deal between Fokker, DASA and the Dutch government was signed on April 27, 1993. With this deal, DASA agreed to invest NLG 723 million

⁴² The takeover by DASA meant that Fokker had been taken over by a successor of its previous German merger partner - VFW. The VFW-Fokker merger was dissolved in 1980 and VFW was then merged with MBB. Deutsche Aerospace took over MBB in 1989. Deutsche Aerospace was the aerospace arm of Daimler-Benz. It included the aircraft maker Dornier (that produced regional and commuter aircraft) and the aircraft engine manufacturer MTU. In 1995, Deutsche Aerospace became Daimler-Benz Aerospace (DASA).

⁴³ Fokker's share price was set at NLG 30. DASA would buy 13.4 million new shares of Fokker for NLG 397 million and would purchase the government's shares in Fokker in two phases. One half would be purchased immediately for NLG 156 million and the other half would be purchased for the same price in 1996 if the company achieved a set level of profit. DASA paid the government NLG 317 million for its 10.6 million shares in Fokker and the government turned around an invested NLG 121.9

in Fokker and the state agreed to provide a NLG 180 million government guaranteed loan to the company. The agreement would permit Fokker to officially launch the Fokker 70⁴⁴, the smaller 70-seat derivative of the Fokker 100. Fokker's cluster partner KLM would eventually buy a total of 12 Fokker 70 aircraft. Two other issues remained to be resolved, however. One centered on the launch of a 130-seat regional aircraft. The options were a stretch version of the Fokker 100 or the launch of a totally new aircraft. The other issue involved the widening of the group to involve DASA partners Aerospatiale and Alenia (Flight International, 17-23 March 1993: 10; Flight International, 28 April - 4 May 1993: 10; Flight International, 5 - 11 May 1993: 24).

Fokker viewed the takeover by DASA as a way of strengthening its position in the regional aircraft sector. On its own, Fokker lacked the financial resources to finance new products and survive the cyclical ups and downs of the industry. The link-up with DASA would provide Fokker with strong backing in the industry (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1993: 6). DASA had the financial and technical expertise, while Fokker would contribute a family of regional aircraft, a major marketing and sales organization, and an extensive product support network (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1994: 5). DASA saw the takeover as a way of directly entering the regional aircraft sector, a sector where it expected substantial medium to long-term growth. DASA also thought that its takeover of Fokker would allow it to establish the basis for

million for a 225 stake in the new Fokker holding company (Aviation Week and Space Technology, 22 February 1993: 27; Flight International, 24 February - 2 March 1993: 6; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 134).

⁴⁴ Even though the prototype of the Fokker 70 had been assembled and flown for the first time in early April, the signing of the deal allowed for the formal launch of the program.

leadership in the European regional aircraft sector. "Deutsche Aerospace has thus established the essential industrial and economic conditions necessary for building, together with Fokker, a future oriented, European manufacturing structure for regional aircraft" (Deutsche Aerospace, 1994: 40).

The Dutch government saw the deal between DASA and Fokker as a way of restructuring the European regional and commuter aircraft industry, and providing Fokker with a financially and managerially strong parent firm that would help improve the national champion's performance. In this agreement, there were elements present of both the old policy path and a new emerging path. In line with the traditional path, the agreement could be seen as but another instance of the search for an appropriate international partner for Fokker. The government also tried to guarantee Fokker's future within the DASA-led aircraft group by securing a leadership role for Fokker as a full-fledged regional aircraft manufacturer within the group. It did not want Fokker to become a simple subcontractor to the German parent. While the agreement did incorporate this protective element of the traditional path, it also had elements of a new emerging neo-liberal path. The government saw the deal as a way of extricating itself from the financing of the company. This policy approach was in line with the government's neo-liberal ideas that emphasized reduced support for industry and the divestment of state-owned holdings in commercial and industrial firms.

The merger between the two European aerospace companies was also in line with the views and ideas of the European Commission. The Commission had

been trying since the mid-1970s to develop a role for itself in aerospace policy, but the carving out of defense from the Treaty of Rome, and the refusal of members states to finance increased activity, limited its ability to act other than in the areas of competition policy and external trade (Hayward, 1994: 349-354). In a 1990 Communication from the Commission on the aerospace industry, the European Commission indicated that economies of scale were the crucial factor in industry competitiveness, and the structural problems facing the industry were due to its size and level of integration. The Commission argued that the “long-term viability of Europe’s aircraft industry will therefore depend more and more on the ability of the Member States and their aerospace companies to give precedence to a Community rather than a national approach” (Commission of the European Communities, 1990: 3). The Commission advocated action to make it easier for European firms to integrate (Commission of the European Communities, 1990: 3-9). A 1992 Communication from the Commission continued to emphasize the role of scale economies in the industry, pointing out that there were too many manufacturers of commuter and regional aircraft in Europe and world-wide, and the economics of the industry would lead to further rationalization (Commission of the European Communities, 1992: 6-8). European competition officials cleared the DASA -Fokker merger indicating that it would not lead to the creation or strengthening of a dominant position that would hinder competition in the internal market (Commission of the European Communities, May 10, 1993).

Like the VFW-Fokker tie-up, the takeover of Fokker by DASA involved a change in ownership for the national champion firm. Once again, Fokker was

transformed from a Dutch national champion firm into part of a European multinational champion firm. It again changed the institutional setting for Dutch civil aerospace policy by introducing a German element into the Dutch aerospace cluster. Dutch aerospace policy and development would, therefore, once again be subject to the interests of a foreign firm and a foreign government.

The DASA merger did not resolve Fokker's problems, however. While the negotiations for the Fokker takeover were underway, Fokker's financial position deteriorated, leading DASA to demand an additional NLG 200 million from the Dutch government to improve the capital base of the company. The additional support would be in the form of loan guarantees, and DASA would match the amounts contributed by the government (Flight International 27 January - 2 February 1993: 5; Flight International, 10 - 16 February 1993: 5). To deal with its financial problems⁴⁵, Fokker announced it was cutting production and its workforce in the first quarter of 1993.⁴⁶ (Flight International, 31 March - 6 April 1993: 4; Flight International, 14 - 20 April 1993: 14; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1993: 22). This was the first in a series of changes that Fokker implemented as it struggled to adapt to the more lean and flexible requirements of post-Fordism. Early in 1994, in light of a NLG 460 million loss for 1993, Fokker announced further plans to reduce its workforce and cut production

⁴⁵ In April, Fokker revealed that its net profits for 1992 amounted to NLG 20 million, down from NLG 77 million in 1991⁴⁵ (Flight International, 31 March - 6 April 1993: 4; Flight International, 14 - 20 April 1993: 14; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1993: 22). A small profit in the first half of 1992 was turned into a loss of NLG 127 million for the first half of 1993. A NLG 90 million charge was also incurred for adjustments to the work force and production rates. Production of white tails (aircraft produced without a customer) led to high interest expenses (Flight International, 18 - 24 August 1993: 18).

⁴⁶ Fokker announced a cut of 2,118 jobs from its 15,500 man workforce. The job cuts and other measures were bring about cost reductions of NLG 270 million. Earlier in 1993, Fokker announced plans to reduce annual aircraft production. Production of the Fokker 100 was to be reduced from 59 to 40 aircraft per year and production of the Fokker 50 was to be

in the face of its continuing financial difficulties⁴⁷. The company wanted to modify its approach to business in line with the “lean and mean” interpretation of the new techno-economic paradigm. The company adopted a more flexible manufacturing process based on production to order. It also intended to streamline its organization, reduce production lead-time, and introduce more flexible work arrangements, as well as renegotiate its agreements with its subcontractors and partners to obtain lower costs. (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1994a: 3 - 12; Aviation Week and Space Technology, 14 February 1994: 57; Aviation Week and Space Technology, 21 February 1994: 45; Aviation Week and Space Technology, 14 March 1994: 39; Flight International, 16- 22 March 1994: 16).

In July 1994, the deteriorating financial situation at Fokker led the Dutch government to coordinate a series of negotiations designed to provide more financial support to Fokker, to help reduce the company’s debt load, and to deal with weak sales due to the aircraft industry downturn. The plan, contained in the July Master Agreement, involved Fokker, DASA, and the State. It was announced as Fokker incurred a record loss of NLG 196 million for the first half of 1994, including a NLG 225 million charge for restructuring and a sales slow-down. The plan contained three distinct elements. First, DASA was to provide a NLG 600 million convertible loan to Fokker, to be repaid through a future share issue.

reduced from 27 to 20. The cutback in production and jobs was due to the downturn in the world aircraft market (Flight International, 31 March - 6 April 1993: 4).

⁴⁷ An additional 1,900 jobs were to be cut on top of the 2,000 cut in 1993. The workforce was expected to drop from 12,000 in early 1993 to approximately 8,000. The combined production rate for the Fokker 100 and 50 was to be cut from 60 to 40 per year. The Fokker facility in Dordrecht, which produced aircraft sub-assemblies, was also to close. The shake-up also saw the resignation of Fokker Chairman Erik Jan Nederkoorn and his replacement by Ben J.A. van Schaik, former head of Daimler

Second, the government arranged a sale and lease back arrangement with the Dutch bank Rabobank whereby the latter would acquire Fokker's technological know how, mainly aircraft patents, for NLG 400 million and lease it back to the aircraft maker. The lease payments would be tax deductible. The final element was the establishment of a new leasing company to take over Fokker's leased aircraft portfolio, designed to reduce the burden of customer financing. Fokker would only take a minority share in the new company that was to be set up by the end of 1994. The objective of the plan was to return the company to profitability by 1996 (Aviation Week and Space Technology, 18 July 1994: 33; Flight International, 20 -26 July 1994: 5; Aviation Week and Space Technology, 29 August 1994: 32; Flight International, 31 August - 6 September 1994: 25; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1995: 6).

From the Dutch government's perspective, elements of the old and new policy paths were evident in the July Master Agreement. In line with past policy, the government did continue to support Fokker, but this time, reflecting elements of the new direction, support was not in the form of direct financial assistance as it was provided through the tax system. In fact, this agreement really marked a shift in favour of a new policy path that saw an increasingly limited role for the state. The Dutch government viewed the signing of this agreement as its final financial support effort for Fokker. "By signing the July Master Agreement the State aimed in due course to close the books on Fokker. There was no room for further government support, apart from development credits which were financed by

Fokker repayments”(N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 124-125). This willingness to wash its hands of Fokker meant that the broader policy line was at last being extended to one of its high-tech champions. This move was in-line with the emerging policy direction and the government’s view that the state should withdraw from providing “distress” assistance to firms in financial trouble. It is clear that the government wanted to push the policy path back to its original intended direction, with support for aircraft development and no distress funding.

By late February 1995, it became evident that Fokker faced another round of cutbacks. It was clear that the previous changes had not done what was needed to help the company to adapt to the new techno-economic environment. As was seen in Chapter three, commuter and regional aircraft manufacturers were forced to change their business models in the early 1990s in the face of the poor economic environment. This round of cuts at Fokker was driven by the need to match similar actions by competitors such as British Aerospace. Restructuring at competitors was leading to lower costs. The plan eventually announced called for further job cutbacks, lower production rates, and the elimination of excess capacity.⁴⁸ The financial results for 1994 showed another record loss at Fokker⁴⁹.

Week and Space Technology, 21 February 1994: 45).

⁴⁸ Fokker announced a further 1,760 jobs were to be eliminated, bring the workforce down to 6,700 by mid-1996. Job cuts would involve engineering staff, as the completion of Fokker 70 project and the use of new technology reduced the need for engineering staff. The production of subassemblies and components would be transferred to a new company, Fokker Aerostructures, which would lead to lower costs and allow the company to seek other aircraft industry business. Component production facilities at Ypenburg were to close, the company’s cabin interior division was to be sold, and the Schiphol headquarters would be shut and staff moved to the Schiphol airport facility. Fokker was also seeking to renegotiate contracts with subcontractors, partners and suppliers, including DASA, to reduce costs. A revamped sales organization would focus on standardized aircraft for the leasing market, and military and corporate versions of existing aircraft (Aviation Week and Space Technology, 6 March 1995: 30; Flight International, 8 - 14 March 1995: 6; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1995: 5-7, 18).

⁴⁹ The operating loss totaled NLG 622 million. A gain of NLG 427 million, that was associated with the technology sale and leaseback transaction with the Rabobank, helped to trim the net loss to NLG 449 million. Falling sales, the need to revalue its

(Aviation Week and Space Technology, 6 March 1995: 30; Flight International, 8 - 14 March 1995: 6; Flight International, 22 - 28 March 1995: 4; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1995: 5-7, 18).

Despite its financial difficulties, both DASA and Fokker continued to examine the potential for a new regional aircraft, including international efforts. In September 1993, Fokker was close to launching a stretched derivative of the Fokker 50, known as the Fokker 60, to meet the needs of the military and civilian markets. The military version of the aircraft was designed as a military transport aircraft, and the first order was expected from the Royal Netherlands Air Force for an initial 4 aircraft. The civil version would carry between 60 and 68 seats. Since the Fokker 60 would compete head-on with the ATR-72, the launch of the aircraft would make a team up of DASA-Fokker with the ATR partners more difficult. (Aviation Week and Space Technology, 6 September 1993: 28). In March 1995, Fokker and DASA reached a memorandum of understanding with a group of Korean aerospace companies to investigate the development of a new regional jet in the 100 to 120-seat category⁵⁰. Fokker and DASA also tried, once again, to interest British Aerospace in cooperation, but in 1995 British Aerospace joined with ATR to form Aero International Regional (AIR)⁵¹. This effort at European

leased aircraft holdings, and the costs of layoffs and restructuring contributed to the loss. A charge of NLG 150 million was taken to cover the costs of redundancies (Flight International, 22 - 28 March 1995: 4; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1995: 5-7, 18).

⁵⁰ The agreement was reached with the Korean Commercial Aircraft Development Consortium, a group made up of Samsung Aerospace, Daewoo Heavy Industries, Korean Air, and Hyundai Technology Development. It was expected that technology studies completed by Fokker as part of its Advanced Technology Small Aircraft (ATSA) would form the basis for the new aircraft. The project was seen as a way of strengthening the technology base of the countries involved and of promoting Asian-European co-operation. The DASA-Fokker proposal was in competition with other proposals for the same project from Boeing, British Aerospace, and Aerospatiale (Aviation Week and Space Technology, 20 March 1995: 39; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 97-101).

⁵¹ ATR and British Aerospace formed Aero International Regional (AIR) in January 1996. As part of the deal, British Aerospace decided to stop production of its money losing Jetstream 61 which competed with ATR products. The consortium was open to other European and Asian participants. AIR proposed to launch a new family of regional jets that would have

rationalization, therefore, did not include Fokker (Aviation Week and Space Technology, 20 March 1995: 39; N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997, p. 97-101).

The Demise of a National Champion

It was becoming increasingly clear that Fokker was facing a potentially fatal financial crisis. The loss in the first half of 1995 was expected to be greater than that for the all of 1994. In response to the deteriorating financial situation, DASA and the Dutch government entered discussions to come up with a financial plan to help Fokker. The negotiations centered on ways to strengthen the company's capital base. The loss for the first half of 1995 amounted to NLG 650 million, and the size of the loss was attributed to the weak dollar, the cost of the continuing job cuts, and the weak aircraft market. DASA was willing to continue to support its Dutch subsidiary because it was still strategically important to its plans for the aerospace sector (Flight International, 12- 18 July 1995: 5; Aviation Week and Space Technology, 21 August 1995: 27-28). In September, Fokker submitted a business plan to deal with the crisis to the Dutch government. The company indicated that it would be in a serious crisis unless the government approved of a major injection of cash into the company. The plan was based on an expectation that the government would contribute a capital injection of approximately NLG 2 billion. The government indicated that it would not allow Fokker to collapse, but it

competed with DASA/Fokker plans for the Fokker aircraft family. AIR did attract Korean interest in its jet family. The joint venture fell apart in 1998 after the partners could not come to an agreement to launch the family of regional jets (Aviation Week and Space Technology, 1 January 1996: 20-21; Aviation Week and Space Technology, 4 May 1998: 30; Flight International, 1-7 February 1995: 4; Flight International, 1-7 February 1995a: 4; Flight International, 28 January- February 1998: 4).

wanted to see a solid business plan, and more efforts toward European regional jet co-operation, before it would agree to provide any funding (Flight International, 13 - 19 September 1995: 6).

Negotiations with the Dutch government proved slow and difficult this time. Earlier, DASA had agreed to cover Fokker's liabilities until the end of 1995 while negotiations continued. In December, it agreed to take responsibility for Fokker's liabilities into 1996, as long as the Dutch government continued to negotiate over a refinancing package. There was resistance to giving any more money to Fokker, however, among Dutch politicians. Negotiations continued between the parties until mid-January, when it became clear that they could not agree on a refinancing package. DASA had offered to provide NLG 1 billion, if the Dutch government would provide the other NLG 1.3 billion. The Dutch government considered DASA's financial demands to be too high. (Flight International, 3 - 9 January 1996: 12; The Globe and Mail, 22 January 1996: B6; The Globe and Mail, 23 January 1996: B10; Aviation Week and Space Technology, 29 January 1996: 34; Flight International, 31 January - 6 February 1996: 6-7; Flight International, 31 January - 6 February 1996a: 6-7)

DASA and its owner, Daimler-Benz, were facing their own difficulties. Daimler-Benz posted a net loss of DM 5.7 billion in 1995 (Daimler-Benz, 1996: 51), with DASA alone losing DM 438 million in 1994 and DM 4.2 billion in 1995⁵² (Daimler-Benz Aerospace, 1996: 39, 50). In 1993, DASA had launched a major

⁵² The loss included a DM 2.3 billion provision for the termination of Fokker (Daimler-Benz Aerospace, 1996: 39, 50).

restructuring program to deal with the difficult economic environment. The plan included a strengthening of the core activities, the shedding of non-core activities, the loss of 10,300 jobs, the closure of several German factories, and the reorganization of production in the remaining plants (Daimler-Benz, 1995: 30-34). As the situation continued to deteriorate, more action was taken in 1995 (Daimler-Benz Aerospace, 1996: 8-9). Many in Germany attributed DASA's problems to Fokker, feeding the impression that German jobs were being sacrificed for jobs in the Netherlands. (Financial Times, 13 October 1995: 12). For DASA, the situation demanded NLG 1.3 billion from the Dutch government or nothing. On January 22, a meeting of the Supervisory Board of Daimler-Benz, the parent of DASA, was held to decide on the future of its Dutch subsidiary. At the meeting, Daimler Benz decided to halt its financial support for Fokker. As DASA indicated in its 1995

Annual Report:

Together with our parent company Daimler-Benz, we have done everything economically reasonable to assure Fokker a promising future. DASA had not only transferred more than DM 1 billion in equity capital to the company, but beyond that it had supported Fokker with a total of approximately DM 3 billion through the assumption of shareholder loans and the acquisition of leased aircraft.

In view of the additional expenditure of funds that would have been required to put Fokker on an economically sound footing as well as the extremely difficult long-term market condition, it was no longer acceptable for Daimler-Benz and DASA to bear the burdens for Fokker alone, especially since DASA - independent of the industrial management - held only a 40% stake in Fokker.

We therefore requested the Dutch government to make an adequate financial contribution in the form of an equity capital subsidy of NLG 1.3 billion for the restructuring of Fokker and consequently the preservation of the aircraft industry in the Netherlands. However, it was not possible to arrive at an agreement concerning this matter. Therefore, the Supervisory Board of Daimler-Benz, in a special meeting on January 22, 1996, gave approval to our recommendation to terminate the financial support of Fokker with

immediate effect. This decision averted a financial risk that was in no proportion to the strategic value of Fokker to the group (Daimler-Benz Aerospace, 1996: 9).

The Daimler-Benz decision signaled the end of DASA's ambitious plans for the regional aircraft sector.

The position of the Dutch government on the matter was clear. It felt that the NLG 1.3 billion injection of capital requested by DASA did not reflect the relative shareholdings held by DASA and the government. Moreover, it was not clear whether the NLG 1 billion contribution by DASA was in fact new funding. Nevertheless, the government was still willing to provide some assistance. Thus, the old policy path was still making itself felt. While the government was not interested in providing a large amount of new cash, it was willing to waive interest payments and defer repayment of development loans totaling NLG 800 million for a period of two years. The government believed that this would provide the company with about NLG 300 million in liquidity (N.V. Koninklijke Nederlandse Vliegtuigenfabriek Fokker, 1997: 159-170).

The government's ambivalence reflected domestic politics. The Fokker crisis had become a major media event in the Netherlands with widespread news coverage. The governing coalition was united in its position on Fokker, with the Ministry of Finance totally opposed to giving into DASA's demands. The opposition parties in parliament raised the possibility of continuing alone without DASA, while the workers believed the company should continue as an independent firm. The financial institutions that had exposure to Fokker were

worried and they urged the government to re-consider DASA's demands (van Kooten, November 6 2000). Fokker itself advertised to the public about its positive contributions to the Dutch economy, appealing to feelings of nationalism. An action group comprised of union members, ex-Fokker workers, and others, working under the name "Keep Fokker Flying", launched advertising campaigns stressing the importance of maintaining the company as a key source of technology and a key institution in the Netherlands. There was a feeling of powerlessness amongst the public as some felt that Fokker's fate was not up to the government, but would be decided by the operation of the global economy (Tyson, 1998: 353-364).

In line with the old path that emphasized international partnerships, the state wanted DASA and Fokker to find a European solution to Fokker's problems through entry into a European consortium. If that were achieved, the government was willing to make the repayment of the development loans dependent on the profit levels achieved by Fokker. The funding opened up by the deferred interest and payments on the development loans would be enough to keep Fokker going until a European solution to the problem was found. In line with its neo-liberal ideas, the government, however, was not interested in making a capital contribution to Fokker. DASA felt it would take time to find a European solution and, therefore, a capital injection was needed to write off old debts and losses and provide an adequate equity base. Attempts were made by both the Dutch government and the industry, including a meeting of European Ministers of Economic Affairs in Brussels in late 1995, to find a way to rationalize the sector, but these efforts failed. Once again, conflicting industrial interests kept the

European sector from rationalizing. The European Union's lack of power over the aerospace sector limited the role that it could play in any rationalization of the industry.

Several policies of the European Union worked against a major Dutch government rescue effort for Fokker. The crisis occurred at a time when there was concern over public finance in the Netherlands in light of the requirements for monetary convergence under the Maastricht Treaty. "The convergence criteria contained within the Maastricht Treaty, in particular, constrained the ability of the member states to fund industrial projects by means of deficit budgeting or increasing indebtedness. Once again, this had the effect of calling into question the rationale for the maintenance of industrial sectors in public ownership"(Menon and Hayward, 1996: 268-269). The Treaty specified that a Member State, in order to qualify for membership in the European Monetary Union, must have achieved a budget deficit of 3% of GDP or less and a government debt to GDP ratio of 60% or less by 1999. After starting out the decade of the 1990s with a deficit to GDP ratio below the target, the ratio exceeded the target in 1992 and by 1995 it was still above the target⁵³. The debt to GDP ratio was above the target ratio between 1990 and 1995⁵⁴. With both convergence criteria above the target levels in 1995, there was pressure on the government to reduce public expenditures or raise revenues. Both ratios improved vis-à-vis their targets in 1996 and 1997, with the

⁵³ After starting out the decade with a deficit to GDP ratio of 2.9%, below the 3% target, the deficit to GDP ratio rose 3.9% in 1992, 3.2% in 1993, 3.8% in 1994, and 4 % in 1995 (European Monetary Institute, 1998: 193).

⁵⁴ The Debt to GDP ratio rose from 79 % in 1991 to 80% in 1982 and 81 % in 1983. It fell to 78% in 1994, and rose again to 79% in 1995 (European Monetary Institute, 1998: 192)

deficit to GDP ratio falling below the target level⁵⁵ (European Monetary Institute, 1998: 192-193).

In addition to the impact of the Maastricht Treaty requirements, the European Union's rules with respect to competition, state aid, and public procurement would have placed some pressure on the government. EU rules on state aid and public procurement made it increasingly difficult for member states to support their national champion firms. Such rules "may lead to the reduction or even the abandonment of state support for national champions and make it increasingly difficult to pursue policies of industrial patriotism" (Kassim and Menon, 1996: 5). The European Union might have investigated any deal between the government and Fokker to determine whether it met the state aid requirements.⁵⁶

1996 and Beyond: Policy After The Crisis

The period from 1996 onwards can be characterized as a time when the Dutch government struggled to maintain its historic national champion policy path in the regional and commuter aircraft manufacturing industry. When this effort failed, the government ultimately had to re-orient its policies. Fokker went into protection from its creditors, and the firm and the government launched an effort to

⁵⁵ The deficit to GDP ratio fell to 2.3% in 1996 and 1.4% in 1997, while the debt to GDP ratio fell to 77% in 1996 and 72% in 1997 (European Monetary Institute, 1998: 192-193).

⁵⁶ In 1999, the European Union adopted the "Community Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty". Rescue aid is defined as temporary assistance to keep a firm afloat while a restructuring or liquidation plan is submitted to the commission and approved. Rescue aid must consist of loans or loan guarantees at commercial rates, must be repaid within 12 months, and must be warranted on the grounds of serious social difficulties and have no adverse effects on other Member states. It should be restricted to the amounts needed to keep the firm operating. A restructuring or liquidation plan has to be submitted to the Commission within six months of the granting of the aid. Restructuring aid is based on a long-term restore a firm's viability. Restructuring aid is conditional on the implementation of a restructuring plan that is endorsed by the Commission. It is approved only once. The aid must be designed to restore the long-term viability of the firm and avoid undue distortions of competition. The aid must be limited to the minimum amount needed to enable the restructuring to take

find a new industrial partner to save the Dutch manufacturer from extinction. These efforts clearly showed how the old policy path, which had emphasized support for Fokker, died slowly as the government remained willing to make a contribution to keep the company going. This reflected path-dependent incremental change along the policy path as predicted by the neo-institutionalists. When these efforts finally failed, however, the government abandoned its old policy path, reorienting its aerospace policies to deal with the fact that the focal point of that policy, Fokker, had disappeared.

Immediately after the Daimler-Benz decision, Fokker filed for protection from its creditors and began a search for new partners that could help keep the company alive. The Amsterdam Court protected Fokker from its creditors for a four week period⁵⁷. In order to give the company some breathing space, the government was willing to provide some short-term assistance. On January 26, the Dutch government arranged for a short term NLG 250 million bridge financing loan with the Dutch National Investment Bank. The Dutch Ministry of Defense also agreed to pre-finance its purchase of four Fokker 60 Utility military transports and it concluded an order for two Fokker 50 transports. These moves were designed to provide the company with more cash. (Aviation Week and Space Technology, 29 January 1996: 34; Flight International, 31 January - 6 February 1996: 6-7; Aviation Week and Space Technology, 5 February 1996: 36). In late February, the

place and the beneficiaries of the aid are expected to make a significant contribution to the effort. Detailed monitoring and annual reports must be submitted to the Commission. (Official Journal of the European Communities, 9 October 1999: 2 -9).

⁵⁷ The protection covered the parent company (Koninklijke Nederlandse Vliegtuigenfabriek Fokker NV), Fokker Aviation B.V. (responsible for production and assembly of Fokker aircraft) and Fokker Administration B.V. Stand alone self sufficient operations such as Fokker Aircraft (aircraft overhaul), Fokker Special Products (industrial activities), Fokker Elmo (electronics) and Fokker Space were not included.

Amsterdam Court granted Fokker a one month extension to its protection from creditors. In early March, the Dutch government extended Fokker's credit for another two weeks. These moves were designed to give the company more time to find a partner and negotiate a deal (Aviation Week and Space Technology, 26 February 1996: 32; Flight International, 6 - 12 March 1996: 4).

After failing to find a partner, on March 15, Fokker declared bankruptcy. At the time, Fokker had an order backlog of some 65 aircraft⁵⁸ (Flight International, 20 - 26 March 1996: 4; Aviation Week and Space Technology, 25 March 1996: 25-26). The bankruptcy trustees transferred the healthy subsidiaries of Fokker into a new company called Fokker Aviation B.V.⁵⁹ When the bankruptcy trustee approved additional aircraft production to give Fokker time to find new investors, the company received support from its cluster partner KLM through an order for 7 Fokker 70 aircraft (Flight International, 12 - 18 June 1996: 4; Fokker Aircraft Trustees B.V., June 1996: 3, 11; Fokker Aircraft Trustees BV, 5 October 1996: 15-16).

The Dutch government indicated its willingness to participate in the efforts to revive the company, albeit at a lower financial commitment than was called for

⁵⁸ During the bankruptcy, the State of the Netherlands and the NIVR made claims against Fokker for the government guaranteed loans and NIVR credits outstanding at the time of the bankruptcy. Fokker used these loans and credit for aircraft development. When Fokker went bankrupt, banks demanded repayment of the guaranteed loans and the State had to pay them under the guarantee. The State of the Netherlands made a claim for NLG 384.45 million and the NIVR made a claim for NLG 500 million (Fokker Aircraft B.V. Trustees, 3 November 1997: 12).

⁵⁹ These subsidiaries were Fokker Aircraft Services, Fokker Special Products, and Fokker Elmo. The product support and the aerostructures activities of the bankrupt part of Fokker were carved out and transferred to new companies known as Fokker FPS BV and Fokker Aerostructures BV. Both became subsidiaries of the new company Fokker Aviation BV. On July 17, an agreement was signed for the takeover of Fokker Aviation by the Dutch industrial conglomerate Stork N.V. Part of the deal required Stork to cooperate with any company that bought the aircraft assembly firm and would require Stork, for a two year period, to sell Fokker Aviation to the new owner of the assembly firm if that new owner wanted to reintegrate the two companies (Fokker Aircraft Trustees B.V., June 1996: 3, 11; Fokker Aircraft Trustees BV, 5 October 1996: 15-16).

by DASA. Thus, elements of the old policy path continued to linger. Efforts were also made to find a partner for the aircraft assembly firm and several firms expressed an interest in acquiring the company⁶⁰. Fokker was subsequently approached by approximately 30 companies interested in buying all or part of the company. The original focus was on selling the company as a whole. Bombardier of Canada, whose Irish subsidiary built wings for the Fokker 100 and 70 regional jets, expressed an interest, but it backed out because it considered a deal too risky. Samsung Aerospace of Korea also expressed an interest in acquiring the company and sent officials to evaluate the financial situation of the firm. Other aerospace companies, such as British Aerospace and Hindustan Aeronautics of India, also expressed an interest in taking over portions of the company such as product support. Attempts were also made to pull together a Dutch consortium to take over the company (Aviation Week and Space Technology, 12 February 1996: 28; Flight International, 7 - 13 February 1996: 6; Flight International, 14 - 20 February 1996: 12; The Globe and Mail, 28 February 1996: B2; Aviation Week and Space Technology, 18 March 1996: 33-34).

In November, the Dutch government finally approved Fokker's takeover by Samsung⁶¹. The parties reached a memorandum of understanding⁶² that included

⁶⁰ For example, Russian aerospace firms Tupolev and Yakolev expressed an interest in the company. The plan was to acquire the technology and tooling and transfer it to Russian facilities. The plan required loan guarantees from the Russian government for a \$ 200 million loan, but this loan guarantee never materialized (Aviation Week and Space Technology, 8 April 1996: 33; Flight International, 3-9 April 1996: 6; Flight International, 14-20 August 1996: 6; Fokker Aircraft Trustees B.V., 5 October 1996: 9).

⁶¹ Samsung showed a renewed interest in Fokker after it withdrew from a joint project with China to build a 100 seat regional jet. Samsung was part of the Korean Aircraft Development Consortium, a group of companies created to launch Korea into the aerospace industry by developing and building a regional jet. Other firms involved in the consortium included Daewoo Heavy Industries, Korean Air Aerospace, and Hyundai Space and Aircraft. This joint Korean-Chinese aircraft project was the same project that DASA-Fokker was involved in with the Koreans in 1995 (The Financial Times, 26 August 1996: 10; Flight International, 21 - 27 August 1996: 4; Aviation Week and Space Technology, 9 September 1996: 85). In mid-October Samsung presented its business plan to the Dutch government. The plan called for a new company to be established to buy Fokker, with the new company owned 70 percent by Samsung, 15 percent by the Dutch government, and 15 percent by Stork

government commitments to support the new Fokker. The government decided to take a 15% stake in the new Fokker, and it committed to providing \$255 million for the development of the Fokker 130. The government got reassurances that design, development, and management of the Fokker 130 would remain in the Netherlands. The old policy path exercised lingering effects, as the government struggled to revive its national champion. (Flight International, 13 - 19 November 1996: 6; Flight International, 20 - 26 November 1996: 6). The deal fell apart, however, after a delay⁶³ caused by the Korean government's decision to launch a commission⁶⁴ to review the deal (Flight International, 20 - 26 November 1996: 6;

NV. Production of the existing Fokker aircraft would remain in the Netherlands. A new 130 seat aircraft would be launched to extend the regional jet range, and it would draw on previous Fokker work on the Fokker 130. The new aircraft would be developed in the Netherlands, but assembled in South Korea. A new leasing company would be set up to handle leased aircraft and expand the potential market. Samsung was hoping to reach production of 45 aircraft per year in 1998 with an initial workforce of around 1,000 (The Financial Times, 26 August 1996: 10; Flight International, 21 - 27 August 1996: 4; Aviation Week and Space Technology, 9 September 1996: 85; Flight International, 11 - 17 September 1996: 4; Flight International, 25 September - 1 October 1996: 4; Flight International, 2 - 8 October 1996: 6; Flight International, 16-22 October 1996: p. 5; Aviation Week and Space Technology, 28 October 1996: 26-27; Fokker Aircraft Trustees B.V., 14 February 1997: 3).

⁶² The agreement would see Samsung take a 70% share in Fokker, with the Dutch government and Stork taking 15 percent each. Samsung would pay approximately \$150 million for its stake in Fokker, and another \$250 million would be required to recapitalize the company. The company was not expected to break-even until the year 2000. Initially, a Dutch workforce of around 1,100 workers would be employed manufacturing the existing Fokker aircraft until 2003. The launch of the Fokker 130 would follow quickly, with the launch cost of \$800 to \$900 million to be funded by the three shareholders. Samsung was expecting financial support from the South Korean government for the launch of the 130. The Dutch government agreed to provide \$255 million. Reflective of past efforts to protect Fokker's position as an aircraft manufacturer, the Dutch government wanted assurances that the design, development, and management of the Fokker 130 would remain in the Netherlands. The plan required Korean government approval (Flight International, 13 - 19 November 1996: 6; Flight International, 20 - 26 November 1996: 6).

⁶³ The delay in getting approval for the takeover upset the arrangements that the bankruptcy trustees had made with suppliers. On November 27th, Short Brothers, a subsidiary of Bombardier and the manufacturer of wings for the Fokker 100 and 70 aircraft, announced that it could no longer keep the Fokker wing production line open and would not manufacture the wings in the future. The trustees and Samsung could not change the company's mind. Shorts had found new work with other projects and needed the floor space for those projects. Shorts did offer to provide its drawings and tooling to anyone interested in restarting Fokker operations in the future abandoned. Other suppliers also began to demand payments to keep their facilities available. When it became clear that it would take substantial time for the Koreans to make their decision, the bankruptcy trustees broke off negotiations in late November. In January of 1997, the South Korean government gave formal notice that takeover had been abandoned (The Wall Street Journal, 29 November 1996: C13; The Globe and Mail, 29 November 1996: B7; The Financial Times, 29 November 1996: 1; Flight International, 4 - 10 December 1996: 5; Aviation Week and Space Technology, 9 December 1996: 31 - 32; Flight International, 8 - 14 January 1997: 16; Fokker Aircraft B.V. Trustees, 14 February 1997: 3-4).

⁶⁴ The Korean government appointed a 15-man commission to investigate the feasibility of the Fokker takeover (Flight International, 20 - 26 November 1996: 6; Fokker Aircraft BV Trustees, 14 February 1997: 3). A consulting firm was also hired to review the Samsung business plan and provide advice as to the feasibility of the takeover. The findings of the commission were to be presented to a government review board, headed by the South Korean Prime Minister, in December. The Korean Aerospace Research Institute also undertook to review the takeover and how it fit into the national aircraft development program for a new 100-seat jet. The government indicated that the takeover project would have to be widened to encompass other South Korean aerospace firms if the project was to receive government funding. In response, Samsung invited the other companies in the Korean Commercial Aircraft Development Corporation to participate in the takeover. The other members of the corporation were reluctant to get involved because they questioned the feasibility of the project and some of the firms were involved in competitive projects. For example, Hyundai and Korean Air were working with McDonnell Douglas on the 100 seat MD-95 project (Flight International, 20 - 26 November 1996: 6; Fokker Aircraft BV Trustees, 14 February 1997: 3).

Fokker Aircraft BV Trustees, 14 February 1997: 3; The Wall Street Journal, 29 November 1996: C13; The Globe and Mail, 29 November 1996: B7; The Financial Times, 29 November 1996: 1; Flight International, 4 - 10 December 1996: 5; Aviation Week and Space Technology, 9 December 1996: 31 - 32; Flight International, 8 - 14 January 1997: 16; Fokker Aircraft B.V. Trustees, 14 February 1997: 3-4).

With the Samsung deal dead, the trustees resumed their search for a buyer for Fokker. The trustees were put in touch with the Malaysian government investment group Khazanah Nasional in Kuala Lumpur. The Malaysian firm's interest stemmed from the government plan to make aerospace one of the country's strategic sectors for the future. Once again, the Dutch government expressed a willingness to support the restart of Fokker. Initially the government wanted to use the tax losses of the old Fokker to provide support, but difficulties with regard to the accelerated tax losses led the Dutch government instead to offer to invest NLG 475 million in the venture (Fokker Aircraft B.V. Trustees, 1 July 1997: 3 - 4). A memorandum of understanding reached in mid-March 1997 reflected the government's continued willingness to provide some assistance for its national champion. The agreement called for the state to have 38.5 percent interest in the revived company, with Khazanah owning 39 percent, Stork NV 12.5 percent, and a Dutch investment firm DIG 10 percent. The Dutch government was to provide NLG 400 million out of NLG 1 billion in new investment⁶⁵. It was also

⁶⁵ New capital, comprised of equity and subordinated loans, of NLG 1 billion would be invested in the new company. The Dutch government would provide NLG 400 million, Kazanah NLG 450 million, Stork NLG 125 million, and DIG NLG 25 million (Fokker Aircraft B.V. Trustees, 1 July 1997: 4; Flight International, 26 February - 4 March 1997: 10; Flight International, 16 - 22 April 1997: 7).

willing to provide NLG 75 million for training. (Fokker Aircraft B.V. Trustees, 1 July 1997: 4; Flight International, 26 February - 4 March 1997: 10; Flight International, 16 - 22 April 1997: 7). In the end, a final agreement between Khazanah and the Dutch parties could not be reached and the whole arrangement therefore could not be salvaged⁶⁶. With the collapse of this deal, and the lack of any other serious purchasers, the bankruptcy trustees decided to begin the liquidation of the company⁶⁷ (Fokker Aircraft B.V. Trustees, 1 July 1997: 5).

Faced with the demise of Fokker, the Dutch government sought to reorient its industrial policy in the aircraft sector. With a lot of the research infrastructure and industry activity previously centered on the activities of Fokker, something had to be done. In early 1998, the government announced its plans for the sector. The government examined five future scenarios for the Dutch aerospace industry. These options ranged from minimum government involvement in the industry to the maintenance of a self-supporting aircraft industry. The minimum support option included government support for the industry only through generic instruments, with the withdrawal of all structural support and support for the

⁶⁶ In order to provide for the continuation of the supply of components to Fokker by suppliers, the parties involved in the deal to restart Fokker had to make non-refundable restart payments to suppliers. All the parties were expected to share in these costs according to their level of ownership in the new venture. When Khazanah refused to pay its share, the deal between the Dutch parties fell apart (Fokker Aircraft B.V. Trustees, 1 July 1997: 5)..

⁶⁷ Plans to resurrect Fokker continued to arise from time to time. Beginning in early 1998, there was an attempt by a Dutch investor, with financial backing from Switzerland, to restart Fokker jet production. A new Dutch company, Rekkof (Fokker spelt backwards) Restart NV had purchased the tooling for the aircraft from the bankruptcy trustees and had the option to acquire the intellectual property rights from Stork Aviation. A restart decision was supposed to be made in September, but was delayed due to economic uncertainties in the world economy. A study done for Rekkof on the economic viability of restarting Fokker aircraft production showed that the project was viable. Ultimately, the restart project was abandoned (Aviation Week and Space Technology, 2 February 1998: 40; Flight International, 16 - 22 September 1998: 22; Aviation Week and Space Technology, 5 October 1998: 89; Flight International, 25 November - 1 December 1998: 17; Aviation Week and Space Technology, 28 June 1999: 51). Another Dutch company, Forward Aircraft, tried to resurrect Fokker 50 and 60 aircraft production for military purposes. As a start, it was hoping to supply the aircraft to the US military as a platform for its Aerial Common Sensor programme. The company believed that there was a market in smaller countries for these aircraft for special missions. Ultimately this attempt to revive Fokker 50/60 production was also abandoned (Flight International, 16 - 22 September 1998: 22; Aviation Week and Space Technology, 28 June 1999: 51).

research infrastructure. A second option saw continued government support for airport infrastructure and air traffic control with a major focus on environmental and safety concerns. The research infrastructure would be re-oriented to support these goals. A third option called for the preservation of an industry focusing on aircraft maintenance and the manufacture of components and subsystems. This option would see firms producing products to manufacturer's specifications with little R&D activity. The fourth option focused on the participation of Dutch aerospace firms in international collaborative programmes with government backing. The final option saw continuing support for a self-supporting aircraft industry and was based on a restart of Fokker (Ministerie van Economische Zaken, 1998: 4-5).

Despite its neo-liberal leanings, the government's new policy path could not completely abandon the industry to its own resources. Several factors worked to require continued state support for the industry:

The only certainty which exists in the aviation sector is that if the government withdraws its financial support from the relevant research infrastructure and from the projects to be conducted by these institutes and companies, the sector as a whole will soon collapse. This will be due not to unwillingness or lack of knowledge on the part of the various players but rather to the high risks to which the sector is exposed, the long pay-back periods involved, and, not least, the support that foreign research institutes and private companies are given by their own governments. International agreements made by the WTO to cover this last aspect have failed to alter this situation (Ministerie van Economische Zaken, 1998: 9)

The government, therefore, intended to continue its financial support for the industry. A key aspect of the new policy would be the willingness of industry to commit resources:

Such a commitment must be preceded by a reciprocal financial commitment by industry. It is this on which the success of these the strategy will depend. It must be made clear in advance - especially in the case of civil aviation programmes (but also for military programmes up to a point) - whether and to what extent the government's contribution will be matched by industry, especially as this is specified in WTO and European Union agreements and in bilateral treaties concluded between the EU and the United States governing large-scale aircraft projects (Ministerie van Economische Zaken, 1998: 14).

In other words, a financial commitment from industry was essential to the success of the new policy.

In the final analysis, the Dutch government selected a policy path that focused on the participation of Dutch aerospace firms in international collaborative programmes. This new path represented a major shift because it closed the door to the idea of a national champion aircraft firm in the Netherlands. The government based its continuing support for the industry on the employment impacts and "knowledge" basis of the industry. It would continue to support the "sectoral system of innovation" in the aerospace sector. The government would back the research activities of the NLR, including a strengthening of its capability to support industry participation in international programmes. The programmes of the NIVR would continue, with added emphasis on the international dimension. An evaluation would also be undertaken of the NIVR to determine how the new industrial policy for the industry would impact on its activities. Support would be maintained for higher education, for example at Delft Technical University, focused on the skills needed by the aerospace industry. The government would seek a share in future Airbus programmes such as the long range A340-500/600 program

and the A3XX super jumbo. For the 7-year period from 1997 to 2003, the government budgeted NLG 320 million for support for Dutch companies to participate in Airbus programmes. Included in this was bridge funding for short-term R&D projects until the Airbus work came on line between 2002 and 2004. This money would be available through an increase in the NIVR revolving fund. The remaining NLG 245 million would be available for Airbus related projects over a seven-year period. The government would also work with the industry and research institutes to position the industry to participate in a programme to replace the F-16 fighter. A Military Aircraft Technology Programme would be established and funded at NLG 200 million between 1998 and 2001 (Ministerie van Economische Zaken, 1998: 14-19).

Reflections on the Fokker Case

For most of the post war period, the Dutch government adopted an industrial policy path that emphasized a national champion strategy in the commuter and regional aircraft industry. The government supported the development of Fokker, its national champion firm in the industry. This policy path was in line with neo-institutionalist expectations of relative policy stability over time as the government continued along its historically-based policy trajectory. The period from 1919 to 1986 has been described as the period during which Fokker was built up into the Dutch national champion. As we have seen, the Dutch government, operating in a “socially managed organized market economy”, was not willing to leave the development of the industry solely to the market. During this period, the government used several tools to help develop the national

champion firm, including aircraft development subsidies, loans, operating subsidies, and military procurement. The main tool used, aircraft development subsidies, helped Fokker develop its first generation of regional and commuter aircraft (F27, F28) and begin development of its second generation of aircraft (Super F-28, MDF-100, F50 and F100). The path became so embedded that Fokker expected such support to be available when it looked at new aircraft projects. During this time, the government also helped to establish an institutional structure that would eventually lead to the establishment of the Netherlands Aerospace Cluster. As we have seen, participants in the cluster, including the NIVR, NLR, and KLM, all contributed to the development of the company. This cluster, with Fokker at center, would form the basis for the future development of the Dutch aircraft industry. The cluster formed the core of the “sectoral system of innovation” that supported the development of the aircraft industry in the Netherlands.

This initial development of Fokker was in line with the prevailing ideas of the period. The main emphasis was placed on “industrialization” and “growth and structure”, and the development of Fokker would contribute to increased industrial activity in the Dutch economy. The state sponsored development of Fokker met the government’s interest in developing high-paid manufacturing employment, exports, and value added production. It also met Anthony Fokker’s interest in re-establishing and developing his aircraft manufacturing business, and it was in line with the interests of the workers and unions that were seeking good high paying employment.

While the Dutch government supported its national champion firm, it always held the belief that Fokker could not go it alone in the industry. Its policy was, therefore, not autarkic as the chosen policy path always had an international dimension. The government held to the idea that the Dutch national market and its capital base were too small to support a major presence in the aircraft industry. The government, therefore, encouraged Fokker to find international partners for its aircraft projects or a merger partner to increase the company's efficiency and industry clout. These international partnerships would open up Dutch aerospace policy, Fokker, and the Dutch Aerospace Cluster, to the influence of foreign aircraft companies and governments. The government always tried to protect the status of its national champion by trying to get guarantees that Fokker would remain a full-fledged aircraft manufacturer. Thus, even before there was major talk of globalization and strategic alliances and joint ventures, Fokker was headed down a path that emphasized international partnering. In the 25 years between 1970 and 1995, Fokker was involved in a merger with VFW, a joint project with McDonnell Douglas, and a takeover by DASA. From Fokker's point of view, each one of these ventures was unsuccessful. They hindered the development of the company and ultimately led to its demise.

The election of a new coalition government in 1982 committed to neo-liberal policy change came at a crucial time for Fokker. The company was interested in maintaining its position in the regional and commuter aircraft industry, and it needed to develop new aircraft to replace its older generation products. Having

just come out of a failed effort to develop new aircraft with McDonnell Douglas, Fokker set off to develop new aircraft on its own. Faced with the issue of the long-term survival of its national champion firm, the government decided to continue with aircraft development assistance to the company, a tool that was the crucial element of the historic policy path. The company then set out on its “twin track” decision to support the development of two aircraft, an expensive decision that would lead to a financial crisis in the late 1980s and 1990s. Thus, despite the overall policy shift towards neo-liberalism, the old policy path that emphasized support for Fokker still held on. The government could justify this action based on its forward-looking technology and knowledge agenda, an agenda designed to promote industries and sectors in line with the new high-technology post-Fordist techno-economic paradigm. This move helped the state meet its interests in protecting high paying jobs, high technology exports, and in protecting a well-established industry in the Netherlands with a sound technological and institutional base. It met the interests of Fokker in helping to secure the company’s long-term future. It also met the interests of workers and unions in sustaining high paying jobs in a high technology sector. It helped sustain the interests of the institutions of the Dutch Aerospace Cluster by helping secure the future of the crucial core firm.

The onset of the period of financial crisis from 1987 to 1996 posed a real challenge for the coalition government. The crisis transformed Fokker into a “troubled” firm that required government support. The government’s general policy position emphasised the elimination of “defensive” and “distress” funding for firms, but, faced with a major financial crisis at Fokker that threatened bankruptcy, the

reaction of the government to the financial crisis of 1987 was to continue to support the national champion. Unlike past episodes of support that mainly centered on aircraft development, here the government was concerned with distress funding and the financial survival of the firm. As neo-institutionalists might predict when a government faces a state supported national champion firm in a period of trouble, there was a path-dependent incremental change in the historic policy path to provide distress funding to the national champion. Despite the government's neo-liberal credentials, it could justify its actions by its desire to help support "knowledge" industries. Government intervention with the firm actually reached its peak during this period because this is when the government purchased an ownership interest in the troubled firm. This aid was in the interest of the government in maintaining employment, the interest of the firm in its fight for survival, and the interest of the workers and unions as it maintained high paying unionized jobs. It helped to guarantee the continued existence of Fokker, the lynchpin of the Netherlands Aerospace cluster.

When the opportunity came to merge Fokker into the German industrial conglomerate Daimler-Benz (DASA), the government and DASA saw this as a way of meeting several of their objectives. It was at this point that the first in a series of small incremental shifts in policy became evident as neo-liberalism began to emerge. In line with its neo-liberal ideas, the takeover by DASA provided the opportunity for the government to eventually divest of its interest in the firm. The merger would provide Fokker with the long sought after strong European partner, one of the largest industrial groupings in Europe, which would improve

management and performance and lead to a rationalization of the overcrowded European commuter and regional aircraft manufacturing industry. While the government wanted to rid itself of much of the financial responsibility for the firm, elements of the old policy path were still evident as the government was still intent on protecting Fokker by guaranteeing its continued role as a commuter and regional aircraft designer and developer within the DASA group. The purchase of Fokker was in line with the dominant ideas and interests of DASA at the time because DASA wanted to become the core of the future regional and commuter aircraft manufacturing industry in Europe. Fokker offered a ready built way to enter the industry.

The problem for the government was that the merger did not solve Fokker's problems as it continued to suffer heavy losses under DASA's leadership. DASA was too slow in improving the management and performance of its new subsidiary. As we saw in chapter three, the weak economic environment of the early 1990s created difficulties for many of the world's aircraft manufacturers. As the difficulties became evident, the government initially came to the rescue once again in 1994, particularly through the Technolease technology sale and leaseback scheme. This scheme differed from the previous distress funding provided to Fokker because it really involved no cash outlays as it was basically a deferment of taxes. The government saw the agreement that was signed at the time of this transaction as extricating itself from the need to provide "distress" funding to Fokker when the firm got into financial difficulties in the future. At this point, DASA had controlled Fokker for less than a year, and, therefore, it had not had sufficient time to turn Fokker

around. The government had not given up on the future of the company as it was still willing to provide the normal research and development funding through the revolving fund of the NIVR. It hoped to firmly re-anchor elements of the old policy direction that emphasized regular support for aircraft development, but no more rescue funding. This was in-line with the government's neo-liberal ideas about eliminating funding for distressed firms.

When another financial crisis developed in 1995, and DASA demanded NLG 1.2 billion in state support, the government refused. The government obviously felt that the technological, spillover, and employment benefits of Fokker justified a level of support that was much lower than that demanded by DASA. The government's strategy in linking Fokker to DASA had clearly failed to reach its objectives. The financial performance and management of Fokker had not improved, and there had been no rationalization of the European commuter and regional aircraft industry. Fokker had failed to adapt its business approach to the new techno-economic environment because it had not effectively restructured itself as some of its competitors had done. The changes at Fokker were not quick or decisive enough. Unfavourable comparisons were made with the restructuring that went on at British Aerospace in the early 1990s. Losses at its regional aircraft division threatened the future of the British national champion. As we saw in Chapter three, quick and decisive action turned British Aerospace into a lean and low cost producer. By comparison, change at Fokker was not quick and decisive. The poor financial performance of Fokker since 1987, and the continuing financial crisis, meant that the national champion firm's position eroded with time. Fokker's

performance did not improve even though it received extensive state support and was part of one of Europe's largest industrial conglomerates. To a great extent, the institution of the national champion firm "disintegrated" with time due to its poor performance.

One of the features of Dutch industrial policy that contributed to the demise of Fokker was the lack of an activist approach on the part of the government towards the management and strategies of its troubled firms. The government would provide financial assistance and encourage mergers, but it would not go in and shake up management and their strategies in order to improve performance. The result was usually continued poor performance on the part of the firm. In the case of Fokker during the financial crisis, the government initially provided support to Fokker with a limited effort to prod the company to achieve costs cuts to improve performance. Its major effort to improve management and strategies came with the merger with DASA, as the government expected Daimler-Benz to shake things up by improving management and adopting a European joint venture strategy. When this was clearly not working, the government made limited attempts to intervene. A lack of activism on the part of the government thus contributed to the firms demise.

The poor performance of many state supported firms in difficulty contributed to a negative legacy of past policies of "distress" or "defensive" funding for firms in trouble. The government was faced with pressures due to these legacies, as exemplified by the scandal associated with the shipbuilding firm RSV, and this cast

large-scale funding for Fokker in a bad light. The poor results achieved from past episodes of distress funding led to a negative public perception of such funding, and this would make it easier for the government to refuse such funding to Fokker.

The failure of the European regional aircraft industry to rationalize also contributed to the demise of the Dutch national champion. The government and Fokker opened Dutch industrial policy and the Dutch cluster to European influence in the hope that an industry restructuring along European lines would take place to the benefit of Fokker. Europe had five manufacturers of regional and commuter aircraft, and competition between European manufacturers contributed to the pressures in the marketplace and the poor financial performance of the industry. If this rationalization had taken place, the intra-European competitive pressure would have been reduced, and Europe could have focused its efforts and resources on a single regional aircraft program for the market. Fokker could then have become the Dutch national champion in an Euro-champion aircraft consortium. The European manufacturers produced competing products, and conflicting national industrial interests prevented this from happening. European manufacturers were generally unwilling to sacrifice a part or all of their product range in order to allow rationalization to proceed. DASA failed in its strategy to become the center of a European commuter and regional aircraft consortium. The only rationalization that did occur, between British Aerospace and the ATR partners, did not include DASA. The failure of Europe to come together on a strategy for the commuter and regional aircraft sector kept the competitive pressure on Fokker and would contribute to the demise of the Dutch national champion.

The European Union did not effectively contribute to a solution to Fokker's problems. The Union's lack of jurisdiction in questions of aerospace policy meant that it could play a limited role in bringing about rationalization of the industry. With the sector still very much nationally based, it would have required a concerted national effort to bring that about. As we have seen, that effort was not forthcoming. The European Union's policy with respect to the limits on state aid was also a factor that the Dutch government would have to consider as it responded to the crisis. The government would have faced an EU investigation of any distress funding, and this would have been pressure for the government to limit its aid. The Maastricht Treaty requirements also put pressure on the government's budget, and that limited the ability of the government to provide large scale distress funding.

Despite the government's neo-liberal disposition, it is evident that the old policy path and the idea of the national champion did not die instantly when Fokker sought protection from its creditors. The government did provide a bridging loan and used military aircraft purchases to give the company some breathing room. It also indicated that it was willing to participate in a restructuring of the bankrupt firm. In the search for a new strategic partner for Fokker, it did offer to provide assistance and participate in an ownership stake in a restructured Fokker. This is evident in the proposed deals with Samsung and Khazanah Nasional. It was willing to do so, but at a much lower level of financial commitment than was

requested by DASA. Thus the support of the historic policy path lingered until the end.

In the end, a new strategic partner could not be found for Fokker. The level of state support that was offered was not enough to entice a new partner to enter the Dutch Aerospace Cluster and take on Fokker and the accompanying risks. This led to the disappearance of the national champion firm and the disappearance of the Netherlands as a manufacturer of regional and commuter aircraft. In an outcome different from that which would be predicted by the neo-institutionalists, the government clearly made a break with the past policy trajectory by allowing its national champion to collapse. A neo-liberal outcome might not necessarily have been the only possible outcome, as there was every indication that if Fokker's performance under DASA had improved, the Dutch government would have continued to support its national champion firm in line with the old policy path that emphasized the regular funding mechanisms for aircraft development (NIVR revolving fund). The government, in line with its neo-liberal policies, wanted to eliminate distress funding for the firm.

In the end, neo-liberalism played a role in the decision to change the policy trajectory, but that role was not decisive. Other factors contributed to the shift in policy. One factor was the lack of activism on the part of the Dutch government in pushing for management changes or new strategies to improve performance at its national champion. The resulting bad performance combined with the negative legacies of past episodes of defensive industrial policy to work against Fokker.

Both the firm's poor performance and policy legacies played an important role in the decision to change policy direction. There was also a failure of strategic ideas focusing on international partnerships. Despite the belief that such partnerships would strengthen Fokker, all of the major international partnerships entered into by Fokker ended in failure and setback for the firm. Closely linked with this was the inability of the European commuter and regional aircraft industry to rationalize and adopt a more strategic approach to the industry. This was due to the conflicting nationally based interests in the industry. The European Union was unable to play a constructive role in helping Fokker because of its limited jurisdiction, and several of its policies worked against the provision of continuing state support to national champions such as Fokker.

When a deal could not be reached with any of the potential partners for Fokker in the post-bankruptcy period, the government had no choice and was forced by circumstances to re-orient its industrial policies in the aerospace sector. The centerpiece of the Netherlands Aerospace Cluster had disappeared, and the country was no longer in the business of making complete regional and commuter aircraft. The government, therefore, needed a policy alternative for these changed circumstances. It had to protect the position of the remaining participants in the Dutch Aerospace Cluster. The policy path selected marked a change from the previous path. While the government did not select the true neo-liberal option of minimum involvement, it also did not support the continuation of a self-supporting industry based on a re-established national champion firm. The government felt that it could not adopt a completely hands-off neo-liberal path because of the

support given to the aircraft sector in other countries. In line with the old policy idea that Dutch aerospace could not function efficiently and effectively on its own, the Dutch government re-oriented its policy to favour participation of the Dutch aerospace industry in international, primarily European, collaborative programs. It did not adopt a pure neo-liberal approach as it decided to provide assistance to the industry to allow it to participate in international programs. It also decided to continue support for the “sectoral system of innovation” that supported the aerospace sector. The government was not satisfied to leave the future of the industry to the market alone. It was prepared to offer continuing financial support, reflecting to a certain extent ideas concerning “innovation policy”, mainly in the form of research and development assistance. This would allow the institutions of the aerospace cluster to adapt to the changing environment and reorient themselves towards participation in international projects.

The policy mentioned no specific future role for the Dutch aerospace industry in the commuter and regional aircraft segment of the industry. What is clear though is that any future Dutch role would be as a parts and components or sub-assembly supplier, or risk-sharing partner, in a European or international regional and commuter aircraft project. The Netherlands was not, as the neo-institutionalist would argue, path dependent in terms of policy. While elements of the old interventionist policy path were evident in the government’s post-crisis policy, there was a major policy shift with the demise of the idea of the national champion aircraft firm. With the downfall of Fokker, the days of the Dutch industry as an integrator were clearly over.

Is this a case of neo-liberalism or of a socially managed economy operating under changed conditions ? As we saw in chapter 2, the core idea behind the socially managed economy is the social management of adjustment. The state usually works to regulate change through a controlled adjustment in production and it also assists in finding new opportunities. In the Fokker case, after Fokker became a “troubled firm” in the late 1980s, the government made very weak attempts to encourage adjustment. This was a problem that was endemic to Dutch industrial policy. In a neo-liberal hands-off approach to the adjustment challenge, it transferred the problem to foreign-owned DASA and, even though it was still a shareholder up to the time of bankruptcy, it did little to encourage adjustment by the firm. As we saw in chapter 3, the regional jet market was beginning to take off at around the same time that DASA withdrew its support for Fokker. Fokker was a world leader in the regional jet market, and it had an especially promising product in the Fokker 70 jet. At the time of bankruptcy, it had an order backlog of 65 aircraft, including 40 Fokker 70s, and even in bankruptcy they received orders for the aircraft. The opportunity was there, an opportunity that, as we shall see, Fokker’s competitors Embraer and Bombardier effectively seized and effectively used to propel themselves into world leading positions in the industry. The government was not really interested in directly encouraging adjustment, only in cutting off distress funding for its national champion. If it had read the opportunities, it might have been more proactive early on in encouraging the firm to restructure and improve its performance. That, and alleviating part of the debt burden on the company, might have enabled the national champion to survive.

British Aerospace was able to adjust its production and management activities quickly when it faced a changed environment. Instead, the Dutch government took the ultimate hands off approach by giving the adjustment problem to someone else. When that did not work, it followed its neo-liberal policy agenda of cutting distress funding for the firm. Thus, the ultimate form of adjustment in this case was neo-liberal adjustment.

The next chapter will focus on the impact of domestic politics on industrial policy intervention in the Brazilian aircraft industry. We will look at how domestic politics shaped the post war policy path that supported the development of Embraer, and how politics shaped the response to a crisis in early 1990s. As the chapter will show, policy in the sector was shifted in a more neo-liberal direction, but, unlike the outcome in the Netherlands, the government still maintained its support for its national champion.

Chapter 5

Brazil: Straight Ahead on a Modified Trajectory

This chapter will focus on aerospace policy in Brazil and the development of Empresa Brasileira de Aeronautica, or Embraer, the country's national champion firm in the commuter and regional aircraft manufacturing industry. It will show how Brazil, a statist organized market economy controlled by the military, adopted a policy path that nurtured the development of Embraer between 1969 and 1990. Driven by a need for industrialization and military independence, Brazil supported the development of its state-owned national champion as an independent source of aerospace technology for military and civilian markets. Strong state support permitted Embraer to survive in this costly and risky industry.

As this chapter will show, Embraer, like Fokker, entered a period of financial crisis in the early 1990s. This occurred at a time when neo-liberalism was beginning to challenge the military model of state-centered development. Neo-institutionalists might expect the Brazilian state largely to continue along a policy path that offered strong support for its national champion, and while that is basically what happened, the policy path was recast in a more neo-liberal direction. Despite the sale of the firm by a government committed to neo-liberalism and its branching out into international joint ventures, successive governments continued to support the Brazilian national champion. The result

was the continued resilience of Embraer and the increasing importance of Brazil as a supplier of regional and commuter aircraft.

Neo-liberalism did not have a decisive influence on industrial policy in the commuter and regional aircraft industry in Brazil. It did, however, play an important role in three non-path dependent shifts in a policy path that otherwise continued to emphasize strong state support for the national champion Embraer. Neo-liberalism interacted with the financial crisis of both the company and the state to transform Embraer from a state-owned to a privately-owned national champion. It contributed to a shift in policy instruments as the government moved from using more direct instruments, such as market protection, to more indirect instruments. Neo-liberalism also played a role in the adoption of a policy approach that accepted Embraer's turn to international partnerships as a way of adapting to the new techno-economic environment. Despite neo-liberalism, the historic policy trajectory was maintained in part by the policy legacies of state intervention in the industry. The failure of past government industrial policy in the defense industrial sector also played a role as the government sought to salvage elements of the sector, such as Embraer, that had potential in civilian markets. That support was further driven by the increasingly strategic importance of the national champion in terms of employment, exports, and technology. The growing success of the firm in international markets reinforced this strategic importance and worked to maintain the momentum of the historic policy trajectory.

1969 to 1990: Building Up The National Champion

The period from 1969 to 1990 can be characterized as the time during which state-owned Embraer was built up by the Brazilian government into the country's national champion in the commuter and regional aircraft industry. As we shall see, it was during the 1940s that the government started to establish the institutional base for the aircraft industry, and these institutions would nurture and support the development of Embraer. After 1969, the Brazilian government set out on a policy path that would use state resources to establish the national champion and continue to provide strong state support in subsequent years. During the next thirty years, Embraer developed two generations of propeller-driven commuter and regional aircraft and it began work on its first regional jet. In line with its "statist" orientation, the Brazilian government played a major role in promoting the company's development through the use of the industrial policy tools that it had at its disposal. Such tools included state ownership, home market protection and promotion, military procurement, research and development support, and export financing.

The experience in the aircraft industry fitted the general pattern in Brazil. The traditional view of development in Brazil for most of the latter half of the twentieth century has focused on the state-led nature of the process. The state was the key player in the development process, and it established innovative institutions and processes to promote industrialization (Addis, 1997: 123-124). In general, the Brazilian state has been described as "patrimonial". It managed the

interventionist policies of what has been described as a “patrimonial regime”. The state set the limits within which the economic and social structures of society evolved (Roett, 1999: 21-26).

Of course, this pattern did not emerge overnight. Prior to the 1930s, the government of Brazil did not play a major role in planning the economic or industrial development of the country. During the colonial period, from the early 1500s to 1822, the economy was dominated by the production and export of various primary products such as wood, sugar, gold, and coffee. In the last decade and a half prior to independence in 1822, there was a limited attempt to diversify the economy. The founding of the Banco do Brasil, the establishment of a stock exchange at Rio, and financial assistance to various industrial undertakings provide examples of the kind of support offered for industrialization. Support for the construction of railroads in the second half of the nineteenth century also promoted industrial development. The open door policies of the post-independence government worked to offset these initial industrialization efforts. These policies led to imports of manufactured goods from Britain, other European countries, and the United States (Baer, 1983: 13-32).

World War One provided some impetus to import substitution as it became difficult to obtain industrial goods. Brazil suffered from a severe depression following the economic crash of 1929. The collapse of exports during the depression and a lack of foreign exchange stimulated the domestic production of commodities such as cement, chemicals, paper, metals, and

textiles. In the 1930s, the military was one of the first groups to recognize the importance of industrialization and it was a major force behind efforts to industrialize during this period. After the Depression, Brazil experienced balance of payments difficulties, and the military recognized that this situation would only worsen in the future because primary product exports could not fund the imports needed for development (Chaffee, 1998: 120; Dahlman and Frischtak, 1993: 416-417).

Aircraft development and production in Brazil really began to develop when industrialization became important, especially to the military. Brazil's involvement in the aircraft industry can be traced back to the late nineteenth century¹. More sustainable state-supported aircraft industry development would begin in the 1930s. Between 1930 and 1950, a number of training and sports airplanes were designed and manufactured in Brazil. The first airplane to go into series production was a 2-seat aerobatic training aircraft, known as the M-7, that was produced by Companhia Nacional de Navegacao Costeira (CNNC), a company founded in 1935 with the support of the Vargas administration. Another important early aircraft company was the Companhia Aeronautica Paulista (CAP). Sales of its most important aircraft, a two-seat high wing monoplane known as the CAP-4, were supported by the National Aviation Campaign that began in 1941. This campaign sought to increase pilot training through the dissemination of training aircraft to aeroclubs in Brazil. In the late

¹As early as 1890, an attempt was made by Leopoldo Correia da Silva to sell shares in the Brazilian Air Transport Company for the purposes of building dirigibles in Rio de Janeiro. Brazilians often claim that the first airplane was not invented by the Wright Brothers, but by a Brazilian named Santos Dumont who flew an airplane in Paris in 1906 (Cabral, 1992: 36-37; Carl, 1985: 517-519; Godfrey, 1989: 216-217).

1930s, an agreement between the Brazilian Navy and the German firm Focke Wulf resulted in the establishment of the firm Fabrica do Galeao (FG). Its aircraft were higher technology aircraft compared to those produced domestically by CNNC or CAP, and these projects were important in building up the skills of the labour force and the technological know-how for the future aircraft industry (Cabral, 1992: 36-37; Carl, 1985: 517-519).

The Brazilian government started to focus its attention on actively promoting industrialization after World War II. World War II had provided a major impetus to industrialization because of the difficulties in accessing key input items such as steel and capital goods. The U.S. based Cooke Commission, which undertook a regional analysis of the Brazilian economy during the war, recommended the diversification of the economy through the establishment of steel, wood, and paper industries and the expansion of textiles. The first Vargas administration (1930 to 1945) began the process of setting up state-owned industries. Petrobras, the state owned oil company, Electrobras, the state owned electricity company, and Vale do Rio Doce, the state owned mining company, were all established during this period. These state owned companies helped to stimulate the growth and diversification of Brazilian industry. The armed forces also began the process of establishing institutions crucial to the promotion of science and technology in the Brazilian economy, including the aircraft industry. By the end of the war, the Brazilian industrial base was somewhat diversified, but it lacked competitiveness at an international level (Baer, 1983: 59; Baer, 2001: 271; Chaffee, 1998: 116-120; Dahlman and Frischtak, 1993: 416-418; Macedo

and Barbosa, 1997: 2).

After World War II, market conditions declined as the National Aviation Campaign wound down and market preference turned towards larger aircraft. Both CNNC and CAP tried to enter the market for larger aircraft, but it proved to be too difficult to compete against American firms (Cabral, 1992: 37)². Brazil would not achieve a substantial presence in the world aircraft industry until it established the national champion firm, Embraer, in the late 1960s.

The state, in its efforts to promote the development of an aircraft industry, initially focused on the creation of an appropriate institutional base. State involvement in the sector became more institutionally established in 1941 when the Ministry of Aeronautics took on responsibility for civil aviation and the Brazilian Air Force. In the immediate post-World War II period, the Brazilian government made further moves to establish the institutional structures required for the development of a national aircraft industry. In 1945, the government established the Centro Tecnico de Aeronautica (Aeronautical Technical Centre, CTA) to undertake projects in the aircraft sector. The CTA was responsible for aeronautical research, the certification of new aircraft types, and the training of aeronautical engineers. Within the CTA, five research institutes for aerospace technology were developed. One institute was established as an engineering school and it was known as the ITA (Instituto Tecnologico de Aeronautica). It

² In addition to Embraer, there were a few smaller aircraft firms in Brazil in the postwar period. One company, the Sociedade Constructora Aeronautica Neiva, was established in 1953 and it produced 120 of Brazil's first all metal aircraft known as the Regente. This aircraft first flew in 1962. Neiva also produced several other aircraft in large quantities. The other

was staffed by MIT specialists and it provided undergraduate and graduate training in aerospace engineering, thus providing a national source for aerospace engineers. The other four institutes were the research and development institute known as the IPD (Instituto Pesquisa e Desenvolvimento), the space activities institute known as the IAE (Instituto de Atividades Espaciais), the industrial relations institute IFI (Instituto de Fomento e Coordenacao Industrial), and the institute for advanced studies known as the IEAV (Instituto de Estudos Avancados) (Cabral, 1992: 37-38; Godfrey, 1989: 217; Green, 1987: 3-4; Ramamurti, 1987: 182-185).

The IPD would play a crucial role in the development of the Brazilian aircraft industry. "The development strategy adopted at IPD was responsible for the foundation of EMBRAER as a company to execute government -sponsored aeronautical programs"(Green, 1987: 3). One department of the IPD was responsible for airframe design and development. In its search for a launch project, this department evaluated several different aircraft concepts. It settled on developing "a transport aeroplane for small regional airlines to feed passengers to large carriers for long-haul flights and replace the old-fashioned aircraft of the Brazilian Air Force and civil aviation (DC-3 and Beech 18)" (Cabral, 1992: 38). This project for an 8 to 10 seat turboprop aircraft, known as IPD-6504, received approval in June 1965 and design work began in 1966³. Trials of

major firm, Aerotec, was established in 1962 at Sao Jose do Campos in Sao Paulo state. This firm produced the civil and military trainers (Green, 1987: 23).

³ The aircraft was to be simple and easy to maintain, have respectable performance, and be adaptable for several roles including passenger transport, light cargo transport, navigational training, and aeromedical service. It would be an 8 to 10 seat aircraft that was non-pressurized and utilized two turboprop engines. A French designer, Max Holste, served as an advisor to the design team, which was headed by Ozires Silva, the future chairman of Embraer.

the prototype showed that the basic design was feasible. The prototype would serve as the basis for a larger production version of the aircraft. The challenge was finding a suitable means of launching production. The IPD also had two other potential projects in the form of a crop duster and a high performance glider (Air International, February 1985: 67; Cabral, 1992: 38; Ramamurti, 1987: 184).

The emphasis on industrial development became pronounced under the second Vargas administration (1951 to 1954) and Juscelino Kubitschek's "nationalist" regime (1956 to 1960). It was during this period that the idea of "Desenvolvimentismo" or developmentalism began to take root in Brazil. There were three elements behind the idea of developmentalism. First, it involved the development of intensive import substitution based on the steel, vehicle, machinery, capital goods, energy and chemicals industries. Second, it included the development of policies to encourage capital investment from foreign, private, and public sources. Finally, developmentalism required an expanded role for the state in guiding development, mainly by planning and directing private investment into specific areas. During this period, the National Bank for Economic Development (BNDE) was established to help provide long-term finance for economic growth. The Bank's aim was to help develop, plan, and finance infrastructure and industrial projects (Baer, 1983: 77; Chaffee, 1998: 116-117).

In 1956, the Kubitschek administration launched the "Plano de Metas", the first systematic state drive to promote industrialization. The plan set targets for

both the public and the private sector covering five general areas, and these were energy, transportation, food supply, basic industries, and education. It emphasized the development of heavy industries, infrastructure, and large projects in the energy, transportation, steel, petroleum refining, chemical, capital goods, automobile and pharmaceutical industries. Special incentive programs were launched to promote industries such as automobile and utility vehicle construction, naval construction, and heavy machinery. The industrial strategy placed special emphasis on encouraging foreign firms to set up factories in Brazil, offering local market protection, subsidies, and other forms of special treatment for foreign investors. In 1951, the government also established the National Research Council to promote research in all areas. In 1957, a tariff law was introduced that increased tariffs substantially. The “Law of Similars”, that prevented the importation of a good when a similar domestically produced good existed, became the basis for tariff protection (Baer, 1983: 71-80; Dahlman and Frischtak, 1993, p. 417).

The main result of Kubitschek’s industrial development program was a major expansion of infrastructure. This included the construction of the new national capital, Brasilia, which opened up the interior and led to the development of links to coastal cities. A major presence was also established in the automobile industry that involved a progressive increase in import substitution. The Kubitschek administration was unable to raise substantial finance from international sources for its industrialization plans, and it had inadequate foreign exchange reserves to finance its plans. It, therefore, chose to

increase the money supply to finance its programs and this resulted in an increasing level of inflation. In addition to this, there was a substantial rise in the federal budget deficit between 1956 and 1962 (Chaffee, 1998: 121-122; Macedo and Barbosa, 1997: 2).

The two successor administrations led by Janio Quadros (1961) and Joao Goulart (1961-64) were faced with the inflation problem. The economy began to falter as the projects of the Kubitschek period, and poor economic management, led to growing economic problems. Despite initial attempts at an austerity program, it proved difficult to bring inflation under control and public reaction led to the abandonment of the program. President Goulart was overthrown in a military coup at the end of March 1964 (Baer, 1983: 93; Chaffee, 1998: 123).

The military administrations continued on with the import substitution policies. While the administration of President Castelo Branco (1964-67) focused on bringing inflation under control and improving the underdeveloped capital market in Brazil⁴ (Carl, 1972: 40-41; Carl, 1985: 526-527; Longo, 1997: 26-27), the successor administrations placed emphasis on economic and employment growth. The First National Development Plan continued the import substitution model and emphasized state intervention in the economy. Prices, wages and the availability of credit were all controlled by the government, and the rate of interest was capped. Under the plan, production and employment

⁴ A Capital Market Law was passed in 1965 that had the aim of attracting savings into equity investments, improving the liquidity of private companies, and creating a vigorous securities market. In addition to this, the idea of the "democratization of capital" became important. With this idea, shares in closely held corporations should be opened up

increased, a foreign trade surplus emerged, and inflation was brought under control. A law was also passed in 1967 that allowed a taxpayer to credit against his income tax any amounts that were invested in specified financial institutions that re-invested these funds in shares or bonds approved by the Brazilian central bank. As we shall see, this scheme was to play an important role in the establishment of Embraer. Tax incentives were also passed for investments in specified regions or sectors of the economy. Thus began the period of the “Brazilian Miracle” which was to last until the early 1970s (Carl, 1985: 527-529; Longo, 1997: 26-27).

Several financial institutions, established during the first years of military rule, were focused on science and technology development. One was FUNTEC, a special fund created at BNDE to support the training of technical personnel for research activities at universities. FINAME, established to fund the acquisition of machinery and industrial equipment, played a key role in the development of the domestic capital goods industry. This fund was also the responsibility of BNDE. FINEP, the Agency for Financing Studies and Projects, financed feasibility studies and project development in sectors that were seen as economic and social priorities (Dahlman and Frischtak, 1993: 419, 447). Embraer would eventually take advantage of the availability of FINEP financing.

Not surprisingly, one sector targeted for development under the military regime was the defence sector and this would benefit the aircraft industry. In the

to wider public access. A law passed in November 1964 offered tax incentives to firms that provided wider public access

early 1960s, the development of Brazil's arms industry was spurred by the attitude of the United States, which reduced its Military Assistance Program grants to Brazil after the military coup and terminated the aid in 1968. This forced the Brazilian government to look for alternative sources of supply for military hardware, including aircraft. Economic difficulties in Brazil and a shortage of foreign exchange made it difficult for the government to import foreign military equipment. Unhappy with expensive European alternatives, Brazil set out on a policy of achieving increased self-sufficiency in military hardware as a way of re-equipping the armed forces and, at the same time, stimulating the economy to absorb the idle industrial capacity associated with the recession. Arms procured from foreign sources had to be built under license by a Brazilian firm or in a joint venture with the foreign partner holding a minority interest. By the early-1970s, the development of the military sector began to be seen in more strategic terms, as one element of a strategy to promote technological development and industrial growth. Thus, as we shall see, the government's efforts to achieve military self-sufficiency contributed greatly to the development of the Brazilian aircraft industry, and played a crucial role in sustaining a policy path that supported the development of a national champion (Conca, 1997: 85-91; Hudson, 1983: 24-27).

The Creation of the National Champion EMBRAER

As we have seen, the IPD, one of the five research institutes at the CTA, developed a small transport airplane (IPD-6504). The CTA searched for a private firm to undertake production of the aircraft, but when the private sector in Brazil showed little interest in producing a domestically designed aircraft, the government decided to establish a mixed economy corporation. On August 19, 1969, the government passed Decree Law No 770 which established Embraer. Thus Brazil's state-owned national champion in the aircraft industry was born, marking the beginning of an industrial policy path that emphasized strong state support for the national champion. Embraer was to have a total capitalization of 50 million Cruzeiros, with 51 percent of the voting shares to be owned by the Brazilian government through the Ministry of Aviation. The remainder of the shares would be offered to private firms or individuals. The law exempted Embraer from all duties and taxes on imports of raw materials, components, and equipment needed for the production of aircraft (Carl, 1985: 522-523; Green, 1987: 4-6; Ramamurti, 1987: 186).

To make Embraer shares attractive to investors, the government decided to use one of the existing incentive schemes to attract investment. Any firm operating in Brazil could purchase Embraer shares and credit the amount against its income tax for the year. This incentive was available for the tax years from 1970 to 1975 and the amount credited could not exceed one percent of taxes payable. The percentage of shares held privately increased from 18

percent in 1970 to 93 percent in 1984. Most of the shares held privately were preferred, non-voting shares, and the government maintained control, through the Ministry of Aviation, because it still owned a majority of the voting shares (Carl, 1985: 523-524, 529-530).

In its early years, Embraer benefited from the institutional support of the Ministry of Aeronautics and the Air Force. The Ministry had virtually complete control over the airline and aerospace industry in Brazil. In addition to its control of Embraer, the Ministry had jurisdiction over the Air Force, the CTA, the ITA, the airline industry, and the private aircraft manufacturers. It could provide support to Embraer without having to deal with internal government conflicts. The Aeronautics Ministry could, and did, manipulate the domestic market through tariff and non-tariff barriers and through its regulatory powers over the airline industry. The Air Force, for its part, was a very flexible supporter of the company. It placed large up front orders for aircraft, helped to finance aircraft development, and it allowed Embraer to divert aircraft destined for the Air Force to civilian airlines when the commercial need arose (Ramamurti, 1987: 188-191).

During this period, Embraer started production of commuter and regional aircraft. It started to work developing the IPD-6504, just before the world economy was hit by the first oil shock. Although Brazil was hit by the petroleum price increases, the administration of President Ernesto Geisel (1974-79) believed that Brazil should pursue growth to overcome recession. Price controls were lifted and credit expanded. The administration launched the Second

National Development Plan supporting import substitution and an ambitious program of infrastructure and energy investment undertaken by the state and funded from foreign sources. Major projects were undertaken in areas such as hydro-electric power and fuel alcohol, and there was an increase in domestic oil exploration by state-owned Petrobras (Chaffee, 1998: 132-135; Longo, 1997: 27).

State support for Embraer continued during this period. The company developed the IPD-6504 into a slightly larger aircraft (EMB-110 Bandeirante). While the initial focus of Embraer with respect to the Bandeirante was on the military market, the company soon turned its attention towards the commercial market. Brazil is a country with a large land mass and, at the time, it had a largely undeveloped transportation system. There was thus a natural market for an aircraft like the Bandeirante. In August 1972, the first production Bandeirante had its first flight.⁵ In addition to supporting the development of the aircraft through its state-owned national champion, the Brazilian government also acted to stimulate demand for the aircraft. Through the Ministry of Aeronautics, the Air Force ordered 80 of the aircraft for various uses. In order to overcome problems associated with the limited availability of financing for commuter airlines, the Brazilian government also introduced a subsidy scheme for such airlines. In April 1973, the first three 15-seat EMB-110s enter commercial service with Transbrazil Airlines (Sarathy, 1985: 67).

⁵ Embraer produced several versions of the Bandeirante including the basic 15 seat aircraft, a 18 seat high density version, an executive version, specialized versions for air navigation calibration and aerial photography, a cargo and paratroop version, a version for use in geophysical surveying, and a maritime patrol and search and rescue aircraft .

In addition to the Bandeirante, Embraer inherited two other aircraft projects from the IPD, and the government's policy direction included support for both of these projects. One was the development of an agricultural aircraft, the Impanema, that could be used for crop-dusting, seeding, and spreading fertilizer. The Ministry of Agriculture ordered 10 of the aircraft. In order to further stimulate demand for the aircraft before Embraer started production, the importation of similar aircraft were exempted from custom duties to allow farmers to become familiar the equipment. When production by Embraer began, the tariffs were once again raised. The Ministry of Agriculture also worked to establish eleven companies that bought the Impanema and used it to provide services to farmers that could not afford to acquire an aircraft themselves. The other project inherited from the IPD was a sailplane, and the Ministry of Aeronautics ordered ten of these aircraft (Aviation Week and Space Technology, 11 January 1971: 62, 65; Aviation Week and Space Technology, 15 October 1973: 43-44; Carl, 1972: 48-49; Carl, 1985: 545-546).

In order to push Embraer's technological development, the government and the company encouraged the acquisition of foreign technical know-how. An example of this is provided by the Xavante⁶. As part of the Brazilian Air Force's modernization program, the service was interested in acquiring a new advanced trainer and light attack aircraft to replace existing Lockheed equipment. The Air

⁶ Another example would come in the early 1980s. In 1983, Embraer signed a cooperative agreement with Sikorsky Aircraft that covered the transfer of technology for the design and production of composite materials. The agreement had two main objectives. One was to allow Embraer to produce parts for Sikorsky as an offset for future helicopter sales in Brazil. The second objective was to allow Embraer to build composite parts for the aircraft that it had under development. Sikorsky provided assistance to Embraer in the construction of a new composite materials manufacturing facility and it provided training for Embraer personnel (Aviation Week and Space Technology, 22 August 1983: 144; Aviation Week and Space Technology, 7 May 1984: 17-18).

Force selected the Aermacchi MB-326GB, and it ordered 122 of the aircraft for licensed manufacture in Brazil by Embraer as the Xavante. As part of the deal reached in September 1970, Aermacchi made a commitment to provide technical assistance to Embraer for a ten-year period.⁷ Production of the Xavante provided Embraer with experience in organizing for the series production of aircraft. Here again, the Brazilian government stimulated demand as the Brazilian Air Force eventually purchased 170 of the aircraft⁸ (Aviation Week and Space Technology, 15 October 1973: 44; Carl, 1985: 540; Aviation Week and Space Technology, 22 August 1983: 144; Ramamurti, 1987: 185).

Another aircraft that Embraer developed was the EMB-121 Xingu corporate aircraft. Launch in 1975, it was Embraer's first pressurized aircraft. The six-seat Xingu first flew in October 1976, but problems with the aircraft delayed its entry into production. The first production aircraft had its first flight in May 1977. It was sold to customers in the domestic market and to the Brazilian Air Force (Air International, February 1985: 71).

Another major example of the government's use of foreign know-how to encourage Embraer's technological development came with the company's entry into the general aviation market. In the early 1970s, the Brazilian market for general aviation aircraft was a large one and it was dominated by U.S.

⁷ Embraer sent some of its production personnel and engineers to Italy for training. Italian specialists went to Embraer to assist with production (quality control, technical documentation, assembly line organization, etc) and the development of other projects.

⁸ The air forces of Togo and Paraguay also received six each.

manufacturers⁹. In fact, Brazil was the largest export market for U.S.-built general aviation aircraft, but the economic difficulties associated with the first oil shock led the government to find ways to reduce aircraft imports. The government's strategy was to have Embraer team up with a foreign manufacturer, and it made it clear to the three U.S. manufacturers that their continued presence in the Brazilian market would depend on their establishment of an aircraft production program in Brazil in cooperation with a Brazilian partner. Embraer specified that the agreement must allow it to manufacture an increasing proportion of each aircraft over time, require no royalty payments, allow it to modify the aircraft to suit local conditions, and allow for the future joint development, manufacture, and marketing of aircraft at some point in the future (Ramamurti, 1987: 189-191; Green, 1987: 17-18).

All three U.S. companies, Beech, Cessna, and Piper, were approached by Embraer to negotiate an industrial cooperation agreement¹⁰. Piper showed the most flexibility and it signed 10-year industrial cooperation agreements in August 1974. The agreements between Embraer and Piper provided for the production of a number of single and twin-engined Piper models in Brazil (Hudson, 1983: 28-29; Ramamurti, 1987: 190-191; Green, 1987: 17-18). After the agreement with Piper was signed, the Brazilian government soon moved to provide protection for the new venture. A law passed in 1974 required that all imports of civil aircraft receive government approval, which would involve consideration of

⁹ Cessna, Piper and Beech were the major U.S. players in the market.

¹⁰ Beech dropped out quickly as it was only willing to supply its aircraft from its factories in the U.S.. Cessna, worried about the quality of Brazilian made versions of its products, refused to allow Embraer to make modifications to its aircraft. It therefore dropped out of the competition (Ramamurti, 1987: 190-191; Green, 1987: 17).

the availability of similar domestic products and the purpose for which the aircraft were to be used. In 1975, the tariff on general aviation aircraft imports was raised from 7 percent to 50 percent. Importers of aircraft were also required to place a one-year no-interest deposit with the government for the full price of the imported aircraft. Under the “Law of the Similars”, competitive imports for the Embraer-produced Piper aircraft could be barred from entry into the Brazilian market (Carl, 1985: 546; Green, 1987: 18; Aviation Week and Space Technology, 26 August 1974: 13).

The Brazilian economic miracle came to an end in the early 1970s. The government’s attempt to deal with the first oil shock resulted in a major increase in debt, as debt financing was needed to fund growth. In this environment, the government found it increasingly difficult to sustain its strategy of domestic arms industry development through domestic procurement, but high oil prices stimulated an international demand for arms, and the government turned towards an export-led strategy to sustain the development of its arms industry. By the early 1980s, over eighty percent of Brazil’s arms production would be exported (Baer, 2001: 90-91; Conca, 1997: 90 -91). Brazilian arms exports grew from US \$330 million in 1985 to peak at US \$700 million in 1988 (US Arms Control and Disarmament Agency, 1997: 113).

When Brazil was hit with the second oil price shock in 1979, the administration of President Joao Baptista Figueredo (1979-85) tried to control inflation. The government initially emphasized currency devaluation, the

elimination of export incentives, and a slow down in economic growth to cool inflation. By December 1979, it brought forward an economic package that substantially devaluated the currency, eliminated some export subsidies, import deposit requirements, and other tax incentives, and increased public sector prices, while abolishing the “Law of the Similar” with exemptions. In 1980, the government cut spending and reduced the investments of state enterprises (Baer, 1983: 124-128), but the administration was also determined to press on with the import substitution program: “Its argument was that Brazil was unique and that through public investment, subsidies to import-substituting industries (Proalcool, coal, and petroleum prospecting), and preferential treatment for natural resources exports (agricultural products, such as soybeans and orange juice, and primary goods such as ores), continuous growth could be achieved despite new external constraints and internal distortions inherited from previous administrations”(Longo, 1997: 28). The Third National Development Plan (1980 to 1985) differed from previous plans in that it only presented the intentions of the government and certain government guidelines. It did not specify specific projects and how they were to be financed (da Cruz and da Silva, 1997: 50). In a first indication of the gradual impact of neo-liberal ideas, a program to privatize state owned companies was launched in July 1979, under the National Debureaucratization Program, ostensibly designed to “strengthen the role of market forces, stop the indiscriminate creation of state enterprises, and promote conditions for transferring SOE control to private enterprise” (Longo, 1997: 36). This program nonetheless provided a very weak start to the process of divesting of state-owned enterprises.

The high interest rates used by the government to control the inflation had an impact on Embraer's domestic aircraft sales and this was especially the case for general aviation aircraft¹¹. Sales of the Bandeirante were providing the resources necessary to finance ongoing operations. In order to spur aircraft sales and assist its national champion, the Brazilian government tried to stimulate demand by relaxing the interest rate for the financing of aircraft. It also retained strict controls on aircraft imports¹². Problems continued into the early 1980s. The accumulation of unsold Bandeirantes led Embraer to stop production of the aircraft for the first six months of 1983. In 1983, Embraer was forced to lower its interest rates on domestic sales of Piper general aviation aircraft¹³ (Aviation Week and Space Technology, 21 August 1978: 49; Aviation Week and Space Technology, 22 August 1983: 146; Aviation Week and Space Technology, 22 August 1983a: 146).

At the same time, the late 1970s saw Embraer develop its first indigenous military aircraft design. The aircraft, the EMB-312 Tucano, was a turboprop basic trainer and the development contract was signed in December 1978. Embraer was responsible for the entire process from design to production of the aircraft. Again, the Brazilian government jumped in to support demand. The Brazilian Air Ministry ordered 118 of the aircraft with options on 50 more. The aircraft would go on to achieve major export success, including sales that

¹¹ In mid-1978, there were more than 200 unsold white tail aircraft, many of them general aviation aircraft, parked at Embraer's facility at Sao Jose dos Campos (Aviation Week and Space Technology, 21 August 1978: 49; Aviation Week and Space Technology, 22 August 1983: 146; Aviation Week and Space Technology, 22 August 1983a: 146)..

¹² The interest rate was reduced from 4% to 2.7% per month (Aviation Week and Space Technology, 21 August 1978: 49).

¹³ The rate was dropped to 5 percent monthly for single-engined aircraft and 8 percent for twin-engined aircraft (Aviation Week and Space Technology, 22 August 1983a: 146)

involved the transfer of this Embraer developed technology to third countries¹⁴ (Air International, February 1985: 72-73).

Embraer also started to turn its attention to export markets in the late 1970s, as did other firms in the Brazilian defense sector. It launched an aggressive marketing campaign in developing nations to capture a share of markets traditionally dominated by U.S. or European manufacturers. For example, the company sold the Bandeirante in Sudan, Algeria, Senegal, and Nigeria. It also sought to have its aircraft certified in industrialized countries such as Britain, France and the U.S. Embraer made a major breakthrough in 1977 when it sold Bandeirantes to Air Littoral of France. Embraer viewed the U.S. market as the largest market for the Bandeirante¹⁵, where, as we have seen, airline deregulation stimulated the demand for commuter and regional aircraft, thus providing opportunities for the company. By September 1986, there were 91 Bandeirantes in service with US commuter airlines (Aviation Week and Space Technology, 27 June 1977: 63; Aviation Week and Space Technology, 30 October 1978a: 36; Carl, 1985: 549-551; Hudson, 1983: 35; Sarathy, 1985: 73-74).

Export financing was a key element of the government's policy toolbox

¹⁴ For example, in September 1983, the Egyptian Air Force ordered 120 Tucanos with 60 options. As part of the deal, the first 10 aircraft were produced in Brazil. The remaining aircraft were delivered in kit form. Egyptian participation would progressively increase as production in Egypt progressed, with Egyptian firms eventually producing some parts and components for the aircraft (Air International, February 1985: 72-73).

¹⁵ Deregulation of the airlines in 1978 led to growth in the commuter airline segment of the airline industry and an increase in demand for commuter aircraft. At the time, U.S. aircraft manufacturers were not that interested in the mid-sized commuter aircraft market. The corporate aircraft market was much more attractive to U.S. manufacturers. Two U.S. manufacturers did respond to the opportunities that arose from deregulation. Beech, which had been out of the commuter market for a number of years, introduced the 15 seat C99 and introduced the 19 seat Beech 1900 in early 1983. Fairchild

used to support the national champion's aggressive expansion in foreign markets. Yet this would cause some problems as Embraer's success in the U.S. market led U.S. manufacturers to criticize the export financing policies and the import restrictions of the Brazilian government. In 1982, Fairchild Swearingen filed a petition with the U.S. International Trade Commission seeking countervailing duties against the Embraer Bandeirante (Aviation Week and Space Technology, 21 June 1982: 60-61; Aviation Week and Space Technology, 20 September 1982: 115; Aviation Week and Space Technology, 22 November 1982: 64-65). Beech Aircraft joined the petition effort. The Commission found that there was no evidence of price under-selling with the Bandeirante, and it could not attribute the difficulties experienced by the U.S. industry to imports from Brazil. During the period in question, the domestic industry was profitable and problems experienced by Fairchild were due to problems with customers and with its 19-seat Metro. The Commission concluded that "we have found that there is no reasonable indication of material injury or threat of material injury to the domestic industry by reason of allegedly subsidized imports" (United States International Trade Commission, 1982: 14). As we shall see, export subsidies would again become a major issue in the future as Embraer tried to establish itself as a regional jet producer.

The early to mid 1980s in Brazil were marked by two major events: a major depression and the beginning of the transition from military to civilian rule. The depression resulted a dramatic increase in interest rates. As a result, the

reintroduced its 19 seat Metro aircraft and began to work with SAAB aircraft of Sweden on a new 30 seat aircraft that

debt serving charges on Brazil's large external debt rose dramatically, and this would cause difficulties for firms like Embraer that had come to rely heavily on debt financing. In December 1982, Brazil was forced to turn to the International Monetary Fund for assistance, and an IMF-supported austerity program was implemented between 1983 and 1984 (Baer, 2001: 99-101, 108-109; Chaffee, 1998: 136; Macedo and Barbosa, 1997: 6).

The year 1985 marked the country's transition from military to civilian rule. The administration of Jose Sarney (1985-90) launched a series of plans designed to deal with the problems facing the economy. The first Cruzado Plan, launched in 1986, introduced a new currency, froze prices, eliminated wage indexing, and increased the minimum wage. As a result of the plan, inflation fell dramatically and increased demand stimulated industrial production. Soon the economy was overheated and action had to be taken to cool the economy. A second plan, the Cruzado II, raised prices of various essential products and imposed new indirect taxes. In February 1987, the government announced a moratorium on interest payments on the country's external debt. The Cruzado II plan failed and inflation remained a problem. The Besser Plan, introduced during 1987, included a reduction of government loans, state subsidies, and financial support to troubled private firms, while the Verao Plan, launched in January 1989, included layoffs of government workers, the closing of 6 government ministries and 42 state-owned firms. This last plan had a rough ride in Congress, which refused to accept the layoffs and state company closures

would become known as the SAAB -340 (Sarathy, 1985: 73-74).

(Chaffee, 1998: 143-159).

It was in this environment that Embraer began to examine its second major aircraft project for the regional and commuter aircraft industry. The company had been examining concepts for a new commuter and regional aircraft since it was first established¹⁶, but the focus of development shifted by the late 1970s to an all-new aircraft, the EMB-120, designed to seat 29 passengers. This aircraft would become known as the EMB-120 Brazilia. It was a bigger and more technologically advanced aircraft which Embraer hoped to have into production by 1982¹⁷. The EMB-120 was designed for the international marketplace and it was entering a market crowded with competitors¹⁸. This aircraft would require a major investment in product support and customer relations that Embraer had not faced before. By mid-1983, Embraer had invested over \$ 200 million U.S. in the EMB-120 program. In line with its policy of state support for the development of its national champion, the Brazilian government once again assisted the firm by guaranteeing one third of the development cost (Air International, November

¹⁶ The options included a 30 seat STOL aircraft, a pressurized Bandeirante, and a stretched Xingu. Shortly after Embraer was established, the company began looking at design concepts for new commuter aircraft projects. One project that became an early focus of attention was a Short Takeoff on Landing (STOL) aircraft. This 30 seat aircraft, which was known as the EMB-500, and several versions were planned including passenger, transport, assault, and patrol versions. Embraer also examined the development of a pressurized version of the Bandeirante. Originally, the pressurized version was to be an 18 seat pressurized version of the original aircraft. This project was terminated after analysis showed that little benefit was to be achieved from pressurization in typical Bandeirante operations. Later, attention focused on a stretched version of the Xingu pressurized corporate turboprop that would seat 24 passengers (Air International, November 1983: p. 218; Air International, February 1985: 68; Aviation Week and Space Technology, 11 January 1971: 62-63; Aviation Week and Space Technology, 15 October 1973: 44; Aviation Week and Space Technology, 27 June 1977: 66; Aviation Week and Space Technology, 14 August 1978: 18-19; Aviation Week and Space Technology, 1 August 1983: 31).

¹⁷ The EMB-120 first flew on July 27, 1983 and by this time Embraer had 107 paid options on the Brazilia.

¹⁸ There were six aircraft competing in the same 30 to 50 passenger market segment as the Brazilia. These were the 34 seat SAAB-Fairchild SF-340 (Later known as the SAAB-340 when Fairchild dropped out of the project), the 36-seat de Havilland Dash-8, the 36 seat Shorts SD-360, the 38 seat CASA/Nurtanio CN-235, and the 42 seat Aerospaziale/Aeritalia ATR 42. One of the advantages that Embraer claimed for the Brazilia was the ability to operate under FAA part 135 rules. The Brazilia was a 30 passenger aircraft and was below the payload limit for Part 135 operations. The other aircraft, with more than a 30 seat capacity and a payload over the limit, had to operate under Part 121 rules that govern the major airlines. The Brazilia was the lightest, fastest and lowest powered of the new group of pressurized commuter aircraft and

1983: 217-218; Air International, February 1985: 68; Aviation Week and Space Technology, 11 January 1971: 62-63; Aviation Week and Space Technology, 15 October 1973: 44; Aviation Week and Space Technology, 27 June 1977: 66; Aviation Week and Space Technology, 14 August 1978: 18-19; Aviation Week and Space Technology, 1 August 1983: 31). It also tried to help on the demand side by purchasing Brazilias for the Air Force. About half of the options originated in the Brazilian market from either regional air carriers or the Brazilian Air Force. The Brazilian Air Force acquired 24 of the aircraft for use as transports, and it expressed an interest in special purpose military versions of the aircraft such as maritime surveillance (Air International, February 1985: 72; Aviation Week and Space Technology, 8 August 1983: 28).

With the completion of the development of the Brasilia, and the entry of the aircraft into service, Embraer started to turn its attention to new opportunities. The company wanted to continue to concentrate on the regional aircraft market, but it believed that the time was not appropriate for the launch of an aircraft larger than the Brasilia. The company believed there would continue to be a market for 19-seat aircraft, but the Bandeirante would not be able to meet future airline requirements. A new 19-seat aircraft, designated EMB-123, was to be a relative of the existing product line.¹⁹ The new aircraft would have both civilian and military applications. In the end, the aircraft was based on the Brasilia to achieve maximum parts and operating systems commonality. Embraer hoped to

it therefore offered the lowest direct operating costs (Air International, November 1983: 217; Aviation Week and Space Technology, 1 August 1983: 31).

¹⁹ A number of technical designs were studied, including stretching the Xingu business aircraft (Air International, September 1990: 122-123).

begin delivering the aircraft in 1991, and to capture more than one-third of 19 seat aircraft market (Air International, September 1990: 122-123).

In January 1996, Embraer signed a cooperation agreement with Fabrica Militar de Aviones (FMA) of Argentina to develop the EMB-123 as a collaborative project. FMA was a part of the Argentine Air Force. If the Argentine government could not find the resources to fund its share of the estimated \$280 million development cost, Embraer was prepared to develop the aircraft on its own. In May 1987, the two companies reached a formal agreement on the aircraft.²⁰ Embraer would be the project leader and would fund two-thirds of the project costs. FMA was originally to take a one-third share, but economic difficulties in Argentina led to the company only being able to fund 20 percent of the projects costs. With the agreement, the designation of the aircraft was changed to the CBA-123 (Cooperation Brazil Argentina) (Air International, September 1990: 123-128; Aviation Week and Space Technology, 19 May 1986: 23; Aviation Week and Space Technology, 8 September 1986: 41).

By the late 1980s, however, Embraer had sensed that the market for regional and commuter aircraft was changing. As we saw in chapter three, deregulation had spurred continuing changes in the commuter and regional airline industry, and the potential for small regional jets to open up opportunities for regional carriers was starting to be recognized by industry participants. In

²⁰ Under the terms of the agreement, FMA had responsibility of part of the fuselage, the tail cone, engine pylons, fins, tailplane and elevators. Embraer had responsibility for the remainder of the fuselage, the rudder, and the wing. In terms of marketing, Embraer was responsible for Brazil, North America, and some European countries. FMA was responsible for Argentina, Latin America, and some countries in Africa (Air International, September 1990: 127-128).

June 1989, Embraer announced its intention to develop a new regional jet called the EMB-145. The aircraft, capable of carrying between 45 and 48 passengers, was to enter the market against the then newly launched Canadair Regional Jet.

The EMB-145 would be a stretched derivative of the EMB-120 Brasília, which would keep development costs low and reduce development time²¹. Embraer expected the first flight of the EMB-145 to take place in early 1991 (Flight International, 24 June 1989: 6; Aviation Week and Space Technology, 19 June 1989: 158; Aviation Week and Space Technology, 4 September 1989: 65-67). Embraer believed that it had the right aircraft for the new airline operating environment.

The Early 1990s: Brazil Embraces Neo-liberalism and a Financial Crisis at Embraer

The period from 1990 to 1994 can be described as a period of crisis for the Brazilian state-owned national champion Embraer. Neo-institutionalists might predict that the traditional policy path, which emphasized strong state support for the state-owned national champion, would continue to determine policy during the crisis period and beyond. During this period of difficulties, a new government, committed to a program of neo-liberal economic policy reform, indeed modified the industrial policy path by recasting it in a more neo-liberal direction. As we shall see, facing the financial difficulties of Embraer and the state, the government's answer to the crisis was to provide some financial

²¹ The aircraft was to have 75% commonality with the Brasília. The EMB-145 would involve an 18 foot extension of the Brasília fuselage, over wing turbofan engines, and a redesigned wing.

support to its national champion, but also to transfer the company from the public to the private sector in order to give Embraer the independence it needed to adapt to the new techno-economic environment. Thus one element of the “statist” policy trajectory, the state-owned firm, had been modified by the new government. Later developments would show that the neo-institutionalist view of path dependency would prevail as government policy continued to give strong support to its now private national champion Embraer.

Within a year of the launch of the EMB-145, Brazil elected a new government committed to neo-liberal policy reform. The new president, Fernando Affonso Collor de Mello, was determined to modernize Brazil and deal with the persistent problem of inflation. The Collor administration established two plans to stabilize the economy. The First Collor Plan, issued in March 1990, encompassed a set of fiscal, monetary and income policy changes, implementing a floating exchange rate, frozen prices, and the introduction of a new currency. It also increased taxes, increased the price of public sector services, cut subsidies, and reduced the public sector payroll. The Plan resulted in a short-lived drop in inflation, but threw Brazil into a recession. In February 1991, the Collor administration launched its second stabilization plan, Collor II, that built on the efforts of the first. Prices and wages were frozen, the prices of public sector services were increased, overnight money market accounts were closed down, and tariff reductions were introduced to spur competition from imports (Chaffee, 1998: 162-164; Longo, 1997: 31-33; Macedo and Barbos, 1997: 7-15).

The Collor administration launched a complete reorientation of industrial policy, making a complete break with the import substitution policies of the past. "The Collor government was the first to openly recognize that the import substitution strategy that had led Brazil's growth in 1950-1980 had come to an end" (Chaffee, 1998: 163). The new policies were clearly neo-liberal in orientation. "New policies would increase the competitiveness and quality of Brazilian products, open the economy to foreign competition, and reduce the state's presence in the economy" (da Cruz and da Silva, 1997: 50). A program to divest state-owned companies was launched the day Collor de Mello became president, followed by the more formal National Program of Privatization. The latter program was designed to redefine the state's role from a supplier of goods and services to a regulator, to create a competitive environment by granting private sector concessions, and to redirect the federal governments resources to other priority areas such as social needs and high technology research and development. It was argued that the program would reduce public sector debt, reinforce market forces, and increase the democratization of companies. Foreign investors were permitted to acquire up to 40 percent of the voting shares of state-owned enterprises and up to 100 percent of the non-voting shares. Between 1991 and 2002, the Brazilian government sold 27 state-owned enterprises, 26 minority state shareholdings, and various concessions and leases were arranged with the private sector. Total receipts to the state amounted to US \$ 27.4 billion, with \$9.2 billion in debt transferred to the new owners (BNDES, 2001: 8-9; BNDES, June 2002: SD-1 - SD-6; Chaffee, 1998:

163, 170; Longo, 1997: 36-37).

There are several different views on the factors motivating the government's drive to sell state owned firms. One view sees the motivation as the government's need to raise revenue to deal with its fiscal problems, especially in light of the government's inability to achieve fiscal reform (Baer, 2001: 211, 284-289). Another view sees privatization as a new form of industrial policy. Privatization was to free the state from the special interests that had grown up around the state sector. It also permitted industrial restructuring using private capital to achieve public policy goals (Montero, 1998). Another view sees privatization as an essential element in a process designed to reduce the influence of the military (Hunter, 2000: 119)

Other programs to improve the performance of Brazilian industry included a Brazilian Program of Quality and Productivity aimed at reducing waste and improving the technological performance of Brazilian private and state-owned firms. The Industrial and International Trade Policy aimed to open up the domestic economy to international competition, reduce protectionist taxation, eliminate indiscriminate subsidies and incentives, strengthen the competitive and potentially competitive sectors of the Brazilian economy, and increase the technological capabilities of industry. The Industrial Competitiveness Program focused on the restructuring and deregulation of the economy and the strengthening of laws that stimulated competition (da Cruz and da Silva, 1997: 50).

In late 1992, President Collor de Mello was impeached on corruption charges and his Vice-President, Itamar Franco, assumed office as President. As Macedo and Franco point out : “Franco’s philosophy on the nation’s modernization differed from the previous administration and was more in line with an interventionist approach” (Macedo and Barbosa, 1997: 15). Franco emphasized the reduction of interest rates, an attack on poverty, and economic growth. He initially questioned the need for privatization, but later allowed the program to continue. In April 1993, the President introduced an economic plan “that was designed to lower interest rates, subsidize agriculture, fund infrastructure and housing, continue and expand the program of privatization, subsidize basic food for low-income families, grant incentives for employment, and reduce tax dodging”(Chaffee, 1998: 174). With inflation continuing to be a problem, the government announced a new economic plan two months later, and this time with the emphasis on controlling inflation. The plan was more orthodox in nature, cutting \$6 billion from the federal budget, implementing a tax on cheque writing, enforcing tax evasion, accelerating the privatization program, reducing financial transfers to states and municipalities, and improving on the collection of debts from states and municipalities. The federal budget deficit was temporarily brought under control, but the plan failed to control inflation. In December 1993, the government introduced the second stage of its stabilization program in the form of the Real plan, cutting federal spending even more and increasing taxes by 5 percent. Despite all the efforts, inflation continued to increase, but by early 1994 the economy was experiencing a healthy level of

growth (Chaffee, 1998: 170-180; Macedo and Barbosa, 1997: 15-16).

The new government coincided with a period dramatic crisis for the Brazilian defense industry. In the early 1980s, the Brazilian industry had turned its attention to moving up the technological ladder. It wanted to shift from being a medium technology arms supplier to a supplier of advanced weapons systems. In that effort, several major projects were launched to develop a battle tank, a space launcher, a submarine, and, led by Embraer, a ground attack aircraft. Yet, as the 1980s progressed, the international demand for arms fell dramatically due to the end of East-West tensions and the end of problems in the Middle East. From a peak of \$ US 700 million dollars in 1988, Brazilian arms exports plunged to US \$60 million in 1990 and US \$80 million in 1991. After rising to an average of US \$160 million per year between 1992 and 1994, arms exports plunged once again to US \$10 million in 1995 (US Arms Control and Disarmament Agency, 1997: 113). As defense markets contracted, international competition to serve the smaller market intensified. Cost over-runs on the advanced weapons projects left state-owned firms with large debts, and the government's budget difficulties and high debt levels made it increasingly difficult for the state to fund defense industry research and development and production activities. The crisis became so severe that three of the core firms in the Brazilian defense industry faced bankruptcy²². As we shall see, one of these firms was Embraer (Franco-Jones, 1992: 189-199; Conca, 1997: 1-3, 107-113).

The first hints of a change in attitude at Embraer towards public-private ownership came with the effort to fund the development of the new EMB-145. Although the new aircraft would require about \$150 million for development and another \$50 million for training and marketing, Embraer was not seeking industrial partners for the project. It was looking for financial partners through a trust fund to be established in the United States. In addition, Embraer sought to sell 35% of its equity on the stock market, although the government would continue to control a majority of the voting shares of the company. The company also wanted to issue \$85 million in debentures that could be converted into non-voting preferred shares after 18 months (Flight International, 24 June 1989: 6; Aviation Week and Space Technology, 4 September 1989a: 67).

When the possibility of selling the company was initially raised by Embraer during the transitional Sarney administration, the reaction of the Ministry of Aeronautics was cautious. The Ministry was somewhat open to more private sector involvement, but only in a long-term effort and provided that the government's ownership share did not drop below 51 percent. As we shall see, government views on the sale of the company changed with the election of the Collor administration and the onset of the financial crisis of both the company and the state. The new government exhibited a more flexible view of the possibility of selling the firm, with a privatization strategy that reflected the strategic nature of the company (Conca, 1997: 132-133).

²² The two others were private sector firms ENGESA, maker of armored vehicles and tanks, and AVIBAS, maker of

Embraer's fortunes began to deteriorate in the late 1980s and early 1990s and the government, due to its own financial difficulties, could only offer limited support. In the early 1980s, when Embraer developed the EMB-120 Brasilia, it depended a lot on short-term credit for the \$300 million it needed to develop the aircraft. That expensive credit had to be continually rolled over, leaving the company with about \$400 million in mainly short-term international debt by 1989. In order to finance its CBA-123 and EMB-145 projects, it needed access to capital. The government could not be a source of capital, and the tax incentives used to attract investors to Embraer were expiring. In 1989, the company issued \$ 85 million in convertible debentures and it converted \$100 million of Brazil's international debt into capital in the company. This was done through the issuance of 119 million preferred shares. Embraer also wanted to establish a development investment corporation in the United States to fund EMB-145 development. The shareholders in the corporation would own part of the EMB-145 project, but not a part of Embraer itself. The corporation would own a stake in the intellectual property of the EMB-145 and could act as a distributor for the aircraft (AirFinance Journal, November 1989a: 18-21; AirFinance Journal, April 1990: 87).

In the late 1980s, when the other big defense firms, Avibras and Engesa, were filing for bankruptcy protection, Embraer was struggling to make a profit. In 1988, Embraer had a net loss of \$35 million. Its situation improved in 1989 when the company reported \$89 million profit on sales of \$692 million (Flight

International, 11-17 April 1990: 16). Nevertheless, Ministers in the government of Fernando Collor de Mello began to indicate that the time was coming for the government to divest itself of Embraer. The Minister of Infrastructure, and a former director of Embraer, Ozires Silva, indicated that he did not, however, favour selling Embraer to aerospace companies in other countries. Embraer itself favoured the use of the pension funds of state-owned companies (AirFinance Journal, April 1990: 87).

Financial difficulties with the Brazilian economy and at Embraer in the early 1990s led the company to reassess all of its ongoing programs. Embraer lost \$174 million in 1990 on sales of \$ 632 million (Air Transport World, July 1991: 142). In November 1990, the company was forced to launch a series of dramatic cutbacks due to large scale spending cuts by the Collor administration. It cut 32% of its workforce of 12,800, suspended the development program for the EMB-145 regional jet for six months, and delayed the CBA-123 program by one year²³. The cutbacks meant that the company was owed approximately \$176 million in late payments by the government. Reductions in the military budget led to a slowdown in the military's order for the AMX fighter and thus to a reduction in production levels. In December 1990, Embraer appointed Joao Cunha, who had close political ties to the government, as its president with the hope of improving its relations and fortunes with the government, but his appointment could not prevent the cutbacks. A government decision to withdraw financial support from the company meant that it would have to take further cost

cutting measures and increase its sales. Finance Minister Cardoso indicated that the back payments owed to Embraer would be paid when the company presented a rationalization plan (Flight International, 7-13 November 1990b: 4; Interavia, February 1991: 6).

In early 1991, rumors started to surface about the possible cancellation of the CBA-123 19-seat regional turboprop. Embraer, occupied with efforts to redesign the EMB-145 to improve performance, had decided to use risk-sharing partners to finance the EMB-145. It hoped to have government approval for its risk-sharing proposals by the end of 1991. The company suffered through a three-week strike in April 1991 with a court ordering a large wage increase for the striking workers. In June 1991, speculation began that Embraer was to receive a cash infusion from the government to enable it to carry on with the CBA-123 and EMB-145 programs and make improvements in the rest of the product line (Flight International, 27 March - 2 April 1991: 18; Flight International, 22-28 May 1991: 15; Air Transport World, July 1991: 142; Aviation Week and Space Technology, 24 June 1991: 25).

The financial crisis at Embraer became a real threat to the future of the firm. Despite the existence of some promising future projects, a lack of funds threatened to bring them to a halt. The Brazilian government was in financial difficulties of its own that limited its ability to fund the firm's activities. With Embraer's interest in survival, it started to look at alternative financial options for

²³ At the time, Embraer had letters of interest from airlines for 307 EMB-145s and 100 orders and options for the CBA-123

the future. Yet the Brazilian government remained interested in the survival of the firm because it was the main supplier of military aircraft to the Brazilian Air Force and it was a relatively successful high technology company. With its defense industries in trouble, and several large defense firms threatened with bankruptcy, Embraer was one firm in the defense sector that had a promising future in civilian markets. Saving Embraer was, therefore, important to the government.

In late June, the Brazilian government decided to support its national champion by agreeing to provide Embraer with a \$ 500 million loan, repayable over 12 years, to help eliminate debt and continue with stalled aircraft projects. The money would be used to help stabilize the company's labour problems and improve the current product range. For example, it would be used to introduce a longer-range version of the Brasilia. Embraer Chief executive Joao Rodriques da Cunha Neto indicated that the company was willing to invest \$100 million in the EMB-145 program and was looking for risk sharing partners for the remaining \$200 million needed. The sale of the company to the private sector was also on the government's agenda. Neto, along with the company's entire board of directors, resigned from Embraer in July. The resignation was seen as a signal of dissatisfaction with the way the government was handling Embraer's problems (Aviation Week and Space Technology, 1 July 1991: 22; Flight International, 3 - 9 July 1991: 12; Flight International, 26 June - 2 July 1991: 10).

In early January 1992, the government announced plans to sell Embraer. As we shall see, this decision only marked a non-path dependent incremental shift in the traditional policy path and did not change its fundamental direction. The move was in line with the government's ideas about the role of the state in the economy and the selling of state owned firms. A working group consisting of representatives of Embraer, company employees, the Air Ministry, and the National Economic and Social Development Bank (BNDES), developed the proposal. Approximately 40% of the stock would be made available to foreign investors, with Brazilian investors taking 30% and Embraer's employees taking 10%. The Brazilian government would maintain a 20 % share to protect its interest in Embraer programs important to national security (Aviation Week and Space Technology, 20 January 1992: 17).

As 1992 progressed, the future of the Embraer/FMA CBA-123 program became more uncertain and the government found itself in no position to help. The market for 19-seat aircraft had collapsed with the recession of the early 1990s, and there were now a lot of 19-seat aircraft pulled from service and in storage. In addition, the high price of the CBA-123, \$4.8 million each, was a major drawback for commuter carriers. In order to salvage the aircraft program, Embraer proposed the purchase of enough CBA-123's by both the Brazilian and Argentine governments to justify the start of production.²⁴ It was hoped that the start of production would entice commuter carriers to order the CBA-123, and this would mean that most of the aircraft underwritten by the two governments

²⁴ It was suggested that Brazil buy 40 and Argentina 20 aircraft.

would end up with commercial carriers rather than the governments themselves. Embraer worked to reduce the cost of the aircraft and sought new applications for it, such as a utility aircraft for medical services and military VIP transport. The other alternative was to sell the fuselage design to a third party. By early 1993, it became evident that government orders for the aircraft would not likely take place due to the severe financial difficulties of both the Brazilian and Argentine governments. In this case, unlike previous government efforts to help spur sales of aircraft, the government could not come forward with aircraft purchases to support its national champion firm, despite the fact that the future of the aircraft program was threatened. The aircraft only needed six more months for its certification program to be completed, and 80% of the production tooling for the aircraft was complete. The CBA-123 program eventually lapsed (Aviation Week and Space Technology, 10 September 1990: 22; Flight International, 27 March - 2 April 1991: 18; Flight International, 18 - 24 March 1992: 9; Flight International, 25 - 31 March 1992a: 20; Flight International, 24 - 30 June 1992a: 14; Flight International, 3 - 9 March 1993: 6).

Embraer's financial condition continued to deteriorate in the early 1990s. For example, the company reported a \$235 million loss for 1991 and a \$258 million loss in 1992 (Flight International, 3-9 June 1992: 4; Flight International, 14-20 April 1993a: 6). In June 1992, the company was forced to respond to falling demand for aircraft by reducing its workforce once again²⁵ In late 1992, the company announced that it expected to be sold in early 1993 as the

company was now included in the National Privatization Programme. The political crisis in Brazil concerning allegations of corruption against the regime of Fernando Collor de Mello brought some uncertainty to the future of Embraer, however, and delayed action on the sale of the company. The new government of Itamar Franco made changes to the privatization program. The amount to be paid in cash by bidders and the limit on foreign ownership were to be decided by the government on a case-by-case basis. State pension funds, which had been a major element of the program up to that time, were banned from participating in privatizations (Flight International, 3- 9 June 1992: 4; Aviation Week and Space Technology, 7 September 1992: 127; Flight International, 30 September - 6 October 1992a: 13; Flight International, 3 -9 March 1993: 6). But by late 1993, the sale of Embraer to the private sector was firmly back on the government's agenda. The BNDES announced that it would set the minimum floor price for Embraer during that month. At that point, Embraer had debt of \$900 million and this included \$400 million owed to the state-owned Banco de Brasil. The government wanted to sell the company with a reduced debt load of around \$ 300 million and was working on ways to achieve this goal. The BNDES indicated that the government intended on keeping a "golden share" in Embraer to keep some control over major management changes (Flight International, 3 - 9 November 1993: 26)

Despite the modification of the policy path, the government still wanted to protect its strategic interest in Embraer. In March 1994, the government

²⁵ Embraer cut another 2,500 employees from its workforce of 8,300. This was estimated to save the company \$40

announced a sale date. The minimum price set for the company was \$295.3 million, and 60% of the shares would be sold through an auction at the Sao Paulo stock exchange. All bidders had to be screened by the Brazilian government at least 30 days before the auction. To prevent the company from being purchased and shut down, direct competitors of Embraer were not allowed to bid for the company. The buyers had to assume a debt of \$215 million, with the government assuming the rest of the debt. The government would maintain a 20% interest in the company, 10% would be sold to the employees, and 10% would be available to small Brazilian investors. At the same time, the government established a golden share that would allow it to prevent future changes of ownership or future changes in programmes that would impact on national security. Foreign ownership would be limited to 40% of the 60% of the company that was to be auctioned off. The bidders could use Brazilian government bonds to purchase the company, but 10% of the purchase price had to be in cash to provide new capital for the company. The government set down no specific requirements in terms of job protection or the continuation of programs, but it did require the company to keep the Embraer name and remain in the business of manufacturing aircraft. The government also made a commitment to continue to provide support in the form of export sales financing and it pledged to continue to meet its national aircraft requirements with equipment from Embraer (Air Transport World, June 1994: 205; Aviation Week and Space Technology, 28 March 1994: 71; Flight International, 16-22 March 1994a: 6; Flight International, 30 March - 5 April 1994: 22).

Difficulties with readjusting the payment schedule on some of Embraer's debt, owed mainly to Canada's Export Development Corporation, and the inability to attract industrial investors led to a delay in the sale of Embraer. The August auction date was delayed again as the lower house of the Brazilian Congress needed to give approval to the sale²⁶. The general election in October and a Senate recess were expected to delay the vote until as late as March 1995 (Air Transport World, July 1994: 73; Flight International, 19-25 October 1994: 14). As the company waited for events to determine its future, the company reported major losses for the first half of 1994. The operating loss for the first half reached \$66.4 million, 12% more than in 1993. In November, the BNDES announced that the auction of Embraer would go ahead on December 7, 1994. The minimum price was \$180 million. The government, through the Air Force, still intended on holding a golden share in the company to allow it to protect the national interest. (Flight International, 2 - 8 November 1994: 18; Flight International, 16 - 22 November 1994: 15; Interavia, December 1994: 11).

On December 7th, Embraer was auctioned to the private sector. About 100 trade union members protested against the auction outside the Sao Paulo stock exchange. 55.4% of Embraer's voting stock was sold for R \$154.1 million (US \$182.4 m) with a consortium led by Bozano Simonsen bank acquiring 45.44% out of the 55.4% of the voting stock available for auction.²⁷ The other

²⁶ The Senate was due to vote in August to remove the requirement for lower house approval of sales of state owned companies, but the vote did not take place in August.

²⁷ The consortium represented the local pension funds of Usiminas, Banco de Brasil, Centrais Electricas de Sao Paulo and Telebras. The US investment bank Wasserstein Perella was the largest investor in Bozano Simonsen, and it was itself partly owned by the Japanese Nomura finance company (Flight International, 7 - 13 December 1994, p. 6; Interavia, January 1995, p. 10).

9.96% of the voting stock went to private investors and the Primus Corretora and Banrisul investment banks. Of the total shares sold, 67% went to Brazilian investors and 33% went to foreign investors (BNDES, 16 April 2002: SD-91; Flight International, 7 - 13 December 1994: 6; Interavia, January 1995: 10).

Despite the sale of the company, the government was not willing to completely leave the fortunes of its national champion to the market. As previously mentioned, the Brazilian government maintained its “golden share” in Embraer in addition to its initial 20% holding. This special class of common share was created due to the strategic importance of Embraer as a key supplier of military equipment to the Brazilian armed forces. This “golden share” gave the government the right to veto changes with respect to the name of the company, its logo, the creation or modification of military programs (including those not involving Brazil), third party military technology training, the discontinuance of military aircraft maintenance and parts supply, and the transfer of share control of the company. The government was also entitled to one director on the company’s Board of Directors (Empresa Brasileira de Aeronautica, 15 May 2001: 1-5). The government wanted to protect its position with respect to military programs, and it wanted to have the power to prevent control over the company from being shifted to countries outside of Brazil. The government’s actual share in the ownership of the company would decline to 1.4% in 2001²⁸.

²⁸ The government directly owned 1.5% of the common shares in June 2001. It owned a further 1.2% of the common shares and under 1% of the preferred shares through the Banco do Brazil. In addition to this, BNDES owned 14.1% of the preferred shares (Empresa Brasileira de Aeronautica, 15 May 2001, pp. 73-74).

1995: Policy After The Crisis

From 1995 onwards, the Brazilian government continued with the major thrust of its historical industrial policy path in the commuter and regional aircraft industry, offering strong state support to the new, privately-owned, national champion Embraer. Just as the neo-institutionalists would predict, the basic thrust of the historic policy path continued. Neo-liberalism did have an impact on the policy path during this period, as we shall see, in the willingness of the government to allow for the internationalization of the company. However, despite its neo-liberal orientation, the government continued to view Embraer as the country's national champion in the commuter and regional aircraft industry, and it continued to provide "strategic" support to its national champion for political and economic reasons. As this period will show, and neo-institutionalists might expect, the basic thrust of the "statist" approach lived on.

In January 1995, former Finance Minister Fernando Cardoso became President, continuing with the policies of previous administrations and aiming his main efforts at fiscal reform. He expanded the privatization program to include public utilities, municipal and state owned companies, and public infrastructure (Baer, 2001: 205-210, 287-289). As we shall see, the new President would continue to back Embraer and provide support for the company's internationalization.

With the sale of the firm completed, Embraer had to take action to improve

its performance by further adapting to the new techno-economic environment by lowering production costs. In mid-1995, Embraer announced that it was cutting 30% of its workforce in an attempt to reduce production costs (Flight International, 5 - 11 July 1995: 15). In May 1996, Embraer was successful in negotiating a new labour contract that included concessions on the part of employees²⁹ (Flight International, 1 - 7 May 1996: 14). The company recorded a gradual improvement in its financial performance between 1995 and 1997. For example, losses declined from \$307.7 million in 1995, and \$40.2 million in 1996, to \$13.2 million in 1997. In 1997, the company exported 84% of its production (Interavia, March 1998: 15-18; Embraer, 23 March 1998; Flight International, 15 - 21 April 1998: 22)

While waiting for its financial future to be decided, Embraer pushed ahead with the development of the EMB-145 regional jet and assembling its team of international risk-sharing suppliers³⁰. These risk-sharing partners played a major role in the funding and development of the EMB-145. The company was, therefore, adapting its business model to the new techno-economic paradigm by increasing internationalization. In line with the long-standing policy path, the government continued to support its national champion by contributing funds to the development of the aircraft. The total cost of developing the aircraft

²⁹ The agreement included a six-month 10% wage cut and 10% reduction in working hours for production employees. The agreement called for the loss of 350 support and administrative jobs. Embraer's President Botehlo stated that without the agreement, the number of administrative jobs cut would have been approximately 800 higher (Flight International, 1 - 7 May 1996, p. 14).

³⁰ For example, SONACA of Belgium became a risk-sharing partner responsible for building specific sections of the fuselage. The company had a 4% share in the programme. ENAER of Chile was also selected to provide the vertical fin, horizontal stabilizer, and elevators. GAMESA of Spain was a risk-sharing partner responsible for the wings and engine nacelles. Allison Engines of the U.S. was selected to supply the turbofan engines to power the EMB-145. C&D Interiors of the U.S. was selected to supply the aircraft's interior (Aviation Week and Space Technology, 7 June 1993, p. 103; Aviation

amounted to \$300 million, shared by Embraer (34%), risk sharing partners (33%), suppliers (10%), and the Brazilian government (23%). A line of credit was established with the BNDES for capital expenditure purposes, with most of the funding used to finance research and development of the EMB-145 (Empresa Brasileira de Aeronautica S.A., 15 May 2001: 54). By the time the EMB-145 was ready for its first flight³¹, Embraer held 18 firm orders for the aircraft, 16 options, and 127 letters of intent, and it expected to complete certification of the aircraft and begin deliveries to customers in 1996 (Aviation Week and Space Technology, 7 June 1993: 103; Aviation Week and Space Technology, 21 June 1993: 28; Flight International, 19 - 25 May 1993: 6; Flight international, 23 - 29 June 1993: 18; Aviation Week and Space Technology, 14 August 1995: 31; Aviation Week and Space Technology, 28 August 1995: 28-29; Flight International, 23-29 August 1995: 5).

The EMB-145 was being offered to regional airline customers at an attractive price. The aircraft cost U.S. \$14.5 million, a price that was approximately 20 percent cheaper than its main rival, the Bombardier Canadair Regional Jet. A low price was the main factor that made the Brasilia so successful. The breakeven point for the aircraft was in the 200 to 250 aircraft range, and the company expected to achieve that production point sometime

Week and Space Technology, 21 June 1993, p. 28; Flight International, 19 - 25 May 1993, p. 6; Flight International, 23-29 June 1993, p. 18).

³¹ EMB-145 regional jet took to the skies for the first time on August 11, 1995. The company had originally planned to have the aircraft's first flight in January 1992, but design problems, the company's 1991 cutbacks, and the sale of the company pushed back the first flight date (Aviation Week and Space Technology, 14 August 1995, p. 31; Flight International, 23 - 29 August 1995, p. 5).

between 2001 and 2003³². To meet the needs of US regional carriers, Embraer began the development of an extended range version of the EMB-145 that would increase the aircraft's range from 2,400 to 3,000 km (Aviation Week and Space Technology, 9 September 1996a: 26-27; Embraer, 14 June 1997a; Flight International, 30 August - 5 September 1995: 26; Flight International, 11 - 17 September 1996a: 10; Flight International, 1 - 7 January 1997: 6).

As Embraer started to focus on the development of derivative aircraft, the government was there to provide support for these efforts. With the EMB-145 development completed and sales of the aircraft starting to firm up, Embraer started to focus its attention on both smaller and larger segments of the market³³ (Flight International, 18 - 24 September 1996: 14). In September 1997, Embraer launched its 37-seat EMB-135, a regional jet derivative of the EMB-145³⁴. The development program required an investment of approximately \$100 million and several funding sources were to be used for the project, "including Banco Nacional Desenvolvimento Economico Socioland, the Brazilian Bank, Finep, the technology development agency, component suppliers and the company's own capital" (AirFinance Journal, October 1997: 18). As with the original EMB-145,

³² Embraer scored its first big success with the EMB-145 in North America at the Farnborough Air Show in September 1996 when Continental Express placed a large order for the aircraft. Continental Express, the regional airline affiliate of Continental Airlines, placed an order for 25 EMB-145s with 175 options. The options could be exercised over a 10-year period. The carrier expected to start taking delivery of its aircraft late in 1996. The firm order had a value of US \$375 million. The exercise of the options would bring the deal up to \$2.6 billion. The Continental Express order was a big boost for the company and it then focused its attention on other potential big U.S. airline orders and European sales (Aviation Week and Space Technology, 9 September 1996a, pp. 26-27; Flight International, 11 - 17 September 1996a, p. 10).

³³ In 1999 and 2000, Embraer launched two other lower cost versions of its regional aircraft without government support. In September 1999, it announced the launch of the 44-seat EMB-140. This derivative would cost \$45 million to develop and certify, and it was expected to be ready for customers during the first quarter of 2001³³. (Aviation Week and Space Technology, 11 October 1999, p. 41; Aviation Week and Space Technology, 2 October 2000, p. 27; Embraer, 30 September 1999; Flight International, 6-12 October 1999, p. 6; Flight International, 3 - 9 October 2000, p. 5). The other version was a business jet version of the EMB-135 and that was launched in July 2000 (Embraer, 24 July 2000; Flight International, 1 - 7 December 1999a, p. 24; Flight International, 1 - 7 December 1999a, p. 24; Flight International, 8 - 14 December 1999a, p. 39; Flight International, 1 - 7 August 2000a, p. 22).

the Brazilian government decided to continue to support its national champion through the granting of long-term loans to help finance the development of the derivative aircraft. The BNDES and Finep, both state agencies, would provide 60% of the funding in the form of long-term repayable loans (AirFinance Journal, October 1997: 18; Aviation Week and Space Technology, 18 May 1998: 39; Embraer, 16 September 1997; Flight International, 24 - 30 September 1997: 7; Flight International, 13 - 19 May 1998: 5).

As the deregulated airline market evolved, Embraer, like its competitors Fairchild-Dornier and Canadair, began to investigate the possibility of launching a family of large sized regional jets. Embraer was hesitant to get into the market for regional jets with 70 or more seats because of what it perceived to be limited opportunities in the large US market due to restrictive pilot scope clause restrictions, the economic crisis in Asia, and a weak European market. In order to share the large costs of such a program, the company was also searching for a partner to enable it to eventually launch such an aircraft project. The company held talks with the Franco-Italian consortium ATR, British Aerospace, SAAB, and Fairchild-Dornier over such a venture (Flight International, 30 September - 6 October 1998: 4; Flight International, 16 - 22 December 1998c: 5; The Globe and Mail, 5 February 1999: B10).

In the late 1990s, both of Embraer's main competitors, Fairchild-Dornier and Canadair, announced development programmes for a family of regional jets

³⁴ The aircraft was given a big boost in May when Continental Express placed a firm order for 25 of the 37 seat aircraft

with 70 or more seats. Fairchild-Dornier was working on its Dornier 728 and Dornier 928 programmes and, as we shall see, Bombardier revealed plans for its 90 and 120 seat BRJ-X programme. Bombardier also launched a 70-seat derivative of its 50-seat CRJ in 1997, and this aircraft was expected to enter service in 2001. In order to remain competitive, Embraer announced the pre-launch of a new family of regional jets in February 1999³⁵. The new family would consist of two aircraft - a 70-seat aircraft (ERJ-170) and a 90-seat aircraft (ERJ-190). In May 1999, Embraer revealed that it was considering a 108-seat stretch of its ERJ-190 (ERJ-190-200) series that would allow Embraer to compete more effectively against the BRJ-X family of Canadair. Embraer believed that market requirements demanded the development of an entirely new aircraft, so development costs would be high. These costs were expected to be \$500 million for the ERJ-170, \$250 million for the ERJ-190, and approximately \$100 million for the ERJ-190-200. The company hoped to split the cost evenly between itself, its risk sharing partners, and outside investors. Embraer intended to use innovative approaches in product development. It would jointly define the aircraft with its risk sharing partners, and use a product development management system to organize and share design data. It would also use computer aided design and a virtual design center as key tools in the development effort.

with 50 options. The firm contract for 25 was valued at US \$315 million (Flight International, 13- 19 May 1998, p. 5).
³⁵ The ERJ was launched after the Swiss regional airline Crossair placed a \$4.9 billion order for aircraft from the new family at the 1999 Paris Air Show. Crossair, a subsidiary of Swissair, placed a US \$4.9 billion order for 15 EMB-145s, 30 ERJ-170s and 30 ERJ-190-200s. The carrier also took options for 25 EMB-145s and 100 of the ERJ series aircraft. The Crossair order effectively launched the Embraer ERJ programme. The firm orders were valued at \$1.7 billion and the exercise of the options would bring the total to \$4.9 billion. This would make it the largest regional aircraft order up to that time. The order was a large setback for Fairchild-Dornier because Crossair announced in 1998 that it was a launch customer for the 728Jet. The Embraer purchase was, therefore, a major switch for the Swiss carrier in favour of the Brazilian manufacturer. The order also pushed Embraer to advance its plans for the stretched version of the ERJ-190. Embraer expected the ERJ-170 to enter service in 2002 and the stretched ERJ-190-200 to enter service in 2004. The entry into service date for original baseline ERJ-190 was pushed forward to 2005 (Aviation Week and Space Technology, 21 June 1999: 32; Embraer, 14 June 1999; Flight International, 16 - 22 June 1999a: 4; Flight International, 23 -29 June 1999a: 23).

(Aviation Week and Space Technology, 15 February 1999: 18; Embraer, 11 February 1999; Flight International, 17 - 23 February 1999: 4; Flight International, 19 - 25 May 1999: 16; Flight International, 9 - 15 June 1999: 18; Flight International, 23-29 October 2001: 34-36)

Embraer's efforts to launch a family of large regional aircraft were given a big boost by its financial results for 1998 which showed that revenue for the year totaled US \$1.3 billion, a 75% increase over the 1997 revenues of US \$746 million. The company also moved into a profit position in 1998, earning US \$102.9 million after suffering a loss of US \$29.6 million in 1997. These good results were due, in part, to Embraer's successful adaptation to the new technoeconomic environment through improvements in production and the introduction of its regional jet family. The company's order book stood at \$US 4.1 billion. Exports contributed substantially to these results as Embraer became Brazil's second largest exporter with 90% of its sales taking place in export markets. Productivity increases (US \$ 40,000 revenue per employee in 1994 to \$ 227,000 revenue per employee in 1998) also contributed to the company's success (Embraer 5 April 1999; The Globe and Mail, 6 April 1999: B11; Aviation Week and Space technology, 12 April 1999: 53; Aviation week and Space Technology, 10 May 1999: 46-49; Airline Financial News, 12 April 1999: 3; Flight International, 14 - 20 April 1999: 28).

In addition to its growth in the commercial aircraft market, Embraer began to focus more on the military market, including military applications for its

regional aircraft. It intended to offer several new or improved products for the military marketplace. While designed primarily to meet the needs of the Brazilian military, export opportunities were also important from the outset. During the early years, the split between military and civil sales had been fifty-fifty. The share of military sales in total turnover had declined in the 1990s with the rising importance of regional jet sales. In 1994, 52% of sales were in the defense sector, with the government of Brazil accounting for 77% of those sales. Sales to the government declined from 9% of sales in 1998 to 2.4% in 2000 (Empresa Brasileira de Aeronautica S.A., 2 July 2001: 74). Embraer indicated that it hoped to raise the military share to 30% of turnover within five years, with the eventual goal being a return to a fifty-fifty split. The company saw the military market as important because of “of the contribution required from the division in terms of technology transfer” (Flight International, 16 - 22 June 1999: 32). As Embraer itself pointed out, the development of government funded military technology had significant spinoffs for its civilian activities:

Research and development costs related to defense aircraft historically have been funded in large part by the Brazilian government. We are able to apply the technological developments we acquire from our defense technology to applications in our commercial business. For example, we developed our regional jet family based on the turbofan technology developed for the Brazilian Air Force's AM-X program (Empresa Brasileira de Aeronautica S.A., 15 May 2001: 21).

Increasing activity in the military sector would, therefore, benefit both the military and civilian sides of the company's business. Perhaps more importantly, increased government support through the military would also not be subject to challenge under international trade agreements.

In line with the established policy path, the government continued to offer strong support to its now privately owned national champion through the awarding of defence contracts to the company. In early 1997, Embraer announced plans for an airborne early warning (AEW) variant of its EMB-145 regional jet. This decision was based on the Brazilian government's selection of the EMB-145 as the platform for the AEW aircraft for its Amazon surveillance system designed to protect the Amazon region from smuggling and environmental damage. Embraer also announced its intention to develop a maritime patrol version of the EMB-145 based on an expected launch order from Mexico for 6 aircraft. Embraer also wanted to offer a VIP version of the EMB-145 to the Brazilian and Argentinean air forces. In addition, the company was seeking to develop a military transport version of its EMB-120 regional turboprop. (Aviation Week and Space Technology, 27 April 1998: 66-68; Aviation Week and Space Technology, 7 June 1999: 25-26; Embraer, 28 May 1999; Flight International, 1 - 7 January 1997a: 13; Flight International, 23 December 1998 - 5 January 1999: 12; Flight International, 5 - 11 May 1999: 19; Flight International, 15 - 21 September 1999: 5).

The government also supported Embraer's efforts to develop its line of dedicated military aircraft such as a jet strike trainer. This aircraft, the AMX-T, would be a development of the AMX that Embraer created with its Italian partner Alenia. Embraer expected to sell this aircraft to foreign air forces as well as the Brazilian air force. Embraer also developed an improved version of its Tucano

turboprop trainer, the Super Tucano, for a US training aircraft competition, but Embraer and its partners lost the competition. The Brazilian air force funded a \$50 million program to develop a light attack aircraft version of the aircraft known as the ALX. A line of credit for was established with FINEP to help fund the company's portion of the ALX program³⁶. The Brazilian air force subsequently ordered 99 ALX aircraft mainly for use in patrolling the Amazon region. Embraer also received a \$200 million contract to modernize some older fighter aircraft in the Brazilian air force fleet, and it was bidding on a contract, with its partner Alenia, for a mid-life upgrade of the AMX light attack aircraft (Aviation Week and Space Technology, 28 August 1995a: 26; Aviation Week and Space Technology, 27 April 1998: 66-68; Aviation Week and Space Technology, 7 June 1999: 26; Flight International, 2 - 8 June 1999: 4; Flight International, 3-9 July 2001: 22).

In early 1999, Embraer indicated that it wanted a share of the Brazilian government's program for a next generation fighter. The government had not yet specified the level of local participation, but Embraer was lobbying hard to have a major role in the project. The Brazilian air force was expected to need between 72 and 149 new fighter aircraft to replace older aircraft in its fleet. For this project, Embraer was open to working with a partner that would also help to enhance its global presence (Flight International, 23 December 1998 - 5 January 1999a: 13; Flight International, 16-22 June 1999: 32).

With the launch of new civil and military projects, Embraer looked to

³⁶ The total outstanding principal on this line of credit was \$24.5 million as of March 31, 2001 (Empresa Brasileira de

further internationalization as a means of funding the increased level of activity. These views were in line with the idea that the industry was becoming global and a major international presence was essential to prosper. In March 1998, Embraer outlined its plans for an international share flotation to raise funds for new product development and to expand the company's worldwide presence. President Maurice Botelho announced that the company would likely seek a listing on the New York and London stock exchanges. He also indicated that the company was interested in having a partner to help the company expand its global presence and assist in developing its support activities for major airline customers (Flight International, 4 - 10 March 1998: 18).

One element of the plan for increased internationalization was a worldwide search for a new international strategic partner. Embraer held talks with several other aircraft manufacturers, including a French consortium led by Dassault Aviation and a British Aerospace/SAAB team. Dassault Aviation wanted to acquire a substantial minority stake in Embraer, and it was leading a consortium of French companies that included Aerospatiale, Matra, Snecma, and Thomson-CSF. The French group saw such a partnership as a way of increasing its sales of military and business aircraft in South America, and it also wanted to participate in Embraer's regional jet and trainer programs. The British Aerospace/SAAB team wanted to form a partnership with Embraer that would encompass both military and civilian opportunities (Aviation Week and Space Technology, 20 September 1999: 46-47; Flight International, 22 - 28 September

1999: 26).

The talks focused on the sale of a significant minority stake in the Brazilian planemaker. It was estimated that a stake of between 10 to 20 percent would be valued at between \$250 million and \$500 million, but the sale would not involve a change in control of the company. From Embraer's point of view, the new strategic partner would provide capital, technology, and help increase its military business. As we saw earlier, Brazil's Air Force was expected to spend up to \$5 billion to update its fighter aircraft fleet, and Embraer wanted a partner that could help it participate in that update program. (Aviation Week and Space Technology, 20 September 1999: 46-47; Flight International, 18 - 24 August 1999: 6; The Globe and Mail, 14 September 1999: B14).

On October 25, 1999, a strategic alliance was announced between Embraer and the French group led by Dassault. The Dassault-led consortium agreed to acquire 20 percent of all the outstanding common shares of Embraer which representing 9 percent of total equity³⁷. Dassault, Aerospatiale Matra and Thomson-CSF, each acquired 5.67 percent stakes and Snecma took a 3 percent stake. The French shares did not carry voting rights, but entitled the companies to a higher dividend and to seats on Embraer's 11-member Board of Directors. The French companies did not expect to increase their share of ownership in the company and it was Embraer's intention that it remain Brazilian-owned. The

³⁷ The Daussault led consortium acquired 48,508,890 common shares of Embraer. 36 million shares would be purchased through a public offer at \$4.30 per share. The remainder of the shares would be purchased from the company's existing three main shareholders (Dassault Aviation, 25 October 1999; The Financial Times, 26 October 1999: 19; The Globe and Mail, 26 October 1999: B14; Aviation Week and Space Technology, 1 November 1999: 24).

acquisition of the shares would not affect control of Embraer as Bozano Simonsen had agreed to maintain its controlling interest until July 2007 (Dassault Aviation, 25 October 1999; The Financial Times, 26 October 1999: 19; The Globe and Mail, 26 October 1999: B14; Aviation Week and Space Technology, 1 November 1999: 24).

Embraer hoped to achieve three objectives from its alliance with French industry. The company wanted an increase in its international market presence (especially in Asia), an increase in its sales and customer service activities, and it wanted to develop new defense products with the aid of technology transfer from its new partners. The members of the French grouping hoped to increase their sales in South America. Embraer and Dassault were to team up and offer the Mirage 2000 and Rafale fighter in the region, with the former having the responsibility for final assembly³⁸. Dassault was also interested in selling its business jets and linking up with Embraer on business jet versions of its regional jets. Snecma, the French engine maker that manufactures the engines for French military aircraft, hoped to increase its presence in the region, including its role in engine repair and overhaul. Aerospatiale Matra hoped to link up Embraer's regional jets with its ATR family of turboprop aircraft, with Embraer also taking advantage of ATR's well established after sales support network. Any

³⁸ When the Brazilian government issued its request for proposals for its new F-X fighter program, it specified a 100% offset requirement for the \$700 million purchase of 12 to 24 aircraft. Several companies, including Boeing, Alenia, Lockheed Martin, Saab-BAe, and Sukhoi bid on the contract. Embraer was teaming up exclusively with its French partners to offer the Mirage 2000. The other bidders would have trouble meeting the 100% offset requirement because Embraer refused to deal with any other partners but the French team. With a drop in regional jet production and layoffs in the last quarter of 2001 due to the downturn in the economy and the impact of the events of September 11, 2001, the F-X fighter competition was becoming increasingly important for Embraer (Flight International, 31 July- 6 August 2001: 22; Flight International, 21-27 August 2001: 19; Flight International, 16-22 October 2001: 26). Embraer was also trying to convince the Brazilian air force to purchase purchasing maritime patrol versions of its regional jets instead of purchasing used

joint military programs would have to be approved by the Brazilian government due to the provisions of its “golden share” (Aviation Week and Space Technology, 1 November 1999: 24; Empresa Brasileira de Aeronautica S.A., 15 May 2001: 18).

The decision to sell a part of Embraer to the French exposed a major rift within the Brazilian government over the future of the company and the shifting balance of power within the government. The decision raised concerns within the Brazilian Air Force and induced resistance to a further incremental change in the policy path from this historic guardian of the national champion. Many in the Air Force felt that the deal threatened the security interests of Brazil and would make Embraer subject to French corporate interests. There were fears that the French consortium could gain control of Embraer because the principal Brazilian shareholders planned on selling their share in the near future. The Air Force voted the government’s golden share that gave the government veto power over the transaction, and the Air Force was pushing for a rejection of the deal. In response to the controversy, President Cardoso asked government lawyers to investigate the deal. The President and his economic advisors were generally in support of the French investment. In December, to clear the way for the transaction to proceed, President Cardoso removed Air Force commander Brauer from his position and replaced him with Carlos Almeida Batista, the president of Brazil’s military court and a supporter of the deal. In early 2000, the Brazilian government formally gave the go-ahead for the transaction (Air

Transport World, February 2000: 23; The Wall Street Journal Europe, 21 December 1999: 8; The Globe and Mail, 21 December 1999: B13; Aviation Daily, 4 January 2000).

Despite finding a strategic partner, Embraer moved to further internationalize when it launched a stock offering in mid-2000 to help fund aircraft development and the construction of new production facilities. Embraer planned to sell 52.8 million new preferred shares, and another 31.2 million shares from the group led by Bozano Simonsen would also be sold. Of these shares, 75.6 million would be sold in the US and the rest on the Brazilian stock exchange. Embraer expected to net around \$488 million. When the sale took place in late July, Embraer raised \$390 million and became listed on the New York Stock Exchange (Embraer, 24 July 2000a; Flight International, 11- 17 July 2000: 19; Flight International, 1 -7 August 2000b: 43).

International partnerships were not the only sign of Embraer's increasing internationalization as the company's activities in export markets also revealed a more aggressive outward orientation. While Embraer achieved major success in international export markets, that very success would lead to a resurrection of trade difficulties that its earlier successes had also encountered. The introduction of the 50-seat EMB-145 jet into the regional jet market in 1995 set off a major struggle in the marketplace. When Embraer introduced its EMB-135 in 1999, it also contested the market for smaller regional jets with Fairchild-

Dornier and its 328Jet introduced in 1998. Prior to the arrival of the Brazilian aircraft, Bombardier, Fokker and British Aerospace had the regional jet market all to themselves. The most immediate competitor for Embraer was Bombardier with its 50-seat Canadair Regional Jet (CRJ) that was introduced in 1991. A major struggle was unleashed between Bombardier and Embraer, especially in the US market. Big U.S. regional airlines began to purchase regional aircraft in large numbers, and each purchase became a struggle between the two manufacturers. Bombardier's CRJ was an advanced technology regional aircraft that offered the high speed advantages of the bigger jets with good operating economics over longer stage lengths. The EMB-145 was designed to be economical to operate and acquire, and it offered the speed and range of a jet with the costs of a turboprop. In terms of direct operating costs, the EMB-145 had lower costs, and its cost performance beat the CRJ on routes below 300 nm. The cost difference shrunk as the stage length grew, and it was very small at 400 nm (Avmark Aviation Economist, April 1998: 2-5).

Embraer staged a remarkable rise in the market during the period 1995 to 2000. In the overall regional jet market, Embraer rose from a market share of 4 percent in 1995 to reach 45 percent in 1998. By 1999, its share was 34 percent and Embraer became the market leader as it out sold British Aerospace, Bombardier and Fairchild-Dornier. In 2000, Embraer's market share rose to 61 percent. In the 50-seat market, where the EMB-145 competed against the Canadair RJ, Embraer's market share rose from 16 percent in 1995 to reach 51 percent in 1997. After dropping back to the 30 percent range in 1998 and 1999,

Embraer's share of the 50-seat market hit 60 percent in 2000 (Avmark Aviation Economist, January/February 1996a: 7; Avmark Aviation Economist, January 1998: 9; Avmark Aviation Economist, January/February 1999: 11; Avmark Aviation Economist, March 2000: 18; Avmark Aviation Economist, January/February 2001: 4).

The rapid rise of Embraer in the regional jet market led its competitors to criticize the level of export sales support that it was getting from the Brazilian government. This support was a key element of the Brazilian government's "strategic" approach to its national champion. In order to back its national champion firm, and help it get established in the market and move down the learning curve with the regional jet, the Brazilian government had offered export financing support for regional aircraft sales through two programs that the Brazilian government operated to support exports of Brazilian goods and services. One program, known as Exim, operated through the BNDES and provided direct financing of export sales. In 2000, Exim provided \$1.4 billion in financing for Embraer's exports which is equivalent to 52% of the company's exports. At the end of March 2001, 32% of the order backlog of Embraer was supported by Exim financing (BNDES, 2001a: 24; Empresa Brasileira de Aeronautica S.A., 15 May 2001: 8). The second program, administered through the Banco do Brasil, was an interest rate adjustment program known as ProEx. As we have seen, the Brazilian government had in the past also offered similar aggressive export support for sales of the Bandeirante.

Embraer clearly recognized the importance of the export financing support provided by the Brazilian government. That support was crucial in Embraer's efforts to sell its regional jets internationally. As the company has indicated, changes to the ProEx program, for example, could have a major impact on the fortunes of the company:

A substantial percentage of our customers benefit from the ProEx program. A reduction of existing commitments under the ProEx program could cause us to reduce prices or otherwise compensate our customers or could result in the cancellation of firm orders in backlog, which could reduce our sales and profitability. If the ProEx program or another similar program is not available in the future, or if its terms are substantially reduced, our customers' financing costs could be higher and our cost-competitiveness in the regional jet market could decrease (Empresa Brasileira de Aeronautica, 2 July 2001: 8).

Clearly, the outcome of the export financing dispute would have major implications for Embraer.

Bombardier claimed that Embraer was getting an unfair advantage in the marketplace from the Brazilian export program ProEx. It used a consultant's study that it commissioned to show that ProEx resulted in payment of a subsidy of \$4.5 million on the purchase of a \$15.3 million EMB-145 aircraft over a 15-year term (Ernst and Young, 1998: 2). Embraer and the Brazilian government argued that the ProEx payments provided an offset for Brazilian country risk. They also countered that the payments leveled the playing field with Bombardier, which was heavily subsidized by the Canadian government (AirFinance Journal, November 1996: 14-15; Flight International, 4 - 10 February 1998: 24).

The dispute between Canada and Brazil started in the mid-1990s. After attempts were made to negotiate a solution, in July 1998, the Government of Canada decided to ask the World Trade Organization (WTO) to convene a panel to settle the dispute with Brazil³⁹. The Canadian government asked the Panel to examine whether the interest rate subsidies provided under ProEX for buyers of regional aircraft were prohibited export subsidies (Department of Foreign Affairs and International Trade, 10 July 1998; Aviation Week and Space Technology, 20 July 1998: 40; The Globe and Mail, 11 July 1998: B3).

Embraer not only faced a trade challenge from Canada, it also faced one from the European Union as Dornier complained to the European Commission about alleged unfair trade practices on the part of Brazil. Dornier argued, as did Bombardier, that Brazil was using its ProEx program to provide support for sales financed in international financial markets, thus giving Embraer a big advantage in the marketplace. At the time, Fairchild Dornier was having a difficult time selling its 30-seat 328Jet against the EMB-135. According to the Commission, Dornier argued that “the use of PROEX enables Embraer to offer financing conditions for the purchase of its 30-seat jet that it cannot match for the purchase of its own 30-seat jet. As financing costs and conditions are usually the most decisive factor for an airline to choose a certain aircraft, Embraer’s abuse of PROEX programme would impede Dornier’s ability to successfully compete in international airline tenders” (Official Journal of the European Communities, 17 April 1999: 34). Dornier alleged that ProEx provided buyers of Embraer aircraft

³⁹ Brazil made its own submission to the WTO for a panel to settle its dispute over the Canadian government’s

with a 15% reduction in price on a net present value basis and this was causing injury to Dornier (Flight International, 15 - 21 July 1998: 8; The Globe and Mail, 15 August 1998: B22; Official Journal of the European Communities, 17 April 1999: 34). In a subsequent Commission report it was found that ProEx had undermined the position of Dornier in the market and it had adverse impacts in the EU, U.S., and Swiss markets. The withdrawal of ProEx was seen to be in the interests of Europe in that it was in the European interest to have a complete regional aircraft industry in terms of design, development, and production (European Commission, 21 October 1999: 28-30). The Europeans would be watching Canada's case at the WTO very carefully.

At the WTO, Brazil defended its support for its national champion. According to the Brazilian government, the "Programa de Financiamento as Exportacoes, PROEX, represents a limited effort by Brazil to reduce the material advantage that the structure of the market confers on producers in developed countries" (The Government of Brazil, 16 November 1998: 4). Brazil argued that it competes in an industry that has a financing system established by developed countries that favours manufacturers located in those countries. This is compounded when the developed country government also subsidizes its aircraft exports. Developing countries, such as Brazil, pay a high-risk premium on their debt and this has an impact on Brazil's export credit terms. This is particularly the case in the aircraft industry where the manufacturer supports the financing of its aircraft. In addition to this, Brazil faces a competitor, Bombardier, which is

subsidization of its regional aircraft industry.

heavily subsidized by its government “This array of subsidies, which far exceeds anything Brazil or other developing countries could afford, is a reality which translates into advantageous export credit terms for Canada’s aircraft manufacturer, and with which Brazil must contend if its producer is to have any chance in the market” (The Government of Brazil, 16 November 1998: 9). Brazil did accept that ProEx interest rate equalization was a subsidy, but it disputed whether the subsidy provided a material advantage. According to Brazil, the subsidy did not provide a material advantage because it acted to offset Brazil risk and Canadian government subsidies to Bombardier. Brazil also indicated that it was, as a developing country, exempted from the subsidy provisions of the SCM agreement for eight years from the entry into force date of the agreement (The Government of Brazil, 16 November 1998).

In early April 1999, the WTO Disputes Settlement Panel ruled on the Brazilian case. It basically found that the main instrument used by Brazil to support its national champion was counter to international trade law. ProEx payments for the export of regional aircraft from Brazil were found to be subsidies contingent on export performance. The Panel also found that “PROEX payments result in the availability of export credits for Brazilian regional aircraft on terms which are more favourable than the terms that would otherwise be available with respect to the transaction in question” (World Trade Organization, 14 April 1999: 86)⁴⁰. The Panel ruled that Brazil must remove the subsidies

⁴⁰ As part of its obligations for the developing country exemption from the subsidy provisions of the SCM, Brazil had to show that it was phasing out, and had not increased, its export subsidies. Evidence presented by Brazil showed that it had increased its subsidies and it had not complied with its obligation to phase out its export subsidies by the end of the transition period (World Trade Organization, 14 April 1999: 78-106).

without delay (World Trade Organization, 14 April 1999: 78-106). In August, the decision was upheld on appeal (World Trade Organization, 2 August 1999: 58-59). After the deadline for removal of the subsidies passed, Brazil modified the ProEx program as applied to the regional jet sector, by requiring that the interest charges reflect international market practice and it placed a floor on the interest rate charges⁴¹. In May 2000, the WTO ruled that payments under the modified ProEx program were subsidies contingent on export performance that conferred a benefit on aircraft producers. Basically, the WTO determined that the charge floor set by Brazil was too low and it asked Brazil to remove the subsidy (World Trade Organization, 9 May 2000: 10, 23-35).

Brazil was hesitant to take action that would endanger its national champion, and this was reflected in discussions that took place with Canada as the case wound its way through the WTO in 2000. Canada was looking for sanctions worth \$10 billion from Brazil and this would normally have required Canada to completely cut off its trade with Brazil for years. To reduce the length of time sanctions would be in place, Canada was looking at alternative forms of action including cutting off intellectual property protection from Brazilian products and cutting off services from Brazil. Canada risked facing a trade war that could drag in other Latin American countries (The Globe and Mail, 1 April 2000: B5; The Globe and Mail, 6 May 2000: B3). During the talks, Brazil made some moves to try to end the dispute. It had offered to remove its ProEx subsidies on

⁴¹ Brazil modified ProEx to ensure that the charges are consistent with international market practices and it based the interest rate based on the United States Treasury 10-year bond rate plus an additional spread of 0,2% per annum (World Trade Organization, 9 May 2000: 10).

future regional jet orders, but Bombardier wanted the subsidies removed on all past orders not yet delivered. Brazil refused to do this, but it did eventually raise the possibility of compensation. Later discussions focused on a package that would see Brazil eliminate ProEx subsidies on future aircraft sales and a compensation package for Canada for subsidies on regional jets not yet delivered. Such a package could include removing the subsidy from aircraft options, tariff concessions, and preferential access for Bombardier on Brazilian government contracts (The Globe and Mail, 24 May 2000: B4; The Globe and Mail, 6 June 2000: B8; The Globe and Mail, 22 June 2000: B1, B7). The Brazilian government was clearly not in favour of taking action that would jeopardize the future of its national champion by removing export financing on aircraft sold and not yet delivered.

The Brazilian government continued to defend its support for Embraer as it faced the possibility of major economic countermeasures. In May 2000, Canada announced that it would "ask the WTO for authorization to take appropriate countermeasures against imports from Brazil of up to \$700 million per annum for a period of seven years. This amount is equivalent to the benefits provided to the Brazilian regional aircraft industry by the illegal ProEx export subsidy" (Department of Foreign Affairs and International Trade, 9 May 2000: 1). In response, Brazil threatened to retaliate against Canada and involve other sectors in that retaliatory response. Both the Brazilian government and Embraer considered the Canadian estimate of \$5 billion in damage as being highly inflated (The Globe and Mail, 9 May 2000: B1, B10; The Globe and Mail, 10 May

2000: B1, B7; The Globe and Mail, 11 May 2000: B1, B11). In August, the WTO authorized Canada to impose \$344.2 million per year of sanctions for a six-year period (World Trade Organization, 28 August 2000: 26-27). In mid December, Canada asked permission from the WTO to impose the authorized sanctions of \$344 million per year for seven years. Brazil argued that its aerospace subsidies had been reformed and no longer violated international rules. Canada, therefore, had no grounds to impose sanctions. Embraer described the sanctions as “an inconceivable retaliation”. It indicated that this issue “is part of a struggle being waged by Embraer, Brazil’s largest exporter, a company located in an emerging nation and whose technological, industrial and market successes have been bothering, and will continue to bother, an industrial giant, Bombardier, a company established in a developed nation...The Canadian action is a naked revelation of the difference between Canada’s altruistic rhetoric of promising support to the economic development of emerging nations, and the practice of an unflagging policy of support of Canadian industry” (Embraer, 13 December 2000). Several days later, the WTO gave its approval to the imposition of sanctions (The Globe and Mail, 12 December 2000: B7; The Globe and Mail, 15 December 2000: B9)

In July 2000, after a fourth WTO ruling ordering Brazil to eliminate its subsidies, the government of Brazil announced that it would comply and reduce its support for Embraer. Thus, international trade policy had an impact on the policy path of the Brazilian government. The WTO trade rules, which worked in favour of a non-interventionist approach to government policy, pushed the

Brazilian government in the direction of disciplining its export subsidies to its national champion. Embraer indicated that its aircraft would be sold in the future on the assumption that there would be no subsidies. Future financing from the Brazilian government would be at internationally acceptable interest rates (The Globe and Mail, 22 July 2000: B3; The Globe and Mail, 28 July 2000: B2). Brazil modified ProEx by setting a new charge floor that was in line with the provisions of the OECD Arrangement on Guidelines for Officially Supported Export Credits⁴². In July 2001, the WTO found that the modified ProEx program did not constitute a subsidy because the government had the discretion to operate the program so that it did not confer a benefit on aircraft producers (World Trade Organization, 26 July 2001: 2-4, 21, 63-64). The revised ProEx program has yet to be challenged based on an actual case of an aircraft sale.

Despite this decision, there has been no resolution of the dispute between Canada and Brazil. The dispute began in 1995 and more formally at the WTO in 1998. The length of this dispute reflects the Brazilian government's determination to support Embraer, and its reluctance to jeopardize the company's future through the adherence to international trade rules. By the mid-1990s, aircraft had become an important and fast growing Brazilian export as international sales took-off. In the first half of the 1990s, Brazilian aircraft exports averaged US \$ 324 million per year. Thereafter, exports rose to US \$458 million in 1996, US \$ 789 million in 1987, US \$1.3 billion in 1998, US \$ 1.8 billion in 1999, and \$ 3.6 billion in 2000 (United Nations, 1996: 203; United Nations, 2001:

⁴² Brazil based its equalization on Commercial Interest Rate Reference Rate (CIRR) that is published by the OECD in line

400). Embraer became Brazil's second largest exporter in 1998 and its largest exporter in 1999 and 2000. Solid export performance, mainly contributed by Embraer, was another reason for the government to support the industry and its national champion. Embraer's growth in that industry had been spectacular. In 1993, the year before Embraer was sold, it ranked 79th out of the world's top 100 aerospace companies with US \$333 million in aerospace sales. By 2000, the Brazilian national champion ranked 21st with aerospace sales of US \$ 2.9 billion. In 1994, Embraer was not among the top 10 civil aircraft manufacturers, but by 2000 it ranked 7th in the world (Flight International 17 - 23 August 1994: 33, 34; Flight International, 21-27 August 2001a: 45, 54).

Reflections on the Embraer Case

Throughout the post-war period, the Brazilian government firmly supported the development of a presence in the aircraft industry. In the early 1940s, the government began the process by consolidating responsibility for civil and military aviation in a single Ministry and setting up the CTA as a research and training institute. The development of the industry was in line with government ideas about the need to industrialize and diversify the economy. By creating the proper institutional framework, and supporting the development of a "sectoral system of innovation" for the aerospace sector, a crucial element for the future advance of the industry was put in place.

The industry began its sustained development in Brazil when Embraer

was established in 1969. The establishment of the national champion firm Embraer came about under a military regime that emphasized a statist approach to industrial policy. “Desenvolvimentismo” or developmentalism and import substitution were the cornerstone ideas that fostered the development of Embraer. Also crucial were ideas concerning independence for Brazil in military affairs, and the interests of the military government in building up an indigenous source of military aircraft and re-equipping its military forces. Embraer was part of a government strategy to build-up a major presence in the world military industry.

In line with those states that have a statist orientation to economic policy, Embraer was established as a state owned firm after it became clear that the private sector alone would not support its development. The government was not simply prepared to allow the market to determine the fate of the industry. If it followed the liberal policy prescription of non-intervention, the industry in Brazil would have failed to develop. With the establishment of Embraer, Brazil became a player in the world commuter and regional aircraft industry as Embraer would develop a line of commuter and regional aircraft that began with the Bandeirante.

After the firm was established, the government took action on several fronts to support the development of its national champion. It basically adopted an infant industry approach to the sector, and used a combination of protection and incentives to spur Embraer’s development. Embraer was assisted throughout by the CTA and the Ministry of Aeronautics. The CTA would provide

designs and trained personnel to Embraer, and the Ministry of Aeronautics would provide development finance and aircraft orders. The government funded aircraft development, purchased aircraft for itself, funded aircraft purchases for other users, encouraged and required foreign technology transfer from foreign partners, provided protection from foreign imports, and provided financial assistance for exports. These actions were in the interests of the government because it wanted to stimulate the development of the industry, and they were in the interests of Embraer because they provided the basis for the continued growth and development of the firm.

Embraer developed over a twenty-year period by developing a succession of commuter and regional aircraft and also by supplying military aircraft to the Brazilian government. By the 1980s, it had a solid position in the industry. In the mid-1980s, a change took place in Brazil that was to have major ramifications for Embraer. A transition began towards civilian rule and Embraer faced a future with more uncertain support from the government.

The late 1980s and early 1990s marked a turning point for the company. Economically hard times in the world economy, and the collapse of the cold war, led to difficulties for Brazil's military industries and hurt the sales of civil aircraft. Several major firms in the defense sector faced severe difficulties, including bankruptcy. At the same time, a new civilian Brazilian government faced a financial crisis of its own and was unable to provide all the financial assistance that was required. In the early 1990s, a new government was elected that was

committed to a policy of neo-liberal economic reform that included a reduced role for the state in the economy and a greater role for market forces. These ideas turned their back on previous ideas of “desenvolvimentismo” and import substitution. Both the government and its national champion firm faced a severe crisis at the same time.

Embraer became more open to a new structure of ownership even before the financial crisis hit. The high cost of developing the EMB-145 and CBA-123 led the company to consider a more substantial role for private investors. These two products were seen as crucial for the future survival and prosperity of the firm, and therefore Embraer had an interest in finding ways to finance these programs. It also had an interest in its own survival. The government wanted to see the company survive because it was a high technology firm that created employment and was a major exporter. The government did eventually come through with money to help stabilize the situation and provide some of the needed funding to get the stalled aircraft programs going again. The government was interested in salvaging something from its defense sector that was in crisis. Embraer offered hope because it produced both military and civilian products, and it had civilian products that looked promising. The government, therefore, had an interest in the survival of Embraer.

In early 1992, the government announced its intention to sell its national champion Embraer. In line with the government’s neo-liberal thinking, the government believed that the sale would push the company to be more

productive and internationally competitive, and it would provide access to funding for future aircraft programs. The government, mired in financial difficulties, could no longer readily play that role. Embraer, wanting access to funds to propel its development, had an interest in seeing itself sold. The sale would also reduce the influence of the military in the economy.

But the government was not willing to let go of the firm completely. Despite the government's neo-liberal credentials, the government was prepared to protect its interests in the firm through the holding of a golden share. This mechanism provided the government with a veto over certain decisions, including those related to changes in military programs and a change in control of the firm. Embraer was still seen as a strategic asset by the government, and it was determined to protect the company's military programs and the firm's independence. After the sale was completed, the government initially still owned 20% of the firm.

Government policy after the sale was still driven by the desire to support the national champion. The long legacy of strong state support worked to promote the continued support for Embraer. The government provided loans to support civil aircraft programs, funded military programs, purchased aircraft, and provided export financing for the firm's products. Despite the commitment of successive governments to a policy that emphasized the role of market forces, Embraer was seen as being too important to have its future solely decided by those market forces. Government support was important in providing funding for

projects and in stimulating sales in export markets. This support helped to push Embraer down the learning curve. Embraer was of strategic importance. It was a primary supplier of equipment to the Brazilian military, it was a major exporter, and it provided high technology jobs. With the difficulties facing the military sector in Brazil, Embraer was one firm from that sector that had the potential to succeed in civilian markets.

A major institutional challenge came in the late 1990s when Embraer launched an international search for a strategic partner and selected a consortium of French firms to play that role. This move by Embraer was seen to be in line with ideas about globalization and the globalization of the aircraft industry. Embraer saw it as a key source of technology, funding, and market access. It felt that it needed such a strategic partner if it was to become a major global player in the world aircraft industry. Part of the Brazilian military, the past guardians of Embraer, saw the move to add the French strategic partners as a threat to the independence of Embraer, and they revolted. In the end, the government put down the opposition from the military, and it allowed the deal to go ahead because it felt that the deal was crucial to the future development and growth of Embraer in a globalized industry. This international dimension was in line with the ideas of neo-liberalism.

The Brazilian government took a “strategic” approach to the industry as it assisted Embraer to enter the regional jet industry and penetrate international markets. This resulted in a major trade dispute with Canada, as we shall see, a

country that also adopted a strategic approach to the industry. The Brazilian government maintained its support for Embraer when faced with the dispute over subsidies. The government recognized the importance of export support to the success of Embraer in international markets and was hesitant to modify its export support programs. Even when it eventually did, it refused to consider removing its support from billions of dollars of aircraft ordered, but not yet delivered. To do so might have had major financial repercussions for the company, and the government preferred to offer compensation. Thus, even as Brazil tried to use trade rules to discipline the subsidies that Canada provided to Bombardier, the Brazilians found that trade policy was a double-edged sword. Trade policy had an impact on the policy path because the WTO agreement required that Brazil discipline its subsidies for aircraft exports. Thus, trade policy worked to push the path in a more neo-liberal direction. Despite this, Embraer itself recognized the crucial role of export support in its international sales drive. Therefore, for the government, Embraer, the company's workers, and the company's supplier base, it was in their interest to see the support continued.

What one observes in the government of Brazil's policy towards its aerospace sector is a trajectory that continued to emphasize "strategic" state support for the national champion firm, and the limited influence of neo-liberalism in shifting this trajectory. In line with neo-liberalism, the government sold its interest in the national champion and thereafter encouraged the firm to internationalize. The government's new openness to international competition led to the abandonment of home market protection and manipulation as an

instrument of policy. But some statist elements of policy were hard to eliminate. The golden share, military procurement, aircraft development funding, and export support are all elements of a statist approach to policy, and these elements persisted during and after the financial crisis that engulfed both Embraer and the state. Of these, export financing became a much more important policy instrument for the government after Embraer was sold. In Brazil, because of the strategic nature of the national champion Embraer, the government was not prepared to give a completely free hand to the market. Like an organized market economy, Brazil was prepared to help shape the market.

For the Brazilian government, the support it provided to Embraer had positive results. This made it easier for the government to continue with its policies of support because there was an obvious payoff. After the financial crisis, Embraer turned itself around and, by 1998, it had improved its performance substantially with higher sales and better productivity. It also moved into a profit position. It had developed and sold its first generation of regional jets, and was working on developing its second generation. It had achieved a solid market position in the world commuter and regional aircraft industry. The success of the company led to a virtuous circle where continued success resulted in continued state support. Institutional inertia built up behind the successful national champion and this led to continuous support for the company's development. Brazil and Embraer had established a solid basis for its continuing future role in the industry.

The next chapter will focus on industrial policy in the Canadian aircraft industry. We will examine the impact of domestic politics on the post war policy path and how politics shaped the response to a crisis in the 1980s. As the chapter will show, policy was shifted into a more neo-liberal direction, but, in a similar fashion to Brazil, the government still maintained its support for its national champion in the industry.

Chapter 6

Canada: Growing Intervention Over Time and a National Champion in the 1990s

This chapter will examine the development of aerospace policy in Canada and the development of its aerospace firms. It will show how Canada, a “liberal state” with a market-oriented economy, adopted a policy path that nurtured the development of its two aerospace firms, Canadair and de Havilland, between the 1930s and early 1980s. Driven by an interest in promoting high technology industries in two key provinces, the government’s initial approach in the postwar years was very “hands off” and it favoured internationalization. When that approach threatened the future of the industry, the government decided to support a major shift towards civil aircraft production, and it adopted a more interventionist approach to promote industry development that included a state takeover of the two firms. Thus, a more interventionist approach to the industry developed over time.

As this chapter will show, both Canadair and de Havilland faced a major financial crisis in the early 1980s, in part due to the shift towards civil aircraft production. The crisis occurred at the same time as a more neo-liberal policy alternative began to emerge. Neo-institutionalists might expect the Canadian state to largely continue along its existing policy path that provided strong state support for the industry and, as we shall see, while this is basically what happened, the policy path was also recast in a more neo-liberal direction.

Despite the sale of the two firms by a government committed to neo-liberalism, and the failure of an attempt at internationalization, successive governments continued to support the two firms. That support was reinforced in the 1990s, when the Ontario government, with federal assistance, brought both of Canada's aerospace players under the ownership of one firm, Bombardier, and formed a single national champion in the aerospace sector.

Neo-liberalism did not have a major influence on industrial policy in the commuter and regional aircraft industry in Canada. It did, however, contribute to three non-path dependent incremental shifts in a policy path that otherwise continued to offer strong state support. Neo-liberalism interacted with the financial crisis of both firms to bring about their transfer to the private sector. It contributed to a shift from more direct instruments of government intervention to more indirect instruments. Neo-liberalism also contributed to a reversion to a more international orientation for the industry, in part as a way of adapting to the new techno-economic environment. Despite neo-liberalism, the historic policy path was maintained in part due to the strong policy legacies in the sector. The path was driven in a "strategic" direction by the government's interest in promoting high technology industries and their related exports and employment. The location of the industry in the politically significant provinces of Ontario and Quebec helped to sustain that support, as did the political significance of the national champion firm, Bombardier, that emerged in the 1990s. In fact, it was a social democratic government in Ontario that played the crucial role in bringing about a single national champion. The success of the industry in the civil

aviation market, and its rapid rise under Bombardier, added to the momentum and contributed to the industry's growing political and economic significance. The result was a sustainable and growing commuter and regional aircraft manufacturing industry, and the increasing importance of Canada as a supplier of commuter and regional aircraft.

The 1920s to the Early 1980s: The Development of an Industry

From the 1920s to the early 1980s, two foreign-owned Canadian aircraft firms, Canadair and de Havilland, were built up into the two national firms in the Canadian aircraft industry. As this section will show, the government's approach was very hands-off during most of this period as it rarely directly interfered with the two aircraft firms. Government support largely came in the form of military contracts and aircraft purchases. The military market, both domestic and foreign, was a significant market in the 1950s. When that market began to decline in the 1960s, however, the government's approach gradually became more interventionist. The government began to support the development of civil aircraft in the 1970s providing strong state support for a major shift into civil aircraft markets. This support included state ownership, financial assistance for the development and production of aircraft, a demonstration project to stimulate demand, and support for aircraft sales. This was the beginning of a "sectoral system of innovation" that supported the industry's growth. The result was the development of a major presence in the civil aircraft industry, including the commuter and regional aircraft industry.

The Canadian government's approach to the aircraft sector for most of this period reflected its general economic orientation. The Canadian state is often described as a 'liberal' state that gives a primary role to market forces in the shaping of economic development. Canada has been portrayed as a market-oriented economy with a company-led process of economic adjustment (Grant, 1989: 1). The state is imbued with a "firm-centred industry culture" that stresses the autonomy of the firm, the independence of management with respect to financial and labour decisions, and the primacy of markets for the allocation of capital and labour (Atkinson and Coleman, 1989: 33). In general, the federal government has preferred macro-economic policies that do not discriminate between sectors or firms (Jenkins, 1983: 23). Despite the primacy given to markets, Canada, like most other market-oriented economies, has experienced varying levels of government intervention over time. This intervention has not been based on a coherent strategy, and it has been described as a "rather confused and uneven amalgam of initiatives" (Atkinson and Coleman, 1989: 23). Industrial policy has been carried out in a "highly incoherent, even contradictory, fashion, but it has never been inconsequential" (Howlett and Ramesh, 1992: 226).

This does not mean that the federal government played no role in industrial development. During the nineteenth century, the Canadian government began to assume a role in promoting such development. During that period, agriculture was the leading Canadian industry and the Agriculture Department was the first industrial department of government. Prior to

Confederation in 1867, the Canadian government was heavily involved in the funding and development of roads, canals and railways (Bliss, 1982: 13). In the post-Confederation period, the national government introduced a “National Policy aimed to integrate the new country economically in the decades following its political creation” (Bradford, 1998: 4). The policy utilized a series of measures in the area of immigration, transportation, and trade that were designed to strengthen the national economy by encouraging domestic manufacturing and encouraging the movement of natural resources through the business networks in central Canada. In addition to promoting manufacturing, the government also promoted the development of productive and low cost primary resource industries and the continued development of infrastructure. Transportation infrastructure and public utilities, such as railways and hydropower, were encouraged through the provision of loan guarantees, loans, subsidies and government investment (Bliss, 1982: 6-16; Bradford, 1998: 4).

The key to stimulating domestic manufacturing was the tariff. A rise in general tariffs in 1879 was designed to stimulate the development of manufacturing industry by opening up new opportunities for industrial investment. It encouraged the establishment of foreign branch plants and it led to the development of small firms that produced in small production runs to meet the of the Canadian market. Both of Canada’s major aircraft manufacturers, Canadair and de Havilland, had their origins in the early 1900s, during the time when the government was using its tariff policy to encourage domestic manufacturing. Both were established as subsidiaries of British companies to

meet the needs of the Canadian market, especially its military needs. In addition to the tariff, the municipal, provincial and federal governments provided subsidies that were designed to promote manufacturing industries. In the early 1890s, the federal Department of Trade and Commerce was established to provide services to commercial and manufacturing industries. The department's initial emphasis was on stimulating the export of manufactured goods (Howlett and Ramesh, 1992: 232-233; Bliss, 1982: 4-13; Bradford, 1998: 4).

The National Policy did lead to the successful settlement of Western Canada, the development of east to west transportation and communication links, and the development of a manufacturing base in Ontario and Quebec. But the policy of encouraging domestic manufacturing favoured central Canada over the western and the Maritime provinces, and this would lead to inter-regional conflicts (Howlett and Ramesh, 1992: 232-233; Bliss, 1982: 4-13; Bradford, 1998: 4). Canada is a federal state with strong regional interests and this impacts heavily on the nature of industrial policy. Such policy in Canada is often dominated by "territorial-political" conflict (Jenkins, 1983: 26). The increasing importance since the 1960s of the provinces that represent regional interests, and the increase in regional self-awareness that began in the 1970s, has contributed to increasing levels of industrial policy conflict. Different regions have different interests that are championed at both the federal and provincial level, and this is reflected in struggles over policy. Canada's manufacturing heartland in Ontario and Quebec, which is also home to Canada's aircraft industry, has historically been dependent on the domestic market, and it has

different interests from the resource producing hinterlands that depend on resources and exports for their success. The latter see industrial policy as special treatment for the wealthy manufacturing heartland of the country. The decision to help a specific firm is often seen as helping one region or province over another (Jenkins, 1983: 18-45). Nowhere else is this more evident than with the province of Quebec. The increasing self-awareness of that province, and its desire for sovereignty and different political arrangements with Canada, has led to conflict. Nationalists in Quebec tend to associate Quebec's poor economic performance and its weak industrial structure with federal economic policies (Tupper, 1982: 51-53). In order to maintain national unity, the federal government has had to give special attention to the needs of Quebec and this also creates friction with other provinces.

The National Policy continued to guide Canadian economic development up until World War I, but the war, economic changes, and the economic collapse during the Great Depression, put the policy into question. The divergent economic fortunes of the different regions of Canada under the policy eventually led to political challenges to the status quo. Western Canada and the Maritimes resented the favouritism shown to central Canada. A Conservative government elected in 1930 utilized a policy of higher tariffs and tariff manipulation to protect Canadian industry and open world markets. The failure of that policy led to a new Liberal government under Mackenzie King that favoured free trade and it began a policy of reducing tariffs and dismantling the National Policy. Interest also grew in the idea of using monetary policy to bring about economic stability. The

realization that the tariff could not maintain employment led to the introduction of new job creation policies including public works, railway loans, housing credits, and incentives for farm labour. The government was still involved in the development of transportation and communications networks, and two important crown corporations, the Canadian Broadcasting Corporation and Trans Canada Airlines (later Air Canada), were formed in the 1930s (Bliss, 1982: 23-27; Bradford, 1998: 4).

Canadair can trace its origins back to the establishment of Canadian Vickers in the Montreal area, a company mainly involved in the building of ships for the Royal Canadian Navy, by the British firm of Vickers Sons and Maxim in 1911. In 1922, the Canadian government called tenders for the replacement of some World War I vintage aircraft, and Canadian Vickers won the contract. With the encouragement of its parent firm, Canadian Vickers set up a Canadian design centre in 1924, and its first project was a forestry patrol aircraft designed for Canadian conditions. Between 1924 and 1941, Canadian Vickers produced aircraft of its own design and also ones under license. In 1927, a group of Ontario investors bought a majority stake in the company, leaving the British parent with a minority position (Pickler and Milberry, 1995: 13-14).

The de Havilland Aircraft of Canada Limited was established in 1928 as a branch of de Havilland Aircraft Limited of Britain after the latter held discussions with Department of National Defence. The company's initial production focused on aircraft for government backed flying clubs. Within one year of its

establishment, a minority position in the company was made available to Canadian investors. In late 1928, the company chose a site in Downsview, at that time north of Toronto, as its home (Hotson, 1999: 14-37).

By setting themselves up in Montreal and Toronto, Canadair and de Havilland established themselves in the two politically significant provinces and cities that were destined to become the centres for the Canadian aircraft industry. Over the years, the industry would become heavily concentrated in the important provinces of Ontario and Quebec. By 1988, 89 percent of the industry's production would be located in these two provinces (Industry, Science and Technology Canada, 1991: 3). The development of the industry in these localities would be dependant on both public and private initiatives. For example, the formation of the aerospace cluster in Montreal was based on both private initiative, especially between the early 1920s and World War II, and public sector incentives during and after the war. Other aerospace companies that located in Montreal included CAE in flight simulators, Pratt and Whitney Canada in aero-engines, Rolls Royce in aero-engines, and Bell Helicopter (Niosi, 2000: 9-11).

The onset of World War II led to a great expansion in the power of the federal government and a major increase in the level of government intervention in the economy. The government, through the War Measures Act, had command over the resources and facilities needed for wartime production, and a new government department, the Department of Munitions and Supply, was created

to assume command of this production. One of the major legacies of the war period was the development of the crown corporation. During the war, it was easier and faster for the government to create a crown corporation to fill gaps in private sector capabilities than it was to establish a new private sector firm. Twenty-eight crown corporations were established during the war period. The government also built 98 factories for wartime production and, by the end of the war, it had acquired assets worth hundreds of millions of dollars (Norrie and Owram, 1996: 385).

The government played a decisive role in stimulating industrial production of new industries during the war, including the aircraft industry. "Within a short period of time, Munitions and Supply greatly expanded the capacity and expertise of new industries and, indeed, whole sectors of the economy. Thus, for example, such a high-technology industry as aircraft production started from practically nothing in 1939-40 but increased dramatically so that, by midwar, Canada was producing more than 4000 aircraft a year" (Norrie and Owram, 1996: 385). The outbreak of World War II led to an increase in demand for aircraft from Canadian manufacturers, and the government invested in production facilities in order to meet that demand. For example, it invested in production facilities at both Canadian Vickers (Canadair) and de Havilland. The government also got more directly involved in production, for example, by setting up a crown corporation to produce the Anson in Canada. (Hotson, 1999:70-91; Pickler and Mulberry, 1995: 15-21). The war established the industry more firmly in Canada.

Government military contracts during World War II stimulated aircraft production at Canadian Vickers, and the company produced aircraft under licence for the Royal Canadian Air Force (RCAF) and the U.S. military¹. It operated a new government owned aircraft factory at Cartierville in Quebec. In 1943, the government launched a search for a new four-engined long-range transport aircraft for the Royal Canadian Air Force and state-owned Trans Canada Airlines, and it subsequently negotiated a license agreement with the Douglas Aircraft Company for the DC-4 and DC-6. While Canadian Vickers made a proposal to build the new aircraft, the company had many commitments to build ships for the navy and others, and it subsequently decided that it wanted out of the aircraft business and the management of the Cartierville plant. In 1944, the government gave the contract to a new company, Canadair, which had developed out of the old aircraft division of Canadian Vickers. The new aircraft would not take to the skies until July 1946, when the four-engined "North Star" had its first flight (Pickler and Mulberry, 1995: 14-35; Phillips, 1979: 112).

Government contracts during the war also led to increased production at de Havilland. The company produced two versions of the famous Mosquito in Canada², an aircraft developed by its British parent, and it also produced several other military aircraft³. The government invested heavily in de Havilland's facilities during the war effort. With the end of the war, the Mosquito contract

¹ Canadian Vickers produced the Canso. This was a version of the PBV-1 amphibious flying boat built under license from Consolidated Aircraft of San Diego, California.

² It produced the bomber and fighter versions.

³ De Havilland also produced the de Havilland Tiger Moth trainer and the Avro Anson 2- engined trainer.

was cancelled and there were large-scale layoffs at the company as military production declined (Hotson, 1999: 42-106).

The decades after World War II saw the first signs of a major shift in Canadian industrial policy as post-war economic policy envisioned a smaller role for the state in the economy, with the government supporting and providing incentives to the private sector. Keynesian economics became the foundation of Canadian economic policy. A commitment was made to tariff reduction and the liberalization of international trade through the government's involvement with the General Agreement on Tariffs and Trade. The post-war Liberal government welcomed foreign investment and expertise into the Canadian economy. While the provincial governments still provided grants and subsidies to industries and still supported the development of infrastructure, the federal government's attention was more focused on gaining access to a wider market for Canadian manufactured goods. However, the federal government did provide support for high technology development, including in the aircraft industry, and it was in this area that it was most active. For example, the development of nuclear power and synthetic materials from petro-chemicals were in the hands of crown corporations. Military procurement and aircraft purchases of Trans Canada Airlines were designed to assist with the development of Canadian aircraft (Bliss, 1982: 28-30; Howlett and Ramesh, 1992: 234-235), including aircraft produced at both de Havilland and Canadair.

After the war, government support assisted de Havilland as it started to turn its attention to civilian production again. Overhaul work provided the basis for the firm's recovery in the initial period after the war. Management also wanted to begin producing small civil aircraft and, as an interim step, it chose to produce the parent company's Fox Moth aircraft until a new design could be developed⁴. For the company, the post war period up until the mid 1960s was centered on the design, development and production of bush planes and STOL aircraft. The Department of National Defence and the Royal Canadian Air Force played a major role in stimulating the production and development of aircraft at de Havilland during this period. They provided research and development funding and made purchases of aircraft. For example, the Department of National Defence purchased 113 Chipmunk trainers in the mid-1940s⁵ (Hotson, 1999: 107-120; Sharp, 1982: 236-239). In the 1950s, de Havilland started to focus on a bigger aircraft, the "Otter", with the RCAF sharing in the costs of research. This aircraft, which first flew in December 1951, was designed to carry nine passengers, crew, and cargo, and the RCAF bought 63 of the aircraft. In addition, the US Army bought 175 aircraft and the Otter also did well in civilian markets. In 1954, the government selected de Havilland to be the prime contractor on its Grumman SRF Tracker program, and this project helped de Havilland develop its technology and production techniques (Hotson, 1999: 126-180; Sharp, 1982, pp. 239-242).

⁴ The first Fox Moth flew in December 1945

⁵ The Chipmunk metal trainer was the first aircraft completely designed by de Havilland Canada and it first flew in May 1946. Another early aircraft, the "Beaver", a 6 passenger STOL aircraft, was developed with no government funding and

In the second half of the 1950s, de Havilland began looking at a larger transport aircraft project that would utilize its expertise in STOL technology at a time when the US military was looking for a new rear loading tactical transport aircraft. The Canadian military provided \$2.5 million in funding for the development of the aircraft after it became aware of the U.S. interest, but the company still needed extensive bank loans to support the aircraft's development. This twin-engined transport aircraft, the Caribou, first flew in July 1958, and the RCAF purchased 9 of the aircraft. Despite slow initial sales because of domestic opposition in the U.S., the U.S. military eventually purchased 165 of the aircraft (Hotson, 1999: 192-204; Sharp, 1982: 242-243, 377).

Early post-war developments at Canadair were first marked by a takeover of the firm by U.S. interests, as Electric Boat⁶, a US-based ship manufacturer, acquired an interest in Canadair in April 1946. In line with the government's policy of welcoming foreign investment, the federal government approved, despite widespread opposition, the takeover of Canadair in June 1947. Many were opposed to the takeover of an important Canadian firm by U.S. interests. After the takeover, Canadair was withdrawn from the public stock market and taken private (Pickler and Mulberry, 1995: 51-59; Phillips, 1979: 112). The federal government supported the development of Canadair by provided funding, through the military, for the development and purchase of both licensed and indigenously produced aircraft. Post-war life at Canadair was more oriented

no orders from the Royal Canadian Air Force. It did do well in the US military markets and civilian markets(Hotson, 1999: 126-180)

⁶ Electric Boat became part of General Dynamics Corp.

towards the military than was the case at de Havilland. Between 1947 and the early 1960s, approximately eighty percent of the company's sales were accounted for by government purchases. Canadair produced several aircraft under license for the Department of National Defence, sometimes modifying the aircraft for specific uses. It produced 1,815 Sabre fighters⁷, 656 T-33 jet trainers⁸, 33 Argus maritime patrol and antisubmarine aircraft⁹, 12 Yukon transport aircraft¹⁰, and 10 Cosmopolitan transport aircraft¹¹. The company also tried to develop some civil derivatives, including the CL-44 and the 540, but the CL-44 had limited sales and the 540 was cancelled¹². In the mid-1950s, Canadair set out to develop its first indigenously produced aircraft, the Tutor jet trainer, and the federal government funded 60% of the cost of two prototypes. The RCAF went on to purchase 190 Tutors (Pickler and Mulberry, 1995: 82-176; Phillips, 1979: 113-115).

In the late 1950s, the Canadian government needed a replacement fighter for the Sabre. Canada was assuming a nuclear strike role in Europe, and the government selected the Lockheed F-104 Starfighter for the role. The aircraft was manufactured under licence by Canadair, and the company eventually supplied 200 of the aircraft for the RCAF, 140 for export, and a large number of aircraft components for Lockheed. Canadair also produced the F-5 under licence from Northrup in the late 1960s and over 200 were built for the RCAF.

⁷ Licensed production of the North American Aviation F-86 Sabre.

⁸ Licensed production of the Lockheed T-33 jet trainer.

⁹ Based on licensed production of the Bristol Britannia.

¹⁰ Also based on licensed production of the Bristol Britannia.

¹¹ Based on a Convair turboprop.

¹² The CL-44 was a civil version of the Yukon and was based on the Britannia. The 540 was a civil version of the Cosmopolitan and based on a Convair turboprop.

The Dutch ordered 105 of the aircraft, with Fokker acting as a supplier (Pickler and Mulberry, 1995: 180-193). In the 1950s and 1960s, Canadair also produced missiles and an unmanned drone surveillance system for the Canadian military (Pickler and Mulberry, 1995: 232-239; Phillips, 1979: 116).

In late February 1959, the Canadian aerospace industry suffered a massive setback when a Conservative government under Prime Minister George Diefenbaker cancelled an indigenously developed military interceptor aircraft known as the Avro Arrow. Developed by A.V. Roe Canada, a Canadian subsidiary of A.V. Roe and Company of the U.K., this leading edge aircraft was cancelled on February 20, 1959, a day that became known in the industry as “Black Friday”. The loss of jobs, technology, and talent was a major blow to the Canadian aircraft industry. The same company had earlier developed the Avro Jetliner, a 50-seat passenger jet aircraft that was the second passenger jet in the world to fly, but this aircraft too was cancelled by the government in 1956¹³. Described by some as the first regional jet, the aircraft first flew on August 10, 1949, a few weeks after the British Comet had its first flight. The cancellation of the two Avro projects cast a shadow over the future of the Canadian aircraft industry, and in the future these events would be seen as one of the biggest technological tragedies in Canadian history.

The period between the end of the war and the mid to late 1950s was a prosperous one for the post-war Canadian economy. Consumer spending,

¹³ For an excellent examination of A.V. Roe Canada, the Jetliner, and the Arrow see Stewart, 1988.

business investment, a resource boom, and the Korean War all contributed to the economically healthy years during that period. Beginning in the mid 1950s, however, troubling signs began to appear in the Canadian economy, and a recession in the late 1950s combined high unemployment with inflation. The Canadian economy followed the US economy into recession, and the end of the resource boom and the Korean War contributed to the economic decline. The Conservative Diefenbaker government, on assuming office in 1957, tried to deal with the recession through several measures, such as winter-works subsidies and the development of the infrastructure required to open up the economic resources of the Canadian north (Norrie and Owrap, 1996: 408-417). During the late 1950s, it also became apparent that the economy faced more long-term structural problems as growth in investment and employment began to decline. Concern began to arise that the problems developing in the economy were due to structural factors that could not be dealt with through Keynesian economic techniques. The pace of industrial change was accelerating due to trade liberalization and the diffusion of technology. Domestic demand for many new products was met by imported goods, and the manufacture of labour intensive standardized products was under pressure from Third World countries. A slowdown in productivity raised concerns, as did a low level of R&D spending, a lack of economies of scale in manufacturing, the intensification of regional economic disparities, and the high level of foreign ownership in the Canadian economy. The provincial governments were also growing more powerful and wealthier, and they were gradually becoming more assertive in the industrial

policy field (Bradford, 1998: 6; Howlett and Ramesh, 1992: 235-237; Bliss, 1982: 32-33).

Beginning in the 1960s, two divergent policy frameworks began to emerge with respect to industrial policy that would dominate the industrial policy debate for the next two decades. One of the positions was nationalist in orientation, and it emphasized a more interventionist approach to policy. It foresaw a more activist federal government playing a major role in industrial restructuring, technological development, and encouraging a greater level of Canadian control over the economy. The alternative approach was continental in outlook, and it advocated a market-oriented approach to the country's economic problems. It claimed that past interventions by the federal government had led to economic inefficiency and had retarded the ability of the Canadian economy to adjust. In a fashion similar to later neo-liberals, it advocated the liberalization of both the domestic and international markets, the rationalization of the branch plant economy, and the reorientation of social policy towards market adjusting assistance (Bradford, 1998: 7-8; Howlett and Ramesh, 1992: 34; Bliss, 1986: 34).

Throughout the 1960s and 1970s, the Canadian government could not decide which of the two strategies to pursue, and it often pursued one strategy or the other and sometimes both together. For example, it would pursue trade liberalization and more open access to international markets, while it would also support troubled industries, such as textiles, footwear and clothing, through tariff

protection and industry modernization programs (Bliss, 1982: 34-35; Howlett and Ramesh, 1992: 235-236).

One of the government's targets in its efforts to open international markets was the defence sector, including the aircraft industry. In the late 1950s and the early 1960s, the government launched initiatives to improve access to the US market for specific Canadian industrial sectors. The most notable was in the automobile industry where the government signed the Canada-U.S. Auto Pact in 1964. During the same period, the government also took action to ensure access to the U.S. market for the defence industry, and in 1959 it signed the Defence Production Sharing Agreement with the U.S. that removed the impediments that prevented Canadian firms from accessing the U.S. market. It allowed Canadian firms to compete on an equal basis for U.S. defence contracts. In 1963, the Canadian government signed the Defence Development Sharing Agreement with the U.S. that gave Canadian firms the ability to bid on U.S. research and development contracts and encouraged cooperative R&D (Alastair and Hugland, 1995: 63-64).

In conjunction with the signing of the Defence Production Sharing Agreement, the Canadian government launched a defence industry support program to assist the industry's development. This program, known as the Defence Industry Productivity Program (DIPP), was to become the major government support program for the country's aerospace industry, and it continued in that role until it was effectively cancelled in 1995. It would become

the mainstay of the industrial policy path in the sector. The main aim of the DIPP program was “to develop and sustain the technological capability of the Canadian defence industry for the purpose of generating economically viable defence exports and related civil exports arising from that capability”(Department of Industry, Trade and Commerce, 1982: 1). The program provided cost-shared support for selected development projects, for the cost of acquiring new advanced equipment for plant modernization, and for the development of production capabilities at system suppliers and parts and components suppliers (Department of Industry, Trade and Commerce, 1982: 1). As the industry started to turn more towards civilian production in the 1970s, the DIPP program funded more and more civil aircraft projects, including projects at de Havilland and Canadair. This was justified on the grounds of maintaining the defence industrial base and the defence spinoffs from civilian development and production. It was also justified by the maintenance of employment in industries that required government support. In the early 1970s, DIPP funding was \$45-50 million per year (Industry, Trade and Commerce, 1976: 10-12).

The early 1960s was also a period when military aircraft sales, both foreign and domestic, began to decline in importance for the Canadian industry. In response to this change, both de Havilland and Canadair began to turn more of their attention towards civil markets. At the same time, the government’s policy path in the sector started to turn more interventionist as it decided to support civil aircraft development to help sustain the future of the industry.

De Havilland 's military sales began to decline as the company's fortunes in the U.S. military market began to wane. This became evident as U.S. military sales began to dry up, often at the behest of US industry. In the early 1960s, the U.S. wanted a larger transport aircraft with STOL capability. De Havilland won the competition and set out to develop a new aircraft that would become known as the "Buffalo". The cost of developing the aircraft was shared on a one-third basis by the Canadian government, the U.S. military, and de Havilland. The aircraft first flew in April 1964 and the RCAF ordered 15 of the aircraft. The U.S. took 4 prototype Buffalos, but no more were ordered¹⁴ (Hotson, 1999: 222-226; Sharp, 1982: 377-378).

In the early 1960s, de Havilland began to look at a successor to the Otter, and it developed a twin-engined 19-seat aircraft, the "Twin Otter", that had its first flight in May 1965. The US army had expressed interest in the aircraft, but resistance from US industry forced the US military to buy an aircraft made by Beech Aircraft in the U.S. With the possibility of large sales to the U.S. military disappearing, de Havilland needed an alternative market if production of the aircraft was to be maintained. With its seating capacity of between 15 and 19 seats, the aircraft became attractive to U.S. commuter airlines. This aircraft marked de Havilland's entry into the commuter and regional aircraft segment of the aircraft industry (Hotson, 1999: 234-237; Sharp, 1982: 378-379). The government also supported de Havilland as it focused its attention on civil applications of STOL technology. In the late 1960s, there was increasing

¹⁴ The U.S. Air Force opposed the Army's right to have large fixed wing aircraft. The Caribou were transferred to the Air

interest in the use of STOL technology for air transport service between major centres, and studies were initiated in both Canada and the U.S. into the use of STOL service in corridors between major cities. De Havilland decided to respond to this interest by developing a bigger STOL passenger aircraft ¹⁵. Financial assistance for the development of the aircraft was provided by the Department of Industry, Trade, and Commerce (Hotson, 1999: 265-267; Sharp, 1982: 379).

The 1960s was also a period of change for Canadair. Beginning in the early 1960s, government purchases declined in importance for Canadair as defence policy changes reduced military purchases to 45% of total company sales. In response to this change, the company, like de Havilland, attempted to diversify (Pickler and Mulberry, 1995: 82). In the early 1960s, Canadair designed and developed, with the assistance of the Department of Defense Production, a Vertical Take-Off And Landing (VTOL) aircraft for the military. While prototypes were built¹⁶, Canadair was forced to turn to the airline market for sales after the military determined that the aircraft did not meet its needs. Despite initial airline interest, and competition with other aircraft, including a proposed de Havilland Canada civil version of the Buffalo, the civil program was halted due to environmental concerns and high operating costs (Pickler and Mulberry, 1995: 195-207). The early 1960s also saw Canadair develop its CL-215 water bomber, which the Quebec government supported by purchasing 15 aircraft. In 1983, the

Force and the four Buffalos were found non-military duties (Sharp, 1982: 377-378).

¹⁵ It first considered developing the Buffalo into a new aircraft, but eventually chose to focus attention on a new design.

federal government negotiated a joint order with several of the provincial governments for a total of 29 aircraft (Pickler and Mulberry, 1995: 212-229; Phillips, 1979: 116, 119). During the 1960s and beyond, Canadair also became a major subcontractor to other companies on their military and civilian projects (Pickler and Mulberry, 1995: 241-258).

In the 1970s, the industrial policy debate between the “continentalists” and “interventionists” intensified. The two divergent policy views both had their advocates within the federal government. The main advocate for the continentalist and market oriented framework was the Economic Council of Canada, a government economic policy advisory body. The Economic Council had issued a report in 1975 advocating a policy based on the liberalization of trade and the establishment of a free trade zone with the US. The main advocate for the more interventionist technologically based framework was the Science Council of Canada, a government science policy advisory body. The Science Council issued several reports calling for a more interventionist approach aimed at technological sovereignty (Blais, 1986: 56-67).

The 1970s also marked the beginning of a period of increasing difficulties for the Canadian economy. After the 1973 oil shock, the economy entered a period of high unemployment and high inflation. The response of the Liberal government of Pierre Trudeau was to pursue both trade liberalization and a more

¹⁶ The prototype was funded with the assistance of the Department of Defense Production. Three updated versions of the aircraft were ordered by the Department of Defense and the Department of Industry, Trade and Commerce (Pickler and Mulberry, 1995: 180-193).

nationalist industrial policy agenda. The government pursued trade liberalization by participating in the Tokyo Round of trade negotiations that began in 1973 at the GATT. The government's more nationalist orientation in industrial policy was illustrated by several major initiatives of the Trudeau government. In 1971, the government formed the Canada Development Corporation (CDC), which was a holding company that was designed to provide Canadian owned industry with venture capital and allow for the buyout of foreign-owned mining and manufacturing firms. In 1974, the government established the Foreign Investment Review Agency (FIRA) as a tool to screen foreign investment coming into the country. While it had the authority to screen foreign takeovers above a certain size, and to reject such takeovers if they were found to lack sufficient benefits to Canada, FIRA could also negotiate to improve the benefits from a proposed takeover. In 1975, the government formed Petro-Canada, a federal crown corporation, to help increase the level of Canadian ownership in the strategic oil industry. Despite this more nationalist stance, the government introduced an industrial policy paper in 1976 that emphasized that resources and food, the traditional basis for Canadian development, would remain at the heart of development policies in the 1980s. Interventionism was rejected and reliance on market forces was emphasized. It indicated that no strategy shift toward manufacturing would occur in development policy (Lithwick and Devlin, 1984: 138-139).

In the 1970s, the "nationalist" and more "interventionist" strand of the Canadian industrial policy debate began to influence developments in the aircraft

manufacturing sector. As the importance of the military market began to decline for both de Havilland and Canadair, the transition to civil production increased the interventionism of the policy path as the government sought to gain more control over the industry and over the transition to more civilian aircraft production. The first episode where the influence of the more “nationalist” and “interventionist” element of policy became evident was the case of the development of a Short Takeoff on Landing (STOL) aircraft at de Havilland. As we have seen, the decline in military sales focused de Havilland’s attention on STOL aircraft for civil use, with the government’s financial backing, and this brought the company into conflict with its British parent. Hawker-Siddeley¹⁷ was developing its own commuter turboprop, the HS-748, and it was also developing its own short haul jet, the HS-146. The British parent indicated that it was not interested in funding a STOL aircraft, but de Havilland Canada and the Canadian government were determined to carry on with the project. In light of this, Hawker Siddeley removed the president of de Havilland (Hotson, 1999: 268).

Government support for the STOL project was crucial. In July 1970, the Canadian government announced that funding for the STOL aircraft project, which became known as the Dash-7, would continue until September 1971. The government also announced its support for the development of a Pratt and Whitney Canada engine for the new aircraft. This support was renewed in 1971 (Hotson, 1999: 268-269). In October 1972, the government announced a further

¹⁷ In 1966, a merger took place between two British aircraft manufacturers. Avro U.K. merged with de Havilland U.K. to form Hawker-Siddeley Aviation. De Havilland became a part of the Hawker-Siddeley operation in Canada (Hotson, 1999: 212).

extension of funding for the aircraft. The Department of Industry Trade and Commerce would provide \$ 462 million in funding to complete the design, tooling fabrication, and construction of two pre-production aircraft. De Havilland and Pratt and Whitney Canada would provide about \$18 million in funding. The government also reached an agreement with Hawker Siddeley over an option to allow for the government's purchase of de Havilland (Aviation Week and Space Technology, 23 October 1972: 25).

While the government was funding development of the Dash-7 aircraft, moves were also being made to encourage government action to stimulate the demand side. Here, the Science Council of Canada, the main advocate of a more technologically oriented industrial policy, played a major role. In December 1970, the Science Council of Canada issued a report calling for a government-backed industrial strategy to support the development of a STOL transport system. Such a strategy would build on de Havilland's STOL expertise and extend also to the infrastructure needed for STOL operations. The Council recommended the establishment of a STOL air service demonstration project between a Canadian and a U.S. city (Stevenson, 1987: 112-113). The STOL strategy advocated by the Council reflected its desire for a more interventionist and technologically nationalist approach to industrial strategy. In May 1971, the federal government adopted the more interventionist approach as it announced that it would begin a demonstration STOL service between Montreal and Ottawa. Since the Dash-7 was not yet in service, the project would operate with the de Havilland Twin Otter. The government was concerned about the slow sales of

the Dash-7, and it attributed this to the front-end costs of establishing STOL service, the lack of domestic Canadian sales, and the lack of a commercial demonstration project. "It is clear that the DASH-7 needs a "launch market" and some form of government action may be necessary to help overcome the problems outlined above" (Transport Canada, July 1978: 14). A subsidiary of state-owned Air Canada, called Airtransit, was set up to run the project, which lasted from July 1974 until April 1976. The government purchased six Twin Otters for the project and covered all the costs.

In late 1975, the Department of Industry, Trade and Commerce provided de Havilland with a \$90 million loan to help cover production of the first 50 Dash-7 aircraft (Aviation Week and Space Technology, 8 December 1975: 22). Sales were slow at first as sales of the aircraft in the U.S. market were hindered by US regulations that limited commuter operators to aircraft of 30 passengers or less (Aviation Week and Space Technology, 17 February 1975: 26). As we have seen, deregulation of the U.S. airline industry would permit U.S. commuter operators to fly larger aircraft and this would help to stimulate sales.

Another episode where the more "nationalist" and "interventionist" strand of industrial policy became evident was in an industry restructuring that took place in mid-1974. This reflected the Liberal government's concern over Canadian ownership in the economy, especially in strategic sectors like the aircraft industry. Despite the activities associated with the development of the Dash-7, in the early 1970s the Canadian aircraft industry experienced difficulties

due to a recession and the end of the Vietnam War. With sales and employment declining substantially, the government and the industry began to contemplate a reorganization of the Canadian industry. One of the government's prime objectives in the restructuring was Canadian control of the industry, and various scenarios were floated that involved only a minority foreign stake in a restructured industry. For example, one scenario envisioned Boeing and Dassault each purchasing a 20% stake in de Havilland. Other proposals saw a minority foreign stake in a merged Canadair and de Havilland (Aviation Week and Space Technology, 27 September 1971: 16-17). Despite an expectation that a restructuring would take place in the early 1970s, no immediate action was taken.

It was not until June 1974 that the federal government took its first step to restructure the industry, pushing the policy path in a more interventionist direction. The first step in the restructuring process involved the government purchasing de Havilland from its British parent for \$38 million by exercising the option it had acquired in 1972, a move that was seen as firming up the future of the Dash-7. Reflecting its preference for market solutions and its aversion to getting directly involved in industrial management, the government indicated that it did not intend to run the company for very long, and it saw its action as an interim measure with the manufacturer resold to Canadian interests within 3 months. In addition to acquiring de Havilland, the government also began negotiations with General Dynamics for the purchase of Canadair. The government felt that the development of both companies was being hindered by

their foreign ownership and it wanted to bring the two companies under Canadian control (Aviation Week and Space Technology, 3 June 1974: 19; Flight International, 6 June 1974: 720).

In the mid-1970s, the government also recognized that sales of the Dash-7 might have to be stimulated with some additional government assistance on the demand side. In 1974, the government had launched the Enterprise Development Program (EDP) that was administered by the Department of Industry, Trade, and Commerce. The program replaced a series of older government programs, and it was designed to provide assistance to small and medium sized companies with the aim of making them more viable and internationally competitive. The program funded firms that undertook high risk innovative or adjustment projects with high expected rates of return. The program shared up to half the costs of a project or it provided loan insurance for up to 90% of a project. With the development of the Dash-7, the government wanted to provide assistance to get the aircraft into the market. It decided to use the credit insurance facility under the EDP to achieve this, especially in terms of the U.S. market. The credit insurance would cover up to 90% of the sale price of the aircraft, and purchasers were required to pay a fee for the coverage. When the Dash-8 was introduced, the program was extended to cover that program. When de Havilland was sold to Boeing, the government committed to a further 50 deals under the program and the last deal insured by the EDP program took place in 1996. Over its life, the program assisted with the sale of about 100 de Havilland aircraft (Hussey, 26 July 2000; The Globe and Mail, 7 March 1991: B1,

B2; The Globe and Mail, 13 March 1992: B3; Department of Industry, Trade and Commerce, 1977: 3-5).

In late 1975, the government made its second move to restructure the industry by exercising its option to purchase Canadair from General Dynamics for \$38 million. The move was part of the government Canadianization strategy for the industry. Again reflecting the dominant preference for a market led process of adjustment, the government indicated that it did not intend to run a nationalized aerospace sector. Observers believed that the federal government wanted to merge de Havilland and Canadair to bring about an industry rationalization, and then sell the merged firm to Canadian investors with the possibility of a minority foreign interest. Several foreign firms bidding on two major military contracts, the Long Range Patrol Aircraft program and the New Fighter Aircraft program, including Lockheed and McDonnell Douglas, expressed an interest in acquiring a minority position in the restructured firm. A continuing foreign minority interest would allow for continued access to foreign aerospace technology (Aviation Week and Space Technology, 8 December 1975: 22-23).

One element of the government's restructuring effort was aimed at establishing new civil projects at Canadair. With the decline in military sales after the end of the Vietnam War, Canadair needed a solid civil aircraft program to carry the company forward. While the company had looked at a business jet project as early as 1972, in 1976 Canadair acquired the rights to the Learstar 600, a twin-engined business jet developed by famed U.S. aircraft designer Bill

Lear. The new CL-600 was a big challenge as it involved a completely new airframe and Lycoming developed engines. The cost was estimated at \$70 million, and the Department of Industry, Trade and Commerce decided to use government guaranteed debt, rather than equity financing, for the new aircraft project. Initially, the government wanted Canadair to find an international partner for the project, and the company held talks with SAAB and Aeritalia with no results. During development, the aircraft suffered from several difficulties, including a weight problem and problems with the new engines¹⁸ (Aviation Week and Space Technology, 12 April 1976: 17-18; Logie, 1992: 91-133).

In the late 1970s, de Havilland was also looking at new projects and it examined several possible options for new aircraft programs. One of those projects was a thirty-seat turboprop commuter aircraft that would build on de Havilland's activities in the commuter market with the Dash-7, and out of this was born the 36-passenger Dash-8. Market surveys of US carriers in the newly deregulated US market indicated a need for such an aircraft (Hotson, 1999: 288; Air International, February 1988: 59-61). In 1981, the federal government provided \$500 million in loan guarantees to support the development of the Dash-8. Of this total, \$450 million was given to de Havilland for the Dash-8 and \$50 million to Pratt and Whitney Canada for the engine for the aircraft. The government provided the funding to allow de Havilland to meet its delivery

¹⁸ The Challenger 600 aircraft first flew in November 1978, and it became apparent that it would not meet its performance specifications, in particular, with respect to range. A costly modification program was required to improve the aircraft's performance. A lull in sales meant that the recovery of the development costs would not occur as planned. The problems with the Lycoming engine led to the development of the CL-601 aircraft with engines made by General Electric. A planned stretched Challenger, designed to keep CL-600 launch customer Federal Express interested in the project, was started in July 1979 and cancelled in August 1981. The recession of the early 1980s also hurt sales (Aviation Week and Space Technology, 9 July 1979: 22-23; Logie, 1992: 145-196).

schedules and to keep the price of the aircraft competitive (Aviation Week and Space Technology, 9 February 1981: 42).

1980 to 1986: A Period of Crisis and Neo-Liberal Shift

The late 1970s and the early 1980s were a difficult period for the Canadian economy as it entered a severe recession brought on by the second oil shock and a high interest rate anti-inflation policy. The economic crisis increased pressure for the adoption of a neo-liberal policy alternative in the mid-1980s. Not only was it a period of economic difficulties, but it was also, as we shall see, a period of crisis for Canada's two aircraft firms. Neo-institutionalists would expect that the interventionist policy path that gradually developed over the post-war period would continue during this crisis period, and the de Havilland and Canadair cases support that view. The initial response to the crisis by a Liberal government emphasized a major state-supported assistance and reorganization effort for the two state-owned aircraft firms. As this effort was being completed, however, a new Conservative government was elected that advocated a neo-liberal approach to economic policy. The major thrust of the new government in the aircraft sector was to roll back some of the previous shift towards interventionism by returning the two aircraft firms to the private sector, a move that recast the policy path in a more neo-liberal direction. Nevertheless, in the effort to sell the two firms, the government also signalled its commitment to providing support to the two firms. Thus, despite the change, the neo-institutionalist view of basic path dependency would prevail.

In the difficult economic climate of the late 1970s and early 1980s, the “nationalist” element of the government’s industrial policy approach arose again. In 1980, the government introduced the National Energy Program (NEP) that was designed to control the strategically important oil sector. The program maintained domestic oil prices below levels that prevailed internationally, taxed economic rents in the oil industry, and pushed for majority Canadian ownership of the industry by 1990 (Norrie and Oworm, 1996: 446-447; Howlett and Ramesh, 1992: 239-240). In 1981, the government released an economic development policy paper that emphasized the role of Canada’s natural resources as the key component of its strategy, with mega-projects to be used to expand capacity in the natural resource sector. The mega-projects would encourage economic development in all the regions through industrial spin-offs, and the surplus from resource development would be used to finance industrial restructuring. In addition to the mega-projects, the government would support efforts to improve the competitiveness of the Canadian economy in key technological sectors such as nuclear technology, communications, data processing, and aerospace. The collapse of commodity prices in early 1980s led to the collapse of the entire strategy (Lithwick and Devlin, 1984: 144-147; Howlett and Ramesh, 1992: 249).

The 1980s also saw several institutional and other changes that impacted on industrial policy. In 1981, the Department of Industry, Trade and Commerce was merged with the Department of Regional Economic Expansion to form the

Department of Regional Industrial Expansion (DRIE). This move was designed to shift industrial policy way from the propping up of declining firms and funding business with grants towards a more adjustment oriented approach to policy (Doern, 1986: 82-83). DRIE would continue to support the aerospace sector through the DIPP program. In 1982, the government formed the Canada Development Investment Corporation (CDIC) as a holding company for its shares in the Canada Development Corporation and its other commercial investments. The objectives of the CDIC were to manage those commercial assets held by the government for public policy purposes, to transfer to the private sector those assets that no longer served a public policy purpose, to hold new commercial investments acquired by the government, and to provide commercial advice to the government when required. Among the commercial assets transferred to CDIC in 1982 were the government's holdings in de Havilland and Canadair (Canada Development Investment Corporation, 1983: 31). In 1983, the government consolidated many of its industrial adjustment programs and created the Industrial and Regional Development Program (IRDP). It provided assistance to firms in trouble to help with the costs of plant modernization or expansion, restructuring, research and development, and marketing. In addition to IRDP, specific adjustment programs also existed in the 1970s and 1980s for several industries, including the Pulp and Paper Modernization Program, the Shipbuilding Industry Assistance Program, and the Canadian Industrial Renewal Program for the textile, clothing, footwear and tanning industries (Howlett and Ramesh, 1992: 242-243). To provide the government with clear direction with respect to economic and industrial policy,

the Liberal government appointed the MacDonald Commission in the fall of 1982. The Commission was to investigate the long-term prospects and challenges for the Canadian economy and their impact on the management of the country's economic affairs and its economic and government institutions. As we shall see, this Commission would have a major impact on the future direction of the next Conservative government's economic, trade, and industrial policies.

The early 1980s were a difficult time for the Canadian aircraft manufacturers too, as the recession took its toll on the airline industry and, therefore, aircraft sales. As we have seen, both manufacturers had made substantial investments in new aircraft development programs, and these programs would become a major contributor to the financial crisis of the period. Difficulties at both de Havilland and Canadair forced the Liberal government to take action to secure the future of the two companies in the strategically important and high technology sector of aerospace.

The government was forced to provide financial support to de Havilland to keep the company operating. The recession had a major impact on de Havilland, and the company suffered severe financial losses between 1982 and 1985, in part due to the write-off of costs associated with the Dash-7 and Dash-8 programs. De Havilland lost \$265.2 million for the last 7 months of 1982, \$236.5 million in 1983, and \$40.4 million in 1984 (Canada Investment Development Corporation, 1985: 53). By the end of 1983, de Havilland had invested \$260 million in the Dash-8 program, and the completion of the program

would require an additional \$157 million by the end of 1984 (Canada Development Investment Corporation, 1983: 17). All told, the federal government provided new equity of \$650 million to the company over the three-year period from 1982 to 1984 (Canada Development Investment Corporation, 1984: 93). The government also provided financial support to Canadair. That company's financial difficulties had its origins in the development of the Challenger. The airplane had been much more expensive to develop than had originally been planned. In 1982, the federal government set a borrowing limit for Canadair of \$1.35 billion, but Canadair had breached the limit by November. By the time the aircraft was brought to production in 1982, the development costs of the aircraft had reached \$460 million. The debt payments totalled \$569 million, a reflection of the government's decision to finance the project with debt and the high interest rates of the early 1980s (Canada Development Investment Corporation, 1984a: 5-6; Logie, 1992: 207-221). Canadair's financial performance in 1982 was disastrous. It lost a total of \$1.4 billion, up to that point the largest corporate loss in Canadian history, mainly due to the write off the Challenger related costs. The company lost a further \$334 million in 1983. Meanwhile, the firm's long-term debt rose from \$218.9 million in 1980 to \$1.1 billion in 1983. To save the company from collapse, the government was forced to inject \$750 million in equity between 1982 and 1984 (Canada Development Investment Corporation, 1983: 13, 56, 66).

Canadair undertook a series of measures under the direction of CDIC to deal with its immediate financial problems. These measures included changes in

company management personnel, management restructuring, reduction in the Challenger production rate, various cost reductions, and improvements in financial controls and reporting (Canadair, 1983: 1-2). In 1984, the government undertook a major financial restructuring of the company. Canadair, the CDIC, and the government believed that the only way to ensure Canadair's future as a competitive aircraft builder was to free it from the heavy burden of long-term debt, and the government, therefore, moved to do just that. The CDIC created a new company called "New Canadair" that acquired all the assets and current liabilities of the existing company. This company then changed its name to "Canadair Limited". The "Old Canadair" was left with no assets and \$1.35 billion of long-term debt to be paid off by CDIC and the government. Canadair Limited was, therefore, a new company with substantial assets, but free of the long-term debt burden (Aviation Week and Space Technology, 19 March 1984: 22-23; Canada Development Investment Corporation, 1984a: 16-18; Canadair, 1983: 2-3; Logie, 1992: 249; Pickler and Milberry, 1995: 289-290).

In the same year that the financial restructuring was completed at Canadair, a new Progressive Conservative government under Prime Minister Brian Mulroney was elected to office. While the new government initially did not have clear intentions with respect to industrial policy, it clearly had neo-liberal leanings. The government's first economic statement in the Fall of 1984 emphasized a pro-market philosophy that focused on the government's role in getting the policy framework right. Such framework policies included taxation, deficit reduction, education and training, and R&D incentives. It set the basic

tone for the new government's agenda, which emphasized deficit reduction, privatization, and deregulation. The new government also took steps to reverse major nationalist-oriented policies of previous administrations. It converted the Foreign Investment Review Agency into Investment Canada, an agency with a mandate to encourage, rather than restrict, foreign investment. The government also dismantled the National Energy Program. (Doern, 1986: 64-66; Doern, 1990: 57; Bradford, 1998: 117-118; Howlett and Ramish, 1992: 239-240, 249-250).

One of the key early initiatives of the new government, launched in September 1984, was a major review of government programs. The objective of the Task Force on Program Review was to provide better service to the public and improve the management of government programs (Task Force on Program Review, 1986: I). One study team looked at government subsidies to business, including the Defence Industry Productivity Program (DIPP) (Task Force on Program Review, 1986: 116-121). The study team concluded that support for the defence sector was necessary because of the extensive subsidies provided to competitors, the political and economic interest in having a defence industry, and the spin-offs from the industry to civilian sectors. DIPP had clearly contributed to the continued existence of the Canadian defence sector. Reflecting the government's general aversion to business subsidies, the study group indicated that the "challenge is to minimize support while ensuring that survival continues"(Task Force on Program Review, 1986: 120). The program should continue as a discretionary grant, but the industry must concentrate on

the most profitable areas and “support should be no more than necessary to ensure survival” (Task Force on Program Review, 1986: 120). The outcomes of Program Review included a tightening up of the requirements under the program, an emphasis on collection of monies owed, and a lack of new funding. Despite the government’s aversion to business subsidies, the defence sector, including the aircraft industry, would continue to receive some minimal level of research and development support from the government.

Another key development that occurred just after the new government assumed office was the release of the MacDonald Commission report. The report called for a major revamping of Canada’s approach to economic policy, an approach that has been described as “corporate neo-liberalism” (Bradford, 1998: 115). The Commission believed that the proper role for the state was to provide the proper framework for market forces to flourish. Governments were incapable of undertaking coherent intervention and the results of past interventions were market rigidities and inefficiencies. According to the Commission, the focus of macro-economic policy should be inflation rather than unemployment. The government should reduce unemployment by encouraging greater flexibility in the labour market. In line with those who advocated a more continentalist perspective, the industrial policy of the Commission emphasized the importance of free trade and called for a free trade agreement with the United States. Such a policy would encourage greater efficiency in Canadian industry by opening it up to increased foreign competition. Government should take a neutral stance with respect to economic development, and it should not use targeted programs

to help declining firms or support sunrise industries. The Commission urged a program of active labour market measures to provide transitional assistance to labour. In line with the Commission's recommendations, the Conservative government went on to sign a free trade agreement with the United States in 1989, and that agreement was expanded in 1992 into the North American Free Trade Agreement that included Mexico (Bradford, 1998: 112-117; Howlett and Ramish, 1992: 249-250).

The new government's first budget in the Spring of 1985 was aimed at encouraging risk taking and letting individuals, rather than governments, pick the winners. The budget was highly critical of the ad hoc and confusing nature of previous government industrial policy efforts. The government announced its intention to reduce subsidies and grants to business. The Department of Regional Industrial Expansion would focus on the softer instruments of policy, such as information, market development assistance, and consultation. Significantly, support would still be maintained for innovation in areas of strategic importance and to maintain the defence industrial base (Doern, 1986: 64-66; Doern, 1990: 57; Bradford, 1998: 117-118). The Conservative government had many reasons to continue supporting the aircraft industry as an area of strategic importance and a crucial element of the defence industrial base. This industry was becoming one of Canada's high technology bright spots. Industry shipments had grown from \$ 662 million in 1973 to \$3.3 billion in 1984, and they would continue to grow and reach \$ 6.0 billion in 1988. The industry exported 70 percent or more of its output, and exports grew from \$ 516 million in 1973 to \$

2.5 billion in 1984. They would reach \$4.2 billion by 1988. Employment in the industry was also increasing. It rose from 31,700 in 1973 to 42,300 in 1984, and it went on to reach 63,650 in 1988 (Industry, Science and Technology Canada, 1991: 8)

The main impact of the government's new policy approach was on the state-owned status of Canadair and de Havilland. In line with its policy of transferring crown corporations to the private sector, the new Conservative government announced its intention to sell the government's commercial assets, including its aerospace assets. In the sale process, the government was not driven by the desire to create a single aerospace national champion, although many in the industry favoured such a move. The government initially considered selling all of the CDIC's assets as a package, but when that proved to be unfeasible, the government looked at selling both Canadair and de Havilland as a package. Investors were much more interested in the assets at de Havilland, and that led the government to announce its intention to sell the company in October 1984. It was the first crown corporation put up for sale, and the government believed that a new owner was essential to secure the future of the company. Government involvement in the company had delayed important decisions, diverted attention from company development, and exposed the taxpayer to major risks and financial losses. The company had a limited product base and it needed new owners to stimulate new products, investments, and provide investment funding (Regional Industrial Expansion, 2 December 1985: 1; Treasury Board of Canada, 2 December 1985: 5-6). The government had

several objectives in returning de Havilland to the private sector. It wanted to expand the company's product base and employment, improve its ability to withstand the cyclical up and downs in the industry, and increase the level of research and development activity at the firm (Regional Industrial Expansion, 2 December 1985: 1). The government therefore instructed the CDIC to find a buyer for the crown-owned firm.

The CDIC had discussions with over 130 firms and individuals that had an interest in acquiring de Havilland, but only three proposals were received. One was from the U.S. commercial aircraft manufacturer Boeing. Another was from Mr Justus Dornier, one of the sons of the founder of the famous Dornier aircraft company in Germany, who was interested in acquiring both de Havilland and Canadair. The final proposal was from Fokker¹⁹ and a group of Canadian investors that formed a group named Rimgate. As the sale process proceeded, stakeholders having a role in the industry made their concerns known. Unions were concerned about jobs, pensions, and Canadian content, and suppliers were focused on the need to maintain Canadian content. There was a general political concern about the future of Canadian production if de Havilland was acquired by a foreign investor. In the end, the CDIC and its advisors felt that the Boeing proposal was superior to the other two (Canada Development Investment Corporation, 5 November 1985: 1-10).

¹⁹ Fokker would have had a 33% stake in the consortium (Canada Development Investment Corporation, 5 November 1985: 5).

The deal to sell de Havilland to Boeing, announced in late December 1985, not only reflected the government's desire to divest of the company, but it also showed that the government was prepared to influence the company's development and make a commitment to the firm for the long-term. Boeing agreed to pay a total price of \$112 million, of which \$65 million was payable upon closing and the remaining \$47 million payable in three equal instalments over 15 years. This obligation to pay the \$47 million could be eliminated if Boeing purchased \$234 million in Canadian goods and services for projects not related to existing de Havilland or Boeing Canada products.²⁰ The government agreed that Export Development Corporation and Enterprise Development Program funding for aircraft sales would continue, and de Havilland would continue to be eligible for the normal government support programs. Boeing committed to \$105 million in investments at de Havilland, and the government agreed to help fund these investments through the Defense Industry Productivity Program²¹. De Havilland was given a world product mandate by Boeing for the production of commuter aircraft for the world market. Boeing agreed to pay royalties on future aircraft sales in recognition of the fact that Canadian government money funded the development of de Havilland aircraft. Boeing also agreed to product liability insurance on de Havilland aircraft already built, but the government would contribute if these premiums rose above a certain limit (Aviation Week and Space Technology, 9 December 1985: 28-29; Government

²⁰ For every \$ 5 million of new work in Canada, \$1 million of the deferred payment would be forgiven

²¹ Boeing committed to \$105 million in product development and facility modernization funding. Of this, \$25 million was to upgrade the Downsview plant, \$20 million for improvements to the Dash-8, and \$60 million to develop the 50-seat Dash-8-300 stretch. The government agreed to fund 35%, 35%, and 50% of these projects, respectively, through the Defense Industry Productivity Program (Government of Canada, 28 November 1985: 20-21)

of Canada, 28 November 1985: 5-21; Regional Industrial Expansion, 2 December 1985b: 1-2).

The government made a point of stressing the advantages that a link-up with Boeing would bring to de Havilland. It indicated that the government could continue to put money into the company, close it down, or find a buyer with the financing, ability, and knowledge to ensure the survival and future prosperity of the company. The government argued that a buyer as large as Boeing was needed to give the company stability. It appeared pleased that it could find a buyer that would give de Havilland a home within one of the major aerospace groups. The government considered the product mandate given to de Havilland by Boeing a big plus. Analysts argued that Boeing would put its financial strength and marketing ability behind de Havilland, and they argued that Boeing needed a range of commuter aircraft to complement its large aircraft product line. As we have seen, deregulation led to increased use of smaller aircraft as hub feeders and as closer links developed between the commuter airlines and the major carriers (The Globe and Mail, 4 December 1985: A2; Financial Post, 14 December 1985: 4). Boeing saw the purchase as a way of serving the commuter airline market, and as a way of beefing up its Canadian presence so that it could obtain more contracts from the Canadian military and Air Canada.

The government came in for strong criticism for selling de Havilland to a foreign aircraft firm and for the low price that was paid for the company, but price

maximization was not the government's main objective in this sale or the later sale of Canadair:

The actual price paid for Canadair and de Havilland are difficult to determine because each involves a number of contingencies. These contingencies are intricately bound up with the control elements of the agreements. The control elements are those aspects of the agreements in which the government sought to achieve its policy goals by providing monetary incentives for their achievement. The key point in understanding the privatizations is that the government was not motivated to maximize in a direct way the sale price of each firm. Rather, the emphasis appears to have been on the post-privatization conduct of the buyers (Doern and Atherton, 1987: 158).

The government tried to get Boeing to support Canadian suppliers by providing a financial incentive, through the elimination of future purchase price instalments, in return for purchases from Canadian suppliers. It also tried to get Boeing to invest in the facilities at Downsview. In addition to this, increased defence spending and the government's airline deregulation policies would also help support de Havilland.

The government's next move, once it had sold off de Havilland, was to deal with Canadair, and it announced its intention to sell Canadair in late January 1986. The Conservatives had always been critical of Canadair while they were in opposition. The government received bids from five companies or groups for the purchase of the company.²² The Quebec government expressed its concern about jobs and maintaining the company's operations in Quebec. It was concerned about the potential impact of a foreign owner, and it preferred to see

²² The five bidders were Bombardier, Canadian Aerospace Technologies, Fleet Consortium, IMP Group, and Magna International (Aviation Week and Space Technology, 14 April 1986: 26).

the company in Quebec hands. Bombardier, which had earlier turned its back on Canadair, had now set a strategy to diversify its operations and was, therefore, interested in acquiring the company. In August 1986, the government announced the sale of Canadair to Montreal-based Bombardier (Aviation Week and Space Technology, 14 April 1986: 26; Aviation Week and Space Technology, 25 August 1986; Logie, 1992: 249 - 252; Pickler and Milberry, 1995: 293-294).

The sale of Canadair to Bombardier reflected, in a fashion similar to the de Havilland sale, the government's desire not only to divest itself of the company, but also to influence the future development of the company and to provide longer-term support. Bombardier purchased Canadair from the government for \$120 million. CDIC retained the rights to the Challenger technology, but licensed that technology back to Canadair. The estimated value of the royalties was \$173 million, but the government could exercise an option to obtain a lump sum payment of \$20 million in place of the royalties. The government also acquired two classes of non-voting shares that allowed it to influence the company's future behaviour. If Canadair used its working capital to support the development of the company, and if it met certain goals with respect to increases in exports, research and development, and Canadian content, it could redeem the shares at a nominal value. Otherwise, they had to be redeemed at face value²³. The agreement also provided for a one percent

²³ The two share classes were Class A and Class B shares that were valid for 6 years and 15 years respectively. The government had the right to require Canadair to retract the Class A shares for \$100 per share if Canadair failed to use its working capital to support its aircraft business. The retraction was based on the amount of inappropriate expenditures. Otherwise, the shares could be redeemed for \$.01 per share based on the amount of permitted investments. With the

royalty if Canadair received a forthcoming contract to maintain Canada's CF-18 fighter aircraft. Bombardier committed to maintain employment levels at Canadair, enhance the company's research and development capabilities, and encourage the involvement of Canadian suppliers in the company's aircraft programs. The government indicated that Canadair would be eligible for all regular industry support programs, and it committed to funding for specific projects under DIPP²⁴, the continued availability of export financing, and the establishment of a sales financing mechanism if it was needed to help support sales of a commuter version of the Challenger business jet.

The sale of Canadair to Bombardier was politically significant. Bombardier, based in Quebec, was the province's first and its biggest multinational enterprise involved in heavy manufacturing in the form of transportation equipment. It had been well connected to the federal government, whether Liberal or Conservative, since the World War II period, when the company produced covered snowmobiles for the government for Arctic patrols. The company had many personnel connections to the federal government. For example, one of the company's recent presidents, Robert Brown, was a former high-ranking civil servant at Industry Canada. Bombardier has also been a staunch federalist, and the company's chairman, Laurent Beaudoin, was a vocal

Class B shares, Canadair could redeem the shares for \$.01 per share based on its incremental investments in R&D, its incremental exports, its incremental Canadian content increases, and its incremental new project funding. After 15 years, any outstanding Class B shares would be redeemable at \$100 pr share (Canadair, 18 August 1986: Annex B and C; Bombardier, 1987: 31).

²⁴ Under the DIPP program, the government committed up to \$14 million (up to 35% of the cost) to update the CL-215 waterbomber, up to \$10 million (up to 35% of the cost) for modifications to the Challenger, and up to \$5 million (up to 35% of the cost) for the purchase of new equipment. Efforts to undertake major modifications to the Challenger would be subject to regular DIPP funding rules and DIPP funding would also be available for the continuing development of the CL-227 remote surveillance system (Canadair, 18 August 1986: 23-26)

supporter of the federalist cause in the 1995 Quebec referendum on sovereignty. Its staunch federalist stance caused Bombardier difficulties with the Quebec government, but there were still close political ties between the company and Quebec politicians (The Globe and Mail, 13 Jan 2001: B1, B6; The Globe and Mail, 20 October 1992: B6; Fraser, 1987: 150-163).

Policy After The Crisis: Towards an Aerospace National Champion

From the mid-1980s onwards, successive Canadian governments continued along the previous policy path in the commuter and regional aircraft industry, offering strong state support to their two new, privately owned, aircraft firms, Canadair and de Havilland, just as the neo-institutionalists would predict. In fact, despite a federal government seemingly committed to neo-liberalism, the policy path took an incremental shift towards increased interventionism when Boeing decided to sell its de Havilland subsidiary. The federal government's open attitude to foreign investment was tested with Boeing's decision to sell the company to a foreign state-owned competitor. When that deal was blocked by the European Union, a single national champion was formed when Bombardier and the Ontario government purchased de Havilland in 1992. After the formation of the single national champion, successive federal governments provided strong support for economic and political reasons.

In terms of industrial policy, the late 1980s and the early 1990s were a period of marked institutional and policy change. In 1987, the Conservative

government under took a major re-organization of industrial policy institutions. A new department was created known as Industry, Science and Technology Canada (ISTC). This new department was formed by the merger of the Ministry of State for Science and Technology, a science and technology policy ministry formed back in 1971, with the Department of Regional Industrial Expansion (DRIE). It was to be the centre of micro-economic policy for the government, and, in order to free the new ministry from the highly politicized regional development area, two new regional development agencies were formed for western and Atlantic Canada²⁵ (Doern, 1990: 51-57).

The main program focus of ISTC was on the areas of strategic technologies, sector competitiveness, and business information and development services. Strategic technologies would focus on biotechnology, information technology, and advanced materials, and ISTC programs would aim at assisting Canadian industry develop, acquire and supply such technologies. Sector competitiveness would help the different industrial sectors, including the aerospace sector, to develop action plans to help improve their competitiveness. The only subsidy programs that continued were those that had a good record of stimulating the technological development of Canadian industry. Included among those continuing programs was the government's flagship aerospace program DIPP. The Department would, therefore, continue to support aerospace industry development. With the signing of the Canada-U.S. Free Trade Agreement in 1989, the government became increasingly concerned about the

²⁵ These two agencies were Western Economic Diversification Canada (WED) and Atlantic Canada Opportunities Agency

ability of the U.S. to take action against Canadian government assistance to industry. Most ISTC programs were, therefore, designed to be more focused on service and knowledge rather than the handing out of grants. They also focussed more on the pre-competitive stage and were non-firm specific. In the 1990 budget, the government converted all its grant programs into programs based on repayable loans (Doern, 1990: 52-56)

In the aerospace sector, one strategy that the Conservative government continued to use to support the aerospace industry was the awarding of defence contracts. This became evident soon after Canadair was sold when, in early November 1986, the Canadian government awarded the company a lucrative contract to maintain Canada's new CF-18 fighter. The contract was worth from \$1.4 billion to \$3 billion over the 20-year life of the CF-18s, and Bombardier won the contract over two other Canadian bidders²⁶. The awarding of the contract stirred up a lot of bitterness and controversy as Western Canada felt cheated by the awarding of the contract to a Quebec-based firm on political grounds. Western-based Bristol Aerospace had a lower bid and was judged to have a higher technical assessment. The government emphasized that it was in the national interest to award the contract to Canadian owned Canadair over British owned Bristol. Also crucial was the fact that Canadair could take the skills and technical know-how acquired from the CF-18 contract and apply them to its own aircraft programs. Bristol Aerospace specialized in aircraft maintenance and it

(ACOA).

²⁶ The other two bidders were Bristol Aerospace of Winnipeg and the IMP Group of Halifax. The former was owned by the UK company Rolls Royce.

did not manufacture aircraft. The skills provided to Canadair could also be used in future years to obtain other maintenance subcontracts (The Globe and Mail, 1 November 1986: A1, A4; The Globe and Mail, 1 November 1986a: A1, A2; The Globe and Mail, 1 November 1986b: A4; The Globe and Mail, 1 November 1986c: A4).

The government also supported Bombardier in its attempt to win a major subcontract from Aerospatiale of France. In early 1988, Canadair was negotiating with Aerospatiale of France for a major subcontract on Airbus long-range aircraft, which involved the design and manufacture of six major fuselage components. The fifteen-year program would be worth up to \$1 billion and would contribute to the Canadair's strategy of reducing its dependence on the Challenger. The contract was awarded to Bombardier in October 1988. Start up costs for Canadair totalled \$157 million, but the federal and Quebec governments decided to contribute half the cost by each providing a \$37.3 million loan (Aviation Week and Space Technology, 21 March 1988: 74; Aviation Week and Space Technology, 4 July 1988: 70; Aviation Week and Space Technology, 3 October 1988: 103).

The government also continued the earlier policy of supporting the development of new products. In 1988, Canadair's attention turned towards the idea of building a regional jet version of the Challenger business jet, a move that would bring Canadair into the commuter and regional aircraft sector of the aircraft industry (Flight International, 7 January 1989: 15). The government,

living up to the commitment it made at the time of the Canadair sale, provided financial support for the project. In September 1988, the federal government awarded Canadair \$8.8 million to support advanced design work for the aircraft. This study assessed the business risks and opportunities associated with the project and provided a basis for a go or no go decision (The Globe and Mail, 2 September 1988: B4). In April 1989, Bombardier announced the go-ahead for the \$275 million regional jet program. At the time of the announcement, the company had a letter of comfort from the federal government indicating that the project met the criteria for DIPP funding. Later that month, Bombardier was awarded a total of \$86 million in loans from the federal and Quebec governments. The federal government provided \$43 million under DIPP, while Quebec's Department of Industry, Commerce, and Technology granted a similar loan through its Société de Développement Industriel du Québec (The Globe and Mail, 27 April 1989: B6).

Bombardier's strategy, once it had acquired Canadair, was to internationalize and further extend itself into aerospace, especially in niche markets. In 1989, the British government moved to sell Short Brothers, an aircraft manufacturing firm that it owned in Northern Ireland, and Bombardier entered the bidding for the company. The other bidders were the British-Dutch team of GEC-Fokker and the German firm Messerschmitt-Boelkow-Blohm (MBB). In June 1989, it was announced that Bombardier had won the bidding for Short Brothers. Bombardier would pay \$48 million for the Irish company, and the British government would write off \$625 million in loans and pump in another

\$625 million into the firm. Of the latter amount, \$440 million was to recapitalize the firm, \$125 million for capital investment, and \$29 million for miscellaneous charges. The acquisition of Short Brothers gave Bombardier an entry into the European Common Market and it also eliminated a competitor, as Short Brothers was planning to launch its own 50-seat regional jet known as the FJX (Aviation Week and Space Technology, 6 March 1989: 30; Aviation Week and Space Technology, 13 March 1989: 31; Aviation Week and Space Technology, 12 June 1989: 63; MacDonald, 2001: 138-140). In April 1990, Bombardier made a move to expand its presence in the business jet market by acquiring the US business jet manufacturer Learjet. Learjet's parent firm was under bankruptcy protection and was looking for buyers for the firm. Bombardier paid \$75 million for Learjet and agreed to assume \$38 million in loan liabilities. Learjet gave Bombardier a presence in the US market and added a line of lower-end business jets to its Canadair line (Flight International, 18-24 April 1990: 4-5).

The expansion and new products strategy of Bombardier contrasted with Boeing's strategy at de Havilland. During the period of Boeing's ownership, sales of the Dash-8 increased and it further developed and introduced the stretched Dash-8-300. It also discussed launching a further stretch, the 70-seat Dash-8-400, but Boeing essentially turned de Havilland into a single product company by stopping production of the Twin Otter, Buffalo, and Dash-7.

From the mid-1980s to the early 1990s, "national competitiveness" came to dominate the government's industrial policy agenda, and the Conservative

government used two major policy avenues to address the competitiveness issue. First, it sought to improve competitiveness by improving the economic environment for business, and here it launched many initiatives including, for example, the deregulation of markets, deficit reduction, tax system reform, signing of the free trade agreement, and changes to the competition laws. In September 1991, it tried to stimulate competitiveness by putting forward constitutional proposals that would strengthen the Canadian economic union by removing inter-provincial trade barriers and encouraging greater federal-provincial policy harmonization. Second, the government made efforts to help improve the human and capital resources available to Canadian industry (Demers, 1992: 151-154). The competitiveness of the aircraft manufacturing sector was included in the government's agenda.

As part of the government's push on competitiveness, it launched the Prosperity Initiative in October 1992. This initiative was a nation-wide consultation process that aimed to improve the innovation and training performance of Canadian industry. The aerospace and defence sector consultations produced a series of recommendations for industry and government to help improve sector competitiveness. With respect to the government, the consultations produced a call for, amongst other things, government seed funding for centres for aerospace manpower training, continued government support for innovation projects that benefited Canada with less emphasis on regional benefits, the provision of more competitive and timely EDC concessional financing, a continuation of the defence development and

production sharing arrangements with the U.S., more coordinated actions by federal and provincial governments in general and in support of high technology developments, and the maintenance of the DIPP program with stable or higher funding levels in real terms (Industry, Science and Technology Canada, June 1992: 2-12).

In January 1992, a paper on the Canadian economy by Harvard professor Michael Porter was released by the government that stimulated a lot of debate about the appropriate approach to policy and a lot of interest in clustering. (Demers, 1992:151-154). The Porter study looked at the commuter aircraft industry in Canada as part of the country's transportation cluster. The industry was found to be internationally competitive and it held a 10 percent share of world exports of commuter aircraft. While the industry was found to be competitive, it had a weak industry diamond that raised some questions about its future competitiveness²⁷ (Porter and The Monitor Company, 1991: 140).

Competitiveness was an issue when Boeing was deciding the future of its de Havilland subsidiary. It had become increasingly evident in the late 1980s that Boeing was experiencing difficulties at de Havilland. In 1987, Boeing sued the federal government over health and safety problems at the de Havilland plant. The government had indicated at the time of sale that the plant met Ontario health and safety standards, which it did not. In February 1990, the

²⁷ Porter found that the industry had low domestic rivalry and was only moderate in the following areas: factor conditions, demand conditions, related and supporting industries, and the role of government (Porter and The Monitor Company, 1991: 140).

government resolved the dispute by paying Boeing \$161 million. The deal included \$61 million in cash, \$51 million in cash that would not be repayable if the company reached specific operating and investment goals, and up to \$47 million in deferred payments if Boeing managed to double the sales of the Dash-8 to more than 650 aircraft. Investment in the Dash-8-400 would be sufficient to meet the investment requirement. Boeing was also free to request funding for the Dash-8-400 from the Defense Industry Productivity Program (The Globe and Mail, 10 February 1990: A4; Aviation Week and Space Technology, 19 February 1990: 76; Flight International, 28 February - 6 March 1990: 4). In 1987, the company weathered an eleven-week strike that hurt production and left a negative view with Boeing of labour relations in Ontario.

The Conservative government's predisposition towards non-intervention and its welcoming attitude towards foreign investment were challenged by Boeing's decision in July 1990 to put its de Havilland division up for sale²⁸. The company indicated that it was discussing a possible sale with Aerospatiale of France and Aeritalia of Italy (later Alenia), both state-owned firms. Aerospatiale and Aeritalia were competitors of de Havilland as they produced the 50-seat ATR-42 and 70-seat ATR-72 through their jointly owned ATR consortium. Boeing indicated that it was selling de Havilland because it did not meet expectations as the company still suffered from productivity problems, labour problems, and it was still losing money. Boeing also had to invest \$450 million in R&D, capital equipment, and buildings, which was substantially more than the

\$50 million it envisioned spending when it acquired the firm (Aviation Week and Space Technology, 30 July 1990: 87; Flight International, 29 August - 4 September 1990: 4-5). The business culture at Boeing was not suitable to the turboprop business and it could not get the unions on side. Boeing had also become disillusioned with Canada at the corporate level because of its failure to win government contracts or aircraft sales to Air Canada. Boeing was also a major competitor to Airbus in the large aircraft market, and Aerospatiale was one of the leading partners in the European consortium. Some have argued that Boeing was trying to off load a losing proposition on to Aerospatiale to place a major financial burden on its competitive opponent. With Boeing's decision to sell its de Havilland operation, the federal government's strategy of bringing stability to de Havilland by linking it with a major international aerospace firm had clearly failed.

The situation at de Havilland was also one of the first issues that confronted a new social democratic government in the province of Ontario that was elected in September 1990. The previous Liberal government had identified aerospace as one of the "high growth" industries of the future, but despite its belief that such industries should be nourished, it took little action in support of the sector. (Premier's Council, 1989: 19-22; Premier's Council, 1989a: 115-143). The Liberals were still living in the era of complacency when it came to economic development, taking such development for granted. When the New Democratic Party (NDP) was elected to office in 1990, it came face to face with Boeing's

²⁸ This section on the sale of de Havilland draws heavily from interviews: (Mackay, 10 July 2003; Kane, 3 September 2003;

decision to divest itself of de Havilland. This was a government that believed in industrial policy with an active role for the provincial government. When the government announced its industrial policy package in January 1992, just as a solution to the de Havilland issue was found, it based its policy on the idea that competitive advantage could be created through the cooperative efforts of workers, investors, companies and government, with industrial policy serving as a framework that permitted all the partners to work together as a team. This market-led policy aimed to encourage innovation, upgrade worker skills, increase technological capacity, establish home-based activities, develop clusters, and improve international capabilities. The ultimate goal was to increase the level of value-added activities in the provincial economy (Government of Ontario, 1992). As we shall see, the Ontario government would play the key role in the outcome at de Havilland.

Aerospace rose on the Ontario government's agenda mainly because of jobs. De Havilland was the largest industrial employer in the City of Toronto, providing thousands of well-paying jobs, and protecting those jobs was of major importance to the new government. Protecting the research and development capability at de Havilland was also important. While the primary interest of the Ontario government was jobs, and while some in the aerospace industry and in government had a vision of creating a single Canadian national champion in the aerospace sector as the linchpin for a Canadian aerospace cluster, the Ontario government had no such vision. As events will show, the development of a

single national champion arose out of circumstances rather than from any plan to form such a champion. The Ontario government formed a working group to review the takeover of de Havilland and it was made up of representatives of government, business, and labour. (Financial Post, 30 January 1991: 5).

One reason for the increased attention to de Havilland was the close connections between the NDP government and the Canadian Auto Workers Union (CAW), the main union at the company. The CAW opposed the Boeing-ATR deal because it believed that selling de Havilland to a government-owned foreign competitor threatened the company's future as a full fledged integrated designer of aircraft, and this threatened the associated jobs, research and development, and supplier base. The CAW indicated that de Havilland's future with ATR would be directly tied to the amount of funding that the federal and provincial governments would be willing to provide the company, and the union feared that the deal would eventually see the company downgraded to a parts and component supplier for its European parent. De Havilland would not be operated in the Canadian national interest as it would operate according to the needs of France and Italy. The union believed that Canadian participation was a prerequisite to any deal to acquire de Havilland, including any deal involving ATR, because only through such a Canadian presence could the future role of de Havilland as a developer and builder of aircraft be protected. The federal or provincial government should be ready to take an equity interest in the company. If the ATR deal were to go through, the Europeans should be required to continue production of existing aircraft, commit to launching the Dash-8-400, and

commit to a future role for the company in the research and development of new aircraft (Canadian Auto Workers, 6 May 1991: 1-9; Canadian Auto Workers, 11 September 1990: 1-5; The Financial Post, 7 September 1990: 4).

In their initial business plan, the commitments by Aerospatiale and Aeritalia were ambiguous. They indicated that they planned to continue production of the existing Dash-8 models, but that continued production depended on market conditions. They made no commitment to the development of the Dash-8-400. The ATR consortium believed that de Havilland produced too many components in house, and they hoped to reduce production costs by turning the Downsview plant into an assembly operation using parts made by subcontractors in Ontario. De Havilland would contribute to an equal extent with Aerospatiale and Aeritalia in the development of a new 70-130 seat family of regional jet aircraft under joint development with Deutsche Aerospace. This would allow for the transfer of jet technology to de Havilland from its parent firms. ATR also expected de Havilland to become a subcontractor to the major aircraft manufacturers such as Boeing and Airbus. Employment at the Toronto plant would drop in the first few years, but pick up again as sales increased, new aircraft programs started, and subcontracts were received. ATR's initial proposal called for up to \$1 billion to be spent on R&D at de Havilland over 10 years, and the consortium was seeking substantial government support for the R&D effort and for restructuring. ATR was seeking \$500 million from the federal and provincial governments for R&D, plus hundreds of millions more for restructuring (Aviation Week and Space Technology, 15 April 1991a: 74; The Globe and Mail,

2 January 1991: B1, B2; The Globe and Mail, 5 February 1991: B1, B2; The Financial Post, 6 February 1991: 40; Flight International, 20-26 February 1991: 16; Flight International, 22-28 May 1991: 4).

Aerospatiale and Aeritalia did express a willingness to consider adding a Canadian partner to its takeover team, and one Canadian company that took a look at de Havilland was Bombardier. The Quebec-based transportation manufacturer was the owner of Canadair, and was viewed by many as the only company in Canada with a strategic interest in buying de Havilland. Bombardier was consistently circling around during the de Havilland episode, exhibiting different levels of public interest in the company. During the fall of 1990 and the spring of 1991, Bombardier held discussions with ATR about a possible role for itself in the takeover of de Havilland. It was considering joining up with ATR in a joint bid for the company. Bombardier's involvement in the de Havilland takeover would be a step towards the formation of a single national champion. As we have seen, Bombardier had links to Aerospatiale, a key member of the Airbus Industrie consortium, through a major contract that it had to supply the latter with subassemblies for Airbus aircraft. Robert Brown, president of Bombardier Aerospace, and a former Industry Canada official, knew of the past difficulties at de Havilland and was reluctant to get involved in a take over of the company. Bombardier was sceptical about the ATR Business Plan and it wanted to set up a joint board with ATR to run the company. In the end, an agreement could not reach with ATR, and Bombardier appeared to have dropped out of the picture by June of 1991. With Bombardier appearing to be uninterested, and Boeing

granting exclusive negotiating rights to ATR, the Ontario government believed that the only option available was to do a deal with ATR. The government set out, therefore, not to kill the deal, but to shape it so as to maximize the benefits for the Ontario and Canadian economies.

Despite the federal government's favourable attitude towards foreign investment, it was faced with a major challenge with this transaction due to the potential negative consequences of the investment on the future of de Havilland and the Canadian aerospace sector. Many believed, including union and some government officials, that the ATR takeover was not aimed at strengthening de Havilland, but rather was designed to take out a competitor. The federal government played an important role because it had the only mechanism available to stop the deal in the form of the foreign investment review process in the Investment Canada Act. In March of 1991, federal Minister of Industry, Science, and Technology, Benoit Bouchard, ruled out a federal government repurchase of de Havilland, but he did indicate a willingness to consider some form of financial assistance (The Financial Post, 8 March 1991: 1). In response to demands from the opposition Liberal Party and New Democratic Party for the federal government to block the deal, Prime Minister Mulroney reflected the government's open attitude towards foreign investment by refusing to take such action. He indicated that workers were not helped by attacks on foreign investment (The Globe and Mail, 11 April 1991: A1, A2). The federal government was also very concerned about the level of financial assistance requested by the Europeans. Some federal officials were against the idea of

providing subsidies and they were sceptical about the future of de Havilland. Their views were shaped by their experiences with de Havilland as a crown corporation and their relations with the company after it was acquired by Boeing. When Michael Wilson became Minister of Industry, Science and Technology in May 1991, the federal position shifted in more favourable direction. The new Minister, representing a Toronto constituency, was prepared to contribute to a solution, but he was concerned about the lack of strategy and wanted a more strategic view of the issue.

The consortium presented its business plan to Investment Canada in May 1991 (Flight International, 20-26 February 1991: 16; Flight International, 22-28 May 1991: 4). Investment Canada wanted the deal to proceed, but the Ontario government, aerospace officials at Industry Canada, and the CAW worked to convince Investment Canada that the deal was not beneficial to Canada and needed improvement. In line with its developing industrial policy strategy, the Ontario government began to look beyond jobs and to consider the issue from the perspective of strengthening the industry in Ontario through the development of the province's aerospace industry cluster. De Havilland was the key integrator in that cluster. They also wanted to position de Havilland to take advantage of what was perceived to be an upcoming global restructuring in the industry. In the end, Investment Canada was influenced to consider the deal in more strategic terms. Other industry stakeholders, such as suppliers, were also concerned about the impact of the Boeing-ATR deal on the Canadian content of de Havilland aircraft.

In late June, Investment Canada announced that it was not satisfied that the proposed takeover was of net benefit to Canada. As part of a more strategic approach, the federal government wanted an agreement that would see de Havilland become a competitive player in the international aircraft industry. Such a strategic approach emphasized a more appropriate fit with the new technoeconomic environment. An acceptable international alliance would have to strengthen the Canadian aerospace industry and include Canadians in a major role, offer a good prospect of de Havilland becoming a commercially viable company, maintain de Havilland's system integration capability and develop linkages to the high technology supplier base, and it would have to involve government assistance requests in line with standard government practice (on a project by project basis) (Investment Canada, 20 June 1991: 1). Investment Canada pointed out that international strategic alliances were becoming important in the aerospace industry, and de Havilland had not developed any such linkages. The company had a single product line and did no subcontract work. The proposal by ATR offered an opportunity of improvement in these areas, but issues such as the rationalization of the product line had to be addressed (Investment Canada, 20 June 1991a: 2; Aviation Week and Space Technology, 1 July 1991a: 29; Flight International, 5-11 June 1991: 6; Interavia, July 1991: 6). Clearly, both governments were not opposed to the ATR deal, they just wanted it reworked to bring more benefits to Ontario and Canada.

In June 1991, the European Commission launched an investigation into the proposed takeover to determine if it violated European Union competition rules and created a dominant player in the commuter and regional aircraft market (Globe and Mail, 13 June 1991: B1, B2.). Meanwhile, the ATR consortium started to search for a Canadian partner to overcome one of the government objections to the deal, which was the lack of a Canadian participation in the takeover. At this point Bombardier once again re-entered the picture. Negotiations involving Bombardier began with the encouragement of the Ontario and federal governments, but the talks went nowhere. Bombardier could not reach a deal with ATR on terms that were acceptable (Globe and Mail, 27 June 1991: B9; Flight International, 21 - 27 August 1991: 6). With Bombardier apparently out of the picture once again, and no other Canadian investor coming forward, the Ontario government announced in September that it was entering negotiations with ATR to become a partner in the takeover of de Havilland. The Province was willing to take up to a one-third equity stake in the company in order to provide a Canadian partner. A revised business plan also called for a reduction in government assistance, with the new assistance requested by Aerospatiale and Alenia totalling approximately \$300 million. The Ontario and federal governments agreed to split the assistance equally, and the Ontario government's share would be in addition to the amount of equity it invested (Ontario Ministry of Industry, Technology and Trade, 9 September 1991; The Globe and Mail, 10 September 1991: A1, A2; The Globe and Mail, 11 September 1991: B1, B4; Aviation Week and Space Technology, 16 September 1991: 26).

In the Fall of 1991, the European Union dealt a fatal blow to ATR's plans and to the strategy of the federal and provincial governments. By late September, it had become evident that the EU might block the deal on competition grounds, and both the federal and provincial governments lobbied hard to have the deal passed. Despite the Canadian lobby effort, the European Commission announced in October that it had blocked the takeover of de Havilland. It was the first time it had used its one-year-old merger review power to block a transaction. The Commission took such action because it believed that the takeover would have created a dominant force in the commuter and regional aircraft market that might have forced some existing competitors to withdraw and discouraged new entry. The Commission indicated that the merger would give the new firm 50% of the world market for commuter airplanes and 67% of the EU market. There was intense opposition to the proposed takeover from European commuter and regional aircraft manufacturers, especially Fokker and British Aerospace, and they lobbied hard to have the EU block the transaction. Both of these manufacturers believed that it was in their interest to have the deal blocked by the EU because a combined ATR/de Havilland group threatened their position in the industry. As we have seen, Fokker produced the 50-seat Fokker 50 that was a direct competitor of the Dash-8-300, and the company believed that a merged ATR/de Havilland group threatened the future of that aircraft. Although an uproar developed in France and Italy, the consortium members eventually withdrew their takeover bid. (Official Journal of the European Communities, 5 December 1991; Aviation Week and Space Technology, 7 October 1991: 73; Flight International, 2 - 8 October 1991: 6;

Flight International, 9 - 15 October 1991: 4-5; Flight International, 16 - 22 October 1991a: 6; Globe and Mail, 3 October 1991: A1, A2).

After the EU rejected the deal, both the Ontario and the federal governments began working on ways to revive the takeover. The Ontario government reiterated its pledge to do whatever was necessary to keep de Havilland operating. The Ontario government and ATR held negotiations in the fall of 1991 aimed at a new deal. ATR believed that one way to overcome the objections of the EU was to have a majority Canadian partner so that ATR would not actually control de Havilland. ATR, therefore, entered negotiations with the Ontario government aimed at having the latter assume control of the company. The new plan foresaw the Ontario government taking a controlling two-thirds interest, with ATR holding the remaining one-third. The new plan also called for a reduced level of government assistance and more firm commitments in other areas. A new turboprop aircraft was to be developed at de Havilland, the company's design capability was to be maintained, and a centre of excellence was to be established. As it became clear that prospects for the new plan at the EU were not good, ATR decided to abandon its planned acquisition of de Havilland (Aviation Week and Space Technology, 28 October 1991: 33; The Globe and Mail, 4 October 1991: B1, B2; The Financial Post, 28 October 1991: 6).

After ATR dropped its bid, separate negotiations started between the Ontario government and Aerospatiale, and Bombardier re-entered the picture.

Laurent Beaudoin, Chairman and Chief Executive Officer of Bombardier, wanted to further strengthen his company's activities in aerospace and this made de Havilland more attractive. Shortly after the EU decision, Boeing announced that it would lay off 1,250 workers at de Havilland and cut production in half. In late November, Aerospatiale dropped out of the negotiations, and that left Bombardier negotiating mainly with the Ontario government and Boeing. At this point, Bombardier thought that it was in a good position because the Europeans were out and Ontario was anxious to save the company. As part of any deal to takeover the company, Bombardier sought \$700 million from the provincial and federal governments over 5 years in order to cover losses, restructuring costs, and research and development needs (Flight International, 6-12 November 1991: 5; Aviation Week and Space Technology , 11 November 1991: 82; The Globe and Mail, 26 November 1991: B1, B6).

In late January 1992, the Ontario government and Bombardier announced their joint purchase of de Havilland. Under the deal, Bombardier paid \$51 million for a 51% stake in the company and the Ontario government paid \$49 million for a 49% stake. The money was invested in a new holding company, de Havilland Holdings Inc, which was owned the assets of de Havilland Inc. Bombardier had the right to buy out the Ontario government after 4 years for \$49 million. Boeing received \$70 million in cash for de Havilland and the new owners assumed \$190 million in debt. As part of the deal, the federal and Ontario governments committed to up to \$570 million in public funding over a five-year period. There was a commitment of up to \$370 million for restructuring costs, and that included

\$200 million in shareholder loans from the provincial government over the first 3 years and \$170 million from the federal government. In addition, the federal government committed \$60 million in DIPP funding over the first three years and \$40 million for the fourth and fifth years, and the provincial government matched the DIPP funding. Some of the federal and provincial aid was repayable under certain conditions. The federal government also committed to extending its sales support for the Dash-8 for five years, with the provincial government sharing the costs. Bombardier made no commitments with respect to employment. The provincial government set up the Ontario Aerospace Corporation to manage the government's participation in de Havilland (Aviation Week and Space Technology, 27 January 1992: 42; Flight International, 29 January - 4 February 1992: 5; Globe and Mail, 23 January 1992: A1, A2; Globe and Mail, 23 January 1992a: B1, B20; Government of Ontario, 1997: 210-212; Bombardier Inc., 1993: 40).

The sale of de Havilland to Bombardier was significant for the Canadian aerospace industry because it brought together the two main airframe producers in the country under one umbrella. It allowed Bombardier to meet the market's needs with a full line of commuter and regional aircraft encompassing both regional jets and turboprops. The move allowed Bombardier to spread its management costs over the two product lines, reduce parts procurement costs, and subcontract work within the aerospace group that also included Short Brothers and Learjet. For example, in 1992 Bombardier formed the Bombardier Regional Aircraft Division that combined the marketing, sales, contracting, and

customer support activities for both the Canadair RJ and the de Havilland Dash-8 under one roof. The two companies had never had a close relationship, but working together under Bombardier they formed a fully integrated manufacturer that would benefit the entire Canadian aerospace industry. Governments had for years thought about such an integrated industry, but they were unable to bring it about. With the joining of Canadair and de Havilland, Canada now had its “national champion” firm in the commuter and regional aircraft sector (The Globe and Mail, 24 January 1992: B1, B6; Hotson, 1999: 318-327; Alastair and Hugland, 1995: 108-110; Interavia, March 1992: 23-25; Commuter World, February -March 1992: 33-34).

Bombardier’s success in the industry would depend in part on its ability to adapt to the new techno-economic paradigm. The keys to its success were product innovation, process innovation, and, as we shall see, increased internationalization through risk-sharing partnerships. Between 1986 and 2000, the company would launch three versions of the regional jet, one version of the Dash-8 turboprop, and several new business jets. It adopted an approach to production known as the Bombardier Manufacturing System, which was originally developed in the company’s transit business, to its aerospace activities. The new manufacturing system revolutionized the production process by, for example, reworking the engineering process by bringing design and engineering together, simplifying work tasks, and adopting just-in-time inventory techniques. The approach was destined to reduce the learning curve, increase efficiency, and reduce aircraft manufacturing times, and the benefits from the system were

substantial. For example, the company managed to reduce manufacturing time for the regional jet from 165 days in 1991 to 50 days in 1995. Between 1990 and 1995, the company's aerospace revenues tripled, but its workforce only grew by 600 and its manufacturing floor space declined by 35 percent (MacDonald, 2001: 74-75, 156-157; Flight International, 9-15 August 1995: 30, 31; Aviation Week and Space Technology, 4 December 2000a, 58-61). Bombardier's performance would lead it up the aerospace industry ladder.

In the 1990s, the Conservative government continued with its policy of awarding defence contracts to support Bombardier. In the early 1990s, the Canadian government was looking for ways to reduce costs in the Canadian military, and one area that became the focus for cost reduction efforts was military flight training. In 1991, the Canadian government awarded a contract for pilot training for the Canadian Armed Forces to a consortium led by Bombardier²⁹. The training involved primary fixed wing, basic rotary-wing, and multi-engined fixed-wing training (Flight International, 9-15 October 1991a: 8). The government also awarded a controversial defence contract to Canadair just before the constitutional referendum in Quebec in the fall of 1992. The government had purchased three A310 passenger aircraft from a financially troubled Canadian Airlines International, at the time Canada's second major airline. It planned to convert these aircraft, and two others, to cargo configuration for use by the Canadian military, and the value of the conversion contract was \$70 to \$ 80 million. A contract to maintain the aircraft was also on

offer, and it had a value of \$24 million over 30 months. Canadian Airlines expected to get both contracts, and the conversion contract was seen as crucial to the future of the company's Calgary maintenance base. In the end, the government awarded the conversion contract to Canadair and the maintenance contract to Canadian Airlines. The government awarded the more lucrative contract to Canadair because of its manufacturing expertise and its association with the Airbus consortium that manufactured the aircraft³⁰. With slightly more than a month before a constitutional referendum in Quebec, workers at Canadian Airlines and politicians in Western Canada claimed that the government awarded the contract to Canadair to carry favour with Quebec (The Globe and Mail, 17 September 1992: B17; The Globe and Mail, 18 September 1992: B5).

In 1993, a new Liberal government under Prime Minister Jean Chretien assumed office. The Liberals came into power with a plan for economic renewal that focused on small and medium sized businesses, regional economies, and local communities. The Liberals recognized need for greater innovation and adjustment in the new knowledge-based economy, and they believed that the federal government had an important role to play in the economy. It had the responsibility for the overall economic framework, working in cooperation with other levels of government and other economic players. In this regard, specific federal initiatives would be undertaken in the areas of capital availability, the development of small business, research and development, infrastructure, trade,

²⁹ Other members of the consortium included Frontec Logistics, Field Aviation, Versa Services, Victoria Flying Club, Thompson-Hickling, Atlantis Aerospace, and Southport Aerospace (Flight International, 9-15 October 1991: 8).

³⁰ Canadair was a subcontractor to the European consortium.

regulation, and the manufacturing and natural resource sectors. It also had the responsibility to foster strong regional economies as the basis for economic renewal. Here, the government would work to foster the entrepreneurial spirit of small and medium sized business and take action using cooperation and networking. There was a need to revitalize the manufacturing, resource, and service sectors of the economy, and encourage the adoption and diffusion of new ideas and technology (Paquet and Roy, 1995: 137-142; Wolfe, 2002: 138-139).

On taking office, the new government launched another institutional reorganization of its key industrial policy ministry and in the process created Industry Canada (IC). Industry Canada was formed out of the old Industry, Science and Technology Canada (ISTC), and it also incorporated responsibilities over consumer affairs, competition policy, business framework laws, foreign investment policy, and telecommunications policy and research from other departments. The new department was designed to encourage business development, efficient markets, and competitiveness. The department would use the policy tools available in an integrated fashion, provide strategic information to business, improve access on the part of business to government, reduce internal barriers to trade, and strategically manage the government's science and technology spending (Doern, 1996: 74-76). Industry Canada inherited the responsibility for aircraft industry support and DIPP from ISTC.

The government's efforts to come to terms with its growing deficit in the mid-1990s had a major impact on the industrial policy path in aircraft industry. In

the summer of 1994, with the Canadian federal government deficit reaching over \$40 billion, the government launched a government-wide Program Review process designed to reduce expenditures and eliminate the deficit. The Review would have major implications for industrial policy and the aerospace sector. The outcome of the Review for Industry Canada was a 50% cut in spending and a 20% drop in the department's workforce. The Department's focus would henceforth be on micro-economic policy, marketplace rules and services, and industry sector development. The government was determined to eliminate subsidies to business, and its flagship program for the aerospace and defence industry, the Defence Industry Productivity Program (DIPP), was set to be drastically reduced and then terminated under the budget plan (Doern, 1996: 80-92). At a time of major government downsizing, DIPP was vulnerable because the efficiency of the program was questionable due to the low repayment rate and the difficulty in showing a return on the government's investment. Many believed that the issue was a Montreal rather than Quebec issue, with the average voter not understanding the importance of the aerospace industry.

The government's decision to terminate DIPP came at an important time for the industry. As we shall see, Bombardier was contemplating the launch of several new additions to its commuter and regional aircraft family, and government support would play an important role in those plans. The industry, led by the Aerospace Industries Association of Canada and individual aerospace firms, launched an intensive lobbying campaign to reinstate funding to the sector. For example, engine-maker Pratt and Whitney Canada, a subsidiary of U.S.

based United Technologies, threatened to move its engine R&D outside Canada unless the government reinstated some form of aerospace industry funding. With Montreal being one of the two major aerospace centres in Canada, the government was also under pressure not to cut industry funding on eve of the Quebec referendum on sovereignty (The Globe and Mail, 13 June 1995: B1, B4).

With widespread pressure from the industry to change its position, the government responded with the establishment of Technology Partnerships Canada (TPC), a broader high technology investment program. TPC was a \$250 million annual investment fund that was designed to encourage research and development of technology in Canada. The program was designed to help close the gap in innovation that was evident between Canada and its international competitors. Without such support, the Canadian aerospace industry would be at a major competitive disadvantage, raising questions about the sustainability of the industry. In order to sell the new program, industry coverage was broadened. Industries such as aerospace and automobiles were considered “old school”, and the program was expanded to include “new school” industries such as environmental technologies and biotechnology. Therefore, unlike the DIPP, which was limited to aerospace and defence, the new TPC program would cover aerospace and defence, environmental technologies, and strategic enabling technologies, such as bio-technology, that have a wider impact on many industries. Funding provided under the program would be fully repayable, with the government sharing in the risks and rewards with industry. Two thirds of the funding went to the aerospace and defence sector, with one-third going to other

sectors. One major aim of TPC was to provide a level playing field for Canadian industry that often had to compete with foreign technology developed with government support (Industry Canada, 11 March 1996; Flight International, 13 - 19 March 1996: 6).

The government's move to reinstate financial support for the aircraft industry reflected the increasing significance and success of the industry. The aircraft industry in Canada was an important industry in terms of production, employment, R&D expenditure, and trade. Between 1978 and 1996, average annual production in the industry was \$4.2 billion per year. During that same period, an average of 38,000 people were employed in the industry, exports averaged \$2.7 billion per year, and imports averaged \$ 2.7 billion. Industry production reached its peak in 1996 at \$8.5 billion, which was the equivalent of 2 percent of total industrial production. Industry employment reached its peak in 1990 and 1996 when 46,000 people were employed in aircraft production, with the latter representing 2.6 percent of total manufacturing employment (Organization for Economic Cooperation and Development, 1999: 70-83)³¹. Between 1987 and 1997, business enterprise expenditure on research and development in the aerospace sector averaged \$ 677 million per year. The peak years occurred in 1997 and 1998 when \$953 million and \$970 million were spent on R&D, and this was equivalent to 17% of total manufacturing business

³¹ OECD estimates.

enterprise expenditure on R&D (Organization for Economic Cooperation and Development, 2000: 60-61)³².

The establishment of Technology Partnerships Canada was important for Bombardier because it was considering new aircraft projects. With the 50-seat CRJ establishing itself in the market in the early 1990s, Bombardier began to focus on the development of new derivatives for both of its two Canadian aircraft operations. The focus was on a larger version of the Dash-8, the 70-seat Dash-8-400, at de Havilland, and a larger version of the CRJ, the 70-seat CRJ-700, at Canadair. In June 1995, Bombardier launched the first of the two projects, the stretched Dash-8. The project had an estimated cost of Cdn \$600 million, with Bombardier funding \$400 million directly and risk sharing partners funding \$200 million. The Canadian government, through its Technology Partnerships Canada program, provided a \$57 million investment to help fund the project that was repayable based on a royalty on aircraft sales. The government investment was designed to promote high technology employment, stimulate aerospace exports, and help push Canada up the ladder of aerospace producing countries³³. In line with Bombardier's desire to internationalize its aircraft programs and spread the risks, the Dash-8-400 program expanded on the use of international risk-sharing partners³⁴. For example, Mitsubishi Heavy Industries of Japan was a risk-

³² OECD estimates.

³³ The government wanted to help move Canada from sixth place in terms of aerospace production and sales to fourth place by the year 2000 (Technology partnerships Canada, 17 December 1996: 1)

³⁴ Risk sharing partners included Menasco Aerospace of Canada for the landing gear, Parker Hannifin of the US for the fuel system, Abex of the US for hydraulics, and Microtecnica of Italy for the flap system (Aviation Week and Space Technology, 15 December 1997: 42).

sharing partner helping to design and produce the fuselage and tail section of the aircraft³⁵.

In October 1996, the Canadian government announced an investment of \$87 million in the CRJ-700 project through the Technology Partnerships Canada program. The investment, repayable through a royalty on aircraft sales, was designed to promote high technology employment and show the government's support and confidence in the new aircraft. In late January 1997, Bombardier formally launched the \$ 645 million program, with Bombardier funding \$440 million, including the government loan, and international risk-sharing partners funding \$205 million³⁶. Like the Dash-8-400, the new regional jet program made expanded use of international risk-sharing partners³⁷. For example, Mitsubishi of Japan supplied fuselage sections and Rockwell-Collins of the USA provided the avionics system. The aircraft had its first flight in May 1999³⁸.

With the launch of both the Dash-8-400 and the CRJ-700, the government took the opportunity to use Technology Partnerships Canada to invest in the aircraft industry supplier base. For example, the government provided an investment of \$100 million to Pratt and Whitney Canada of Longueuil, Quebec

³⁵ Paragraph based on Flight International, 16-22 September 1992: 26; 14 - 20 September 1994a: 22; Flight International, 22-28 March 1995a: 6.; Technology Partnerships Canada, 17 December 1996,: 1; Aviation Week and Space Technology, 19 June 1995: 32-33; Flight International, 14 - 20 June 1995: 11; Flight International, 21 - 27 June 1995: 22; Aviation Week and Space Technology, 30 October 1995: 46; Aviation week and Space technology, 15 December 1997: 38-42; Aviation Week and Space Technology, 9 February 1998: 17.

³⁶ Risk sharing partners included Rockwell-Collins for the avionics, Leibherr for the air management system, Sundstrand for the electrical generation and flap systems, Intertechnique for the fuel system, and Menasco for the landing gear (Flight International, 26 February - 4 March 1997c: 10)

³⁸ Paragraph based on: Flight International, 4 - 10 September 1996: 15; Technology Partnerships Canada, 21 October 1996; Flight International, 30 October - 5 November 1996: 20; Flight International, 29 January - 4 February 1997: 9; Flight International, 26 February - 4 March 1997c: 10; Aviation Week and Space Technology, 7 June 1999a: 24-25; Flight International, 9-15 June 1999b: 157-161.

for work on the PW 150 engine that would power the Dash-8-400. The funding was design to support jobs in Montreal and Halifax, promote competitiveness, and exports (Technology Partnerships Canada, 10 January 1997: 1). The government also provided an investment of \$4.4 million in Avcorp Industries Inc. of Richmond, British Columbia to allow the company to design and manufacture the tail components for the CRJ-700 (Technology Partnerships Canada, 13 November 1997: 1). Technology Partnerships Canada was also used to support the establishment of a Canadian subsidiary of the French avionics and systems supplier Sextant Avionique. Sextant Avionique Canada received an investment of \$9.9 million for the development of the avionics system for the Dash-8-400, the flight control system for the CRJ-700, and the heads up display for the Canadair Global Express business jet. The new subsidiary would have a world product mandate for regional and business jet avionics, and it would add a new capability to Canadian industry in the form of a full integrator of avionics (Technology Partnerships Canada, 6 March 1998: 1).

As the government's financial picture improved and concern grew about the importance of research and development, innovation, and technology, the government started to increase its funding in the science and technology area. In each budget between 1997 and 2000, the government increased its science and technology program funding. In the 1999 budget, it increased its funding for TPC (Wolfe, 2002: 143 - 144). The increase in TPC funding came after a major lobbying effort on the part of the aerospace industry for more funds. The industry, once again led by the Aerospace Industries Association of Canada,

argued that the fund was not large enough to meet its needs, and a lack of funding could direct projects to foreign countries where more assistance was available. Pratt and Whitney Canada was again particularly vocal and threatened to move projects and jobs abroad if more funding was not made available (The Financial Post, 6 June 1997: 8; The Globe and Mail, 5 June 1997: B3; The Globe and Mail, 3 November 1998: B5).

In September 1998, Bombardier announced a plan to develop a new regional jet family at a total cost of \$ 1 billion. The all new 90 seat aircraft, known as the BRJ-X, was designed to meet the competitive challenge posed by the new 70 to 100 seat regional jet families announced by Embraer (ERJ 170, ERJ 190) and Fairchild-Dornier (728Jet, 928Jet). Bombardier started the pre-launch phase, which would examine market requirements and look at a conceptual definition of the aircraft (Aviation Week and Space Technology, 14 September 1998: 27-28; Flight International, 16 - 22 September 1998a: 6; Flight International, 16 - 22 December 1998b: 12; Flight International, 24 - 30 March 1999a: 10). The strategy changed in October 1999, when Bombardier announced its intention to develop a 90-seat version of the CRJ. The aircraft, known as the CRJ-900, would be a stretch of the 70-seat CRJ-700 and would cost approximately Cdn \$200 million to develop with the same risk-sharing partners. Deliveries of the aircraft would begin in 2002, two years before the all-new competitive aircraft from Embraer and Fairchild-Dornier would be available. The BRJ-X was being refocused around a 100 to 110-seat aircraft family, and launch of the CRJ-900 would likely delay the BRJ-X program. In September

2000, Bombardier announced that it was placing its BRJ-X project on hold because of uncertainties over market demand for the aircraft. The larger 100 to 110 seat aircraft would also push into the market territory of the large aircraft manufacturers, Airbus and Boeing, and this also created uncertainties for the project³⁹.

In January 1997, Bombardier exercised its option to buy the Ontario government's share of de Havilland. A new Conservative government in Ontario, that was averse to the idea of industrial policy, sought to reduce the role of the provincial government in the economy, and was happy to withdraw from an ownership role in de Havilland. The Ontario government originally wanted to renegotiate the deal or extend the agreement as it felt that its share of de Havilland was worth more than the \$49 million originally invested. Bombardier argued that the price was fair because it had invested heavily in the company, boosted employment and production, and brought in work from other aerospace divisions of the organization. In the end, the Ontario government settled for \$49 million, and Bombardier would pay the \$49 million over 15 years with lump sum payments of \$4.9 million per year plus interest for 10 years beginning in year six (Aviation Week and Space Technology, 20 - 26 November 1996: 24; The Globe and Mail, 29 January 1997: B1; Government of Ontario, 1997: 2-10).

³⁹ Paragraph based on Flight International, 6 - 12 October 1999b: 7; Aviation Week and Space Technology, 25 October 1999: 31; Flight International, 27 October - 2 November 1999: 13; Flight International, 27 October - 2 November 1999: 13; Flight International, 7-13 March 2000: 10; Flight International, 9 - 15 May 2000b: 16; Flight International, 25 - 31 July 2000: 9; Flight International, 19 - 25 September 2000a: 5; Aviation Week and Space Technology, 4 December 2000: 48; Flight International, 27 February - 5 March 2001: 8.

The federal Liberal government continued the previous federal Conservative government's policy of using defence contracts to help build up the capabilities of the national champion. In November 1997, the Canadian government awarded a controversial non-tendered contract to Canadair for the NATO Flying Training in Canada (NFTC) program. The joint industry-government program was aimed at providing cost-effective flight training services to Canadian, NATO, and other air forces. The 20-year \$2.8 billion contract was awarded to Bombardier's Defence Systems Division (at Canadair), and Canadair, and its industry team⁴⁰, would provide the aircraft, aircraft maintenance, training materials, flight simulators, and airfield support for the program. Instructors would come from the Canadian Air Force and other air forces. The program was designed to create jobs, keep a underutilized military base open, demonstrate the capabilities of the Canadian aerospace industry, and make a contribution to NATO. The non-tendered contract was issued because the Bombardier industry team had won the previous Canadian Forces flight training contract, the Bombardier team was the only one that had an interest in the program, and the time constraints caused by the deadline imposed by NATO for training proposals. The government believed that concern about a competing US program, and comparisons between domestic flight training costs and NFTC costs, would force Bombardier to keep costs down (Department of National Defence, 4 November 1997; Aviation Week and Space Technology, 27 May 1996: 56; Auditor General of Canada, 1999: 27-15 - 27-17). The NFTC program became tied up in Canada-Brazil dispute over regional aircraft when

⁴⁰ The team consisted of Frontec Corporation of Edmonton, CAE Aviation of Edmonton, and CAE Electronics of Montreal

Bombardier changed its mind about the turboprop trainer it was going to utilize in the program. It decided to acquire a trainer from Raytheon of the U.S. instead of the originally selected Embraer Super Tucano. The Canadian government indicated that the decision was not influenced by the trade dispute with Brazil. It was a commercial decision made by Bombardier, and it reflected Bombardier's concern about the ability of Embraer to deliver its aircraft and Embraer's desire to share in the financial risks. Brazil claimed that Canada's actions were discriminatory and it threatened retaliation (Flight International, 7 - 13 January 1998: 5; The Globe and Mail, 24 December 1997: B3).

In 1995, the federal government provided further assistance to Bombardier by expanding the mandate of the Export Development Corporation (EDC) to allow it to enter into joint ventures with Canadian firms to promote sales and exports. Such ventures would expand EDC's role from the provision of loan guarantees and export insurance, and involve EDC in equity financing. It would also allow EDC to get involved in sales to domestic customers. The first joint venture would be with Bombardier to assist with sales of the Canadair Regional Jet. A new joint venture, known as CRJ Capital, was formed to purchase up to 30% of each new regional jet, with the remainder of the financing coming from the private sector. CRJ Capital leased the aircraft to the airlines. The first CRJ order to utilize the new joint venture was an order for 25 CRJ's from Air Canada. The government agreed to directly guarantee 20% of the value of the first 5 aircraft because the new joint venture was not established in time to finance

(Department of National Defence, 4 November 1997),

those aircraft (The Globe and Mail, 5 April 1995: B4; The Financial Post, 5 April 1995: 3).

The government's efforts to support its national champion, Bombardier, also extended into the realm of safety regulation. In June 1999, it was revealed that the Department of Transport had issued an air safety certification type certificate to de Havilland for its new Dash-8-400 before the aircraft had completed its airworthiness inspection. It was the first time a certificate had been issued before the inspection process had been completed. The certificate was issued to allow Bombardier to present the aircraft as Canadian certified at the Paris Air Show, as the company was under pressure in part because its Brazilian rival, Embraer, was unveiling a new aircraft at the show⁴¹ (The National Post, 25 June 1999: A1, A7). It was later revealed that the government was shortening the aircraft certification process due to pressure from Bombardier and the Canadian aerospace industry. The Department of Transport agreed to delegate more of the responsibility for aircraft certification to industry. Normally, it takes about 5 years to certify a new aircraft, and the Department was working to cut this down substantially, with Bombardier lobbying to get it down to 40 months. The move was designed to improve industry competitiveness by allowing for more rapid delivery of aircraft to market. The US Federal Aviation Administration was critical of the move. (The Globe and Mail, 10 May 2000a: A1, A7; The Globe and Mail, 11 May 2000a: A1, A6; The Globe and Mail, 12 May 2000a: B6).

Bombardier's rapid sales expansion in international markets, especially in the U.S. market, brought it into head to head competition with the Brazilian national champion Embraer. As we saw in the previous chapter, the competitive struggle led to accusations of unfair trade practices. Just as Canada accused the Brazilian government of providing subsidies to Embraer, the Brazilians accused the Canadian government of providing subsidies to Bombardier. Brazil indicated that the Canadian government provided subsidies to Bombardier through the financing activities of the Export Development Corporation (EDC), the Defence Industry Productivity Program, Technology Partnerships Canada, and through Canada-Quebec Industrial Agreements.

At the same time, in 1998, that the Canadian government brought its case against Brazil to the World Trade Organization (WTO), the Brazilian government brought a case before the WTO alleging Canadian government subsidies to Bombardier. Brazil asked the WTO to rule on whether certain government financial assistance provided to Bombardier were prohibited export subsidies. The assistance identified by Brazil included financing and loan guarantees provided by EDC, EDC Canada Account financing for the regional aircraft sector, funding provided by Technology Partnerships Canada and its predecessors, the sale of de Havilland to Bombardier by the Ontario government at less than commercial terms, assistance provided under the Canada-Quebec Subsidiary Agreement on Industrial Development, and assistance provided by the Quebec government through Societe de Developpement Industrial du Quebec (World

⁴¹ The certificate was on June 13, 1999, the day before the Dash-8-400 was unveiled by the Minister of Transport and the

Trade Organization, 14 April 1999a: 2-3). The federal government was forced to defend its national champion and the support that it provided to that champion.

In April 1999, the WTO ruled on the Canadian case and found that certain of the financing activities cited by Brazil were prohibited export subsidies. The Panel ruled that EDC Canada Account financing was a prohibited export subsidy because it could offer below market interest rates and the financing was contingent in law on export performance (World Trade Organization, 14 April 1999a: 195-198). The Panel also ruled that Technology Partnerships Canada (TPC) provided contributions to the regional aircraft sector at less than commercial terms, and it funded near-to-market projects that offered high probability for exports ⁴² (World Trade Organization, 14 April 1999a: 195-198). The WTO panel had put the legality of Canada's flagship program for the aerospace sector in doubt. The panel rejected Brazil's other claims and it asked Canada to remove the subsidies within 90 days. (World Trade Organization, 14 April 1999a: 227-228). Trade policy was, therefore, set to play a role in the direction of government policy in the sector.

Faced with a WTO ruling against Canada Account financing and Technology Partnerships Canada, and anxious to maintain its support for the

President of Bombardier Aerospace at the Paris Air Show (The National Post, 25 June 1999: A1).

⁴² The WTO looked at 5 Technology Partnerships Canada projects in the regional aircraft sector: the 1996 contribution of \$87 million to Bombardier for the CRJ-700, the 1996 contribution to de Havilland for the Dash-8-400, the 1996 \$100 million contribution to Pratt and Whitney Canada for the engine on the Dash-8-400, a portion of the 1997 \$12.7 million contribution to Allied Signal for the development of the power management generating system for the Dash-8-400, and the 1998 \$9.9 million contribution to Sextant for the development of avionics systems for the Dash-8-400 and a flight control system for the CRJ (World Trade Organization, 14 April 1999a: 209-215).

aircraft industry, the government was forced to restructure both programmes. Industry Canada held talks with the Canadian aerospace industry about the appropriate way to restructure Technology Partnerships Canada so that it would conform to WTO trade rules (Flight International, 18-24 August 1999a: 14). In November 1999, the government announced the measures it was taking to bring both programmes in line with WTO rules. A new policy guideline was issued for the Canada Account program so that all future transactions in all sectors would conform to the disciplines contained in the OECD Arrangement on Guidelines for Officially Supported Export Credits. Major changes were also undertaken at Technology Partnerships Canada (TPC). The objectives of the program were changed so that export performance was not an objective, and the new focus was on the promotion of technological innovation and capability as opposed to commercialization. Eligible activities were redefined to focus on early stage and collaborative R&D and investment in horizontal generic technologies, rather than product specific technologies. The project assessment criteria were revamped to focus more on the technological competitiveness of the firm rather than commercial viability of the product. The government would continue to share in the risk and rewards of a project, but the repayments would no longer be tied to sales as they would take different forms for different projects. Public reporting on the program was also improved. The government terminated and renegotiated all outstanding funding committed under the old program (Department of Foreign Affairs and International Trade, 18 November 1999; The Globe and Mail, 19 November 1999: B6; Technology Partnerships Canada, 2000: 9). By forcing a reform of both the use of the Canada Account for export financing and

Technology Partnerships Canada, the WTO trade rules worked in favour of a less interventionist approach to the sector.

In late November, Brazil notified the WTO that it would request a panel to examine Canada's compliance with the WTO ruling to remove its prohibited export subsidies. Brazil indicated that it did not believe that the measures announced by Canada were sufficient to comply with the previous WTO ruling. A Panel, which reported in May 2000, ruled that the measures taken by Canada with respect to the Canada Account were inadequate and, therefore, Canada did not comply with the recommendation to remove its prohibited export subsidies. The Panel found that the substance of the new Canada Account policy guidelines was not precise enough to ensure that transactions in the regional aircraft sector under the account would comply with the provisions of the OECD Arrangement. With respect to Technology Partnerships Canada, the WTO panel found that the changes to the program were sufficient and, therefore, Canada had implemented the recommendation to remove the prohibited subsidies (World Trade Organization, 9 May 2000a: 42-43).

As the sales campaign heated up between the two manufacturers, the Canadian government sought to protect the position of its national champion against what it perceived to be Brazil's continued use of subsidized export assistance, even after the WTO had ruled it be withdrawn. In early 2001, Bombardier approached the government for assistance in the sale of up to 150 regional jets to Air Wisconsin. The call for assistance was in response to alleged

Brazilian offer of subsidized loans to win the deal for Embraer. On January 10, 2001, the government announced its willingness to match the financing terms that Brazil was using to support Embraer regional jet sales. The move was justified by pointing to the jobs at risk in the industry from Brazil's activities, and the fact that Brazil had not yet complied with the WTO ruling to remove its subsidized financing under ProEx. In response to the announcement, Brazil threatened to retaliate. In late April, Air Wisconsin awarded the \$2.35 billion contract for 75 regional jets and 75 options to Bombardier, and the deal involved up to \$1.7 billion in EDC financing (The Globe and Mail, 9 January 2001: B1, B9; Industry Canada, 10 January 2001; The Globe and Mail, 11 January 2001: A1, A6; The Globe and Mail, 11 January 2001b: B15; The Globe and Mail, 12 January 2001: B1, B10; The Globe and Mail, 29 January 2001: B6; Flight International, 24-30 April 2001: 7).

Shortly after the government announced its intention to offer export financing support to Bombardier, Brazil requested that a WTO panel be convened to examine subsidies offered by the Canadian government to Bombardier. Brazil requested that the WTO investigate the continued use of Canada Account financing for regional jets. It also wanted an examination of the financing offered to Air Wisconsin, the use of export credits by the EDC, and the use of export credits and guarantees provided by Investissement Quebec. Brazil indicated that Canada continued to offer prohibited export subsidies to Bombardier (World Trade Organization, 28 January 2002: 2-3)

In May 2001, Bombardier once again approached the Canadian government for assistance with a sale to a US regional carrier. This time the deal involved Northwest Airlines, an airline that had previously purchased 54 regional jets from Bombardier, and the deal involved the purchase of up to 60 to 75 jets worth as much as \$ 2.3 billion. The request for assistance was made, once again, because of alleged offers of subsidized loans by Brazil to support the sale of Embraer regional jets to the airline. Despite concerns about public reaction, especially from Western farmers that were facing their own difficulties and who were requesting their own aid package, the government appeared to support giving more assistance to Bombardier. In early July, the government announced its intention to once again match the Brazilian financing being offered to a US carrier. The Canada Account loan would be valued at up to US \$1.2 billion for the 75 aircraft on order⁴³, with similar financing for the options. Once again, the measure was justified by the need to protect jobs and react to Brazil's continuing subsidies. On July 10, Northwest announced that it had awarded a contract to Bombardier for 75 regional jets with options on 175 more aircraft. The value of the deal was \$2.6 billion for the firm 75 jet order, but up to \$8.5 billion if the 175 options were exercised. It was estimated that the government loan would save Northwest \$350 million over the life of the deal. (The Globe and Mail, 25 May 2001: B3; The Globe and Mail, 26 May 2001: B1, B4; The Globe and Mail, 29 May 2001: B1, B8; Department of Foreign Affairs and International Trade, 9 July 2001; The Globe and Mail, 10 July 2001: B1, B9; The Globe and

⁴³ The loan was to be at the OECD Reference Rate for a period of 15 years (The Government of Canada, 9 July 2001).

Mail, 11 July 2001: B3; Flight International, 29 May - 4 June 2001: 10; Aviation Week and Space Technology, 16 July 2001: 58).

In January 2002, the WTO ruled on the Brazilian complaint lodged after the Canadian government announced financing for the Air Wisconsin sale. The WTO Panel found that two Canada Account financings for regional aircraft sales were prohibited export subsidies. Those sales were to Air Nostrum, a Spanish regional carrier, in 1998 and Air Wisconsin in 2001. Both transactions involved financing at below market rates. The Panel also found that certain transactions from the EDC's regular corporate account were prohibited export subsidies. These transactions involved Comair, a U.S - based regional, and took place between 1996 and 1999. Again, these transactions were found to be based on below market interest rates. The WTO ruled that Canada should withdraw the prohibited export subsidies within 90 days (World Trade Organization, 28 January 2002: 35-46, 55-73, 92-93).

The trade dispute between Canada and Brazil began in 1995, and the length of the dispute reflected in part the Canadian government's determination to support Bombardier, the national champion in which the government had made substantial investments. By the late 1990s, these investments began to bear fruit as Bombardier had become a leader in the civil aircraft industry. Aerospace sales at Bombardier rose from \$ 623.9 million in 1988, the first full year after the purchase of Canadair, to \$6.4 billion in 1999 (Bombardier Inc., 1988, pp. 38-39; Bombardier Inc, 1999: 38-39). Income before income taxes

rose from \$ 40.6 million in 1988 to \$681.9 million in 1999 (Bombardier Inc, 1988: 38-39; Bombardier Inc, 1999, p. 38-39). After entering the industry in 1986, Bombardier achieved spectacular success. By 2001, Bombardier had become the world's largest manufacturer of regional aircraft, the third largest civil aircraft manufacturer in the world, and the tenth largest aerospace company in the world (Flight International, 21-27 August 2001a: 45, 54). This breathtaking rise in the aircraft industry provided a solid reason for the government to continue its support for its national champion. The payoff was clear.

Reflections on the Canadian Case

Throughout the post war period, the Canadian government supported the development of a presence in the aircraft industry. The government's post-war policy towards the industry in many ways reflected the country's "firm centred industry culture". It did not take a direct hand in running the industry and allowed the companies to manage their own affairs. The government supported the industry because it had an interest in developing high technology sectors, as well as the related employment and export benefits. The major forms of industry support were Department of National Defence funding for research and new product development, government procurement of aircraft, and civilian support for industry research and development through the DIPP program. A sectoral system of innovation would eventually develop to support industry growth, and it included the aircraft firms, its supplier base, the Department of Defence, and Industry Canada. Reflecting its support for an open international economy, the

government was also willing to allow continued foreign ownership in the industry and it negotiated more open access to the U.S. defence market. The two Canadian aircraft firms had an interest in continued government support because they needed assistance with new product development. The industry's interest in an expanded market for increased sales led to support for the government's effort to gain more assured access to the U.S. market.

The 1970s marked a turning point for the Canadian industry. The end of the Vietnam War led to a decline in the defence market, which up to that time had been the main market for Canada's two major aircraft firms. Both the government and the industry sensed that change was needed if the Canadian industry was to survive and prosper. This recognition occurred at the same time that the economy was beginning to experience difficulties after the first oil shock. It was a time when "interventionist" ideas were becoming somewhat more evident in Canadian industrial policy.

Both the government and the industry perceived a need to shift to civil markets as the military market declined in importance. This was seen by both government and industry as essential to the survival of the sector. The aim was to enter the regional and commuter aircraft and business jet segments of the industry. The government was intent on supporting the transition to more civil production through both support for new product developments, such as the Dash-7 and the Challenger, and support on the demand side, for example, the STOL demonstration project. Both the government and the industry faced

resistance to this strategic shift from the foreign owners of Canadair and de Havilland, however, and the foreign parents were unwilling to support the development of the new products. In the case of de Havilland, there was outright resistance due to the fact that the British parent's interest lay in developing its own competitive aircraft. In order to guarantee a future for the industry, and break it free from the foreign control that was limiting its development, the government had to abandon its hands off approach to industry development and obtain direct control over the two aircraft firms.

This was also a period of institutional change as the two firms were moved from the private to the public sector. While the government expected its ownership to be only temporary, reflecting its deep-seated preference for firm-centred adjustment, it in fact owned both companies for 10 years. Despite government control over the two aircraft firms, it did not force a merger between the firms to create a single national champion. The shift towards a more civil industry orientation was expensive, and the recession of the early 1980s created problems for the transition. The industry was faced with a severe financial crisis that threatened the future of both firms and, in order to preserve the industry, the government was forced to recapitalize the two firms. In the case of Canadair, it was also forced to undertake a major company restructuring.

Just as the restructuring was nearing completion in 1984, a new Conservative government was elected that adhered to more neo-liberal ideas and policy approaches that emphasized a reduced role for the state in the

economy and more emphasis on market forces. The new government felt that previous government interventions in the economy were counterproductive and created economic difficulties. This included intervention in the form of government ownership of firms in the aircraft industry. In line with its neo-liberal ideas, the government announced its intention to sell the two crown-owned aircraft firms. It was another period of institutional change as the firms were transferred from the public to the private sector. The government's open attitude towards foreign investment made internationalization and a foreign buyer acceptable. The government sold de Havilland to Boeing because it believed that a link-up with a major aircraft producer was necessary to bring stability and financing to the firm. Boeing seemed to have an interest in expanding its product line by adding smaller commuter aircraft to its portfolio and it also sought increased sales in the Canadian market. The government sold Canadair to Bombardier, a Quebec based manufacturer of transportation products. The purchase served Bombardier's interest in expanding into a new market.

Yet the government was not willing to withdraw entirely. As part of the sale process, it made commitments to provide financial assistance, and, in particular, it used military contracts, DIPP research and development assistance, and EDC financing to support the two firms. The federal government still had an interest in maintaining the industry due to its highly skilled employment and high technology exports. This was in-line with ideas on the importance of technology in prosperity and competitiveness. The two companies were also located in Ontario and Quebec, two politically important power bases for the government.

The later decision by Boeing to sell Ontario-based de Havilland brought the Ontario government, a social democratic government, into the picture.

The de Havilland sale posed a potential threat to the future of one of the two pillars of the aircraft manufacturing industry, and it presented both the federal and Ontario governments with a major challenge. Boeing's interest in de Havilland had declined as the company's competitive difficulties continued and as Boeing products failed to win major contracts at Air Canada and the Canadian government. Boeing had no commitment to the future of the company. The deal with ATR threatened to see de Havilland turned into a subcontractor for the European firms, and neither the governments nor de Havilland had an interest in such an outcome. The federal government's adherence to a non-interventionist philosophy prevented it from considering an ownership stake the company, but that did not stop it from contributing financial support to help save the company. The Ontario government, motivated by ideas that saw a more activist role for the state in industrial development, was initially focused on jobs and this was the driving force behind its commitment to keep the company operating. Ideas concerning the importance of indigenous firms to economic development and their crucial role in industry cluster development also had an influence on provincial thinking. The initial emphasis on jobs was driven in part by the close connections between the government and the Canadian Auto Workers Union, the main union at de Havilland. The union opposed the ATR takeover because it had an interest in maintaining the company as a full fledged aircraft manufacturer in order to maintain the good paying jobs of its union members. Both the union

and the government, therefore, wanted to maintain the company as a full-fledged aircraft manufacturer.

Both governments believed that there was no alternative to the ATR deal and they set out to shape the takeover so that it provided the maximum amount of benefit to the Ontario and Canadian economies. With intense public pressure and lobbying from the Ontario government and the CAW, and an increased desire on the part of the federal government for a more strategic consideration of the takeover, Investment Canada blocked the deal. The two governments did not want to kill the deal altogether, they just wanted to reshape the deal to protect de Havilland's position as a full-fledged designer and manufacturer of aircraft. This position was similar to that of the Dutch government when it was faced with DASA's takeover of Fokker, where the government tried to protect Fokker's position as a full-fledged aircraft manufacturer. Both the federal and the Ontario governments sought Canadian participation in the takeover to help protect the national interest. Bombardier had an interest in taking over the firm, but it would do so only on its own terms. With no Canadian private sector partner coming forward, the Ontario government came forward to invest in the company and help protect the position of de Havilland. It was in fact the interests of the European Union, and its regional aircraft manufacturers, that ultimately killed the deal and disrupted the strategy of the two governments. When the EU blocked the takeover, the government still faced with the problem of what to do about de Havilland. Both governments had an interest in maintaining jobs, exports, and research and development and they continued to push toward a solution. An

interest on the part of Bombardier in strengthening its aerospace activities maintained its interest in the company.

The answer that eventually emerged was a deal with Bombardier to bring both Canadair and de Havilland under one roof and create a national champion in the regional and commuter aircraft industry. Even though some in industry and within government had considered the creation of a single aerospace firm, the Ontario and federal governments did not have a national champion strategy in mind at the outset. After the European Union blocked the deal, Bombardier fell into place as the national champion because it was the only Canadian private sector investor that had an interest in de Havilland and there was no real alternative buyer. Bombardier had proven itself as a capable player in the industry, having expanded its niche markets in the industry through acquisitions and achieving some major firm turnarounds. For Bombardier, the deal offered an opportunity to cover the full niche of regional and commuter aircraft by adding turboprop aircraft to its Canadair jets. It also offered the prospect of major government support for restructuring and new product development and eliminated a major competitor for federal aerospace funding. For the federal government, it found a secure home for the company under the leadership of an important Canadian-based multinational. For Ontario and the federal government, it maintained Canada's presence in the turboprop market, maintained high skilled employment in Toronto, and it maintained exports. The company and its employees were happy to find a secure place within the Bombardier family, and other industry stakeholders were happy to see a unified

industry in Canadian hands. The entire industry would benefit from the integration of the Canadian commuter and regional aircraft manufacturers.

A little over a year after the sale of de Havilland was completed, a new Liberal government came into power. While the new government professed in favour of a more activist role for the federal government in the economy, financial realities soon converted them to “neo-liberalism”. In its effort to eliminate business subsidies in 1995, the government announced that it was cancelling the aerospace industry’s flagship support program. A major lobbying effort by the industry prevented the policy path from being shifted further in the direction of non-intervention, and it got support for the industry reinstated a year later under a new program called Technology Partnerships Canada, a general high technology industry support program. The industry had an interest in maintaining government support so that it could remain competitive with other foreign subsidized industry players, and this led to the major lobbying effort. The government’s fear of losing substantial aerospace investment, and its interest in improving the competitiveness of the economy by increasing R&D and shifting towards more high technology industries, led the government to establish the new program. Aerospace was also becoming a Canadian high technology success story, and that success worked in favour of continued government support.

The new Liberal government continued the previous Conservative government’s policy of supporting the industry, now represented by the national

champion Bombardier, through military contracts, government procurement, export financing, and research and development support. This continued support was influenced by ideas about the importance of high technology in a globalized economy. Bombardier had plants in the important provinces in Ontario and Quebec, two provinces important to the government's power base. Bombardier also offered staunch support for the federalist cause in Quebec at a time when sovereignty was an issue in Quebec. With the new "national champion" in place, and the importance of the industry growing, the government's support became more "strategic". When the health of the national champion was threatened by subsidized Brazilian regional jet sales, the government came to the rescue. Bombardier, its domestic supplier base, and its workers had an interest in curtailing Brazil's use of subsidized financing that undermined Bombardier's ability to compete in the market. The government could not afford to see its investments in Bombardier, and the jobs and exports the company provided, threatened by subsidized competition. It brought a case before the WTO, and when that did not stop the subsidies, it engaged in its own subsidized financing to beat off the Brazilian challenge. The government, Bombardier, the company's workers, and the company's supplier base had an interest in seeing Brazilian subsidies disciplined.

But trade policy turned out to be a two edged sword, with WTO trade rules also working to discipline Canadian government support for its national champion. By forcing a reform of both export financing through the Canada Account and Technology Partnerships Canada, the rules of the international

trade regime pushed Canada in a more non-interventionist direction, and this placed limits on the ability of the Canadian government to support its national champion Bombardier.

What one observes in this case is the curious example the formation of a national champion in a liberal state following essentially neo-liberal policies. In line with neo-liberalism, the government sold its interest in both aircraft firms. Yet elements of interventionism returned when the future of the industry was threatened. In order to protect jobs and the indigenous capabilities of de Havilland, the federal and provincial governments intervened to shape the de Havilland sale. The eventual outcome, while not part of a pre-planned strategy, was the creation of a single Canadian-owned national champion. The threat posed by Embraer to the future health of the national champion also forced the government to intervene. In Canada, the strategic importance of the industry, in terms of research and development, high skilled jobs, and exports meant that the government was not willing to see its industry threatened. Support for the industry was also crucial to maintaining an industry important in the provinces of Ontario and Quebec. The government was prepared to permit the industry a high degree of autonomy, but it adopted a “strategic” approach and was prepared to defend its interest when threatened.

Bombardier was very successful in adapting to the changing techno-economic environment. Its product development strategy, international linkages, and modern production processes made Bombardier very successful in

international markets. It succeeded in taking Canada's two aircraft firms and building an internationally successful national champion. As we have seen, the company captured a leading position in the regional aircraft market. In a fashion similar to that found in the Brazilian case, the success of the national champion in international markets led to a snowballing effect where continuous success led to continuous state support. Continuous state support helped Bombardier build its success, and institutional inertia based on that success maintained that continuous support. For the Canadian government, therefore, the support it provided to the regional and commuter aircraft industry had positive results. The country now has a major position in the industry and is the world's number one producer of commuter and regional aircraft. The establishment of the national champion Bombardier has laid the foundation for a continuing role in the industry.

The next chapter, the conclusions, will compare and contrast the three countries, the Netherlands, Brazil and Canada, with respect to the impact of domestic politics on the industrial policy path in the commuter and regional aircraft industry.

Chapter 7

Conclusions

This thesis has examined the influence of the shift toward neo-liberalism on the national champions in the commuter and regional aircraft manufacturing industry in the Netherlands, Brazil, and Canada. In particular, it has analyzed the post-war policy in the sector, and the government response to the industry restructuring that began in the mid-80s, to detect continuities and discontinuities in the industrial policy path in the sector.

While neo-institutionalists would suggest a path dependent response to neo-liberal globalization, a period of major difficulties can challenge the cohesion of an established policy path. This opens the opportunity for a new direction based on new policy ideas. The series of crisis that began in the mid-1980s in the commuter and regional aircraft manufacturing industry opened up the possibility for a change in policy path. As states faced the difficulties confronting the regional aircraft manufacturing industry, they puzzled over the industry's problems and reexamined their policy path with respect to their national champions in the sector. The solutions they developed were, of course, heavily influenced by ideas, including, but not reducible to, neo-liberal nostrums. In addition to puzzling, states also had to engage in powering or building up support for their chosen policy path. Here, of course, interests played the key role in developing support for the chosen option. In the three cases examined here,

none of the states could maintain the status quo with respect to their national champions in the face of the changing realities of the industry. The “puzzling” and “powering” process resulted in two distinct policy results. One result was a recasting of the historical policy path and the other was a complete break of that path.

In the case of Canada and Brazil, a form of “bounded policy innovation” took place where policy did change, but it did not challenge the basic consistency of the historical policy path. In both cases, past policies that supported the national champion were recast in a more neo-liberal fashion to make them more congruent with the new techno-economic paradigm. In the case of Brazil, the statist policies of the past, with their widespread and direct government intervention, were recast by the transfer of state-owned Embraer to the private sector, the increased acceptance of internationalization, and the use of more indirect policy instruments to influence the direction of the industry. In a similar fashion, the Canadian policy path, that had been moving in the direction of increased intervention, was recast by the privatization of the state-owned aircraft firms, the increased acceptance of internationalization, and the use of more indirect policy instruments. None of these changes undermined the underlying historical policy path that emphasized state support, but they did provide the flexibility needed to adapt to the new techno-economic environment.

The Brazilian and Canadian cases, therefore, do not lend support to the view that industrial policies around the world are converging in the globalized world economy towards a neo-liberal, non-interventionist approach to policy, and that states have no real alternative but to adopt such neo-liberal policies. Neither of these two countries was willing to let market forces determine the future of their national champions. At the same time, the experiences of these two countries do not support the view of strict neo-institutionalists that states are rigidly locked into a historically based policy trajectory that constrains their future policy options and resists change. It does offer support for those who see room for the state to maneuver in adjusting its policy path to changing conditions. However, unlike the neo-institutionalists that see incremental path-dependent change as a possibility, the changes that took place in Brazil and Canada were non-path dependent. They did not involve a re-jigging of the interventionist tools used in the sector as they involved the adoption of elements of a non-interventionist, neo-liberal policy approach. What we have here are cases of partial convergence and change, with the old policy path emphasizing state support maintained but in a more neo-liberal fashion.

Several factors contributed to continued strong state support for the national champion in Brazil and Canada. As these states faced the difficulties confronting their commuter and regional aircraft manufacturing industry starting in the mid-1980s, they puzzled over the industry's problems and tried to develop solutions. The solutions they developed were, of course, heavily influenced by

various ideas. The policy path in both countries was influenced by the ideas of neo-liberalism. This was reflected by the fact that they both, as part of their solution to their industry's problems, chose to transfer their national champion aircraft firms from the public to the private sector and adopted less direct methods of intervention in the industry. Yet both states were also influenced by ideas that called for continuing support for their national champions. In the case of Brazil, the developmentalist ideas that sustained a statist economy in the past proved resilient in the aircraft sector and helped to sustain continuing support for Embraer. In both Canada and Brazil, the Schumpeterian vision of strategic sectors, with special economic significance in terms of jobs, exports, and research and development, played a key role in sustaining the post-crisis national champion policy. In Canada, the idea of that the national champion was an important element in an industrial cluster also played a role in the development of policy solutions. Policy learning also played a crucial role in the development of the policy path. Past policy legacies of support were important in maintaining support for the national champion, particularly when those legacies were associated with success rather than failure. In the case of Brazil and Canada, the ability of Bombardier and Embraer to adjust to the changing circumstances of the new techno-economic environment, and go on to achieve continuing success in the international marketplace, helped to sustain a policy path in both countries that supported its national champion. In the case of both Canada and Brazil, both national champions were able to restructure their operations towards more efficient production and they successfully adapted to

the market shift towards regional jets. In these latter cases, the idea that success breeds success was a crucial factor in sustaining support for the national champion.

In terms of “powering”, or gaining support for the chosen policy path, the interests of several parties were important. In both Canada and Brazil, the government’s interest is sustaining the jobs, research and development, and exports associated with the industry and its national champion led both governments to emphasize continued support. As the national champion achieved success in international markets, this interest was reinforced because of the continually increasing level of jobs, research and development, and exports. In both countries, the interest of the government in adhering to international trade rules, and using those rules to discipline the other country, worked to temper support for their national champions. Those rules, which favoured a policy of non-intervention, pushed both countries to discipline their use of subsidies in the sector. In Brazil, the interest on the part of the government in developing a level of independence in the provision of military hardware was important in sustaining continuing support for Embraer. When the military-industrial complex began to collapse in Brazil, this was reinforced by the government’s desire to salvage what it could of its military industries by supporting firms like Embraer that had potential for success in civilian markets.

The political significance of the national champion was also important. As the Canadian case showed, the industry's location in the political heartland of the country, and the importance of the national champion Bombardier in the politically strategic province of Quebec, tied it to the future of the country and added political impetus to the government's support for the firm. This political significance would grow as the company became successful. Other industry stakeholders, such as unions, workers, and suppliers, had an interest in supporting the national champion because they were key input suppliers and they depended on the national champion for their livelihood. Both national champions, Embraer and Bombardier, had an interest in sustaining state support because the government provided assistance for expensive new product development, the stability of defence contracts, and support for international sales.

The third case, the Netherlands, provided a different result. Here the "puzzling" and "powering" process resulted in a fundamental change in the policy path based on a new policy paradigm. During the crisis at Fokker, the old policy paradigm that supported the national champion was swept away in favour of a markedly less interventionist approach to the industry. The shift was not completely in the direction of neo-liberalism, as the ideas associated with "innovation policy" had some impact on the new policy approach in the sector. In this case, however, the government was willing to permit its financially distressed national champion to succumb to the forces of the market. This case, therefore,

does lend support to the neo-liberal view that industrial policies around the world are converging in the globalized world economy towards a neo-liberal, non-interventionist approach to policy. It clearly does not support the view of strict neo-institutionalists that states are rigidly locked into a historically based policy trajectory that constrains their future policy options and resists change.

In the Netherlands, as the government “puzzled”, several ideas contributed to a break with the historical policy path and a turn away from support for the national champion Fokker. Neo-liberal ideas had their impact and this was reflected in the government’s decision, in line with its policies on state intervention and subsidies to firms, to sell its holdings in Fokker to DASA and also transfer the ultimate financial responsibility for the firm to DASA. The Dutch government’s interest in relieving itself of the financial responsibility for Fokker contributed to the ultimate fall of the national champion. The government’s hands-off approach to dealing with firms in difficulty meant that it was not as active in encouraging adjustment as it could have been. Negative industrial policy legacies associated with past interventions contributed to an environment where it was possible for the government to withdraw from supporting its national champion. Such legacies created a public environment that was less sympathetic of the interventionist policies required to continue such support. These legacies were reinforced by a poor performing national champion. Where, as was the case in the Netherlands, the national champion had difficulty adapting itself to changing circumstances, including techno-economic changes, the

resulting long-term poor performance worked to undermine government support for the national champion. A failed strategy of internationalization also contributed to the demise of Fokker. The Dutch government expected DASA to solve Fokker's problems, and when it did not, the government was faced with a major financial commitment that it was not willing to undertake.

In terms of "powering", the interests of several parties were important in gaining support for the change in policy path. While workers, suppliers and members of the Dutch Aerospace cluster all had an interest in the continuing existence of Fokker, the government's interest in supporting Fokker waned as the company's financial difficulties became more persistent, and as it began to question the level of support required to maintain the technological spillover and employment benefits from the company. The government's interest in dealing with its deficit problem and meeting the criteria for the European monetary union helped turn the tide against Fokker. In addition, the interests of DASA, Fokker's German parent, in solving its own financial crisis and its failed aerospace strategy and replacing it with a new direction, was fatal. A similar situation could have arisen in Canada, where the Canadian government looked to Boeing to solve de Havilland's difficulties. When Boeing decided to rid itself of de Havilland, the potential was there for a result similar to Fokker. The conflicting interests of the different players in the European commuter and regional aircraft manufacturing industry and their lack of interest in rationalization also played a

role. Ultimately, the lack of interest on the part of any of the companies seeking to purchase the bankrupt national champion sealed the company's fate.

As we saw in chapter 2, there are several different types of convergence. In terms of input convergence, the pressures and constraints facing the Netherlands, Canada, and Brazil did not totally converge. While all three countries felt pressures from globalization, neo-liberalism, state finances, and the difficulties facing the sector, each country faced some unique pressures and constraints of its own. In Brazil, for example, the collapse of the defense industry placed enormous pressures on the Brazilian state to salvage something from the sector. The Netherlands faced budget and state aid constraints from the European Union that limited its room to maneuver and pressures from an European industry with too many players. In Canada, the pressures of national unity were evident. While each country faced somewhat different pressures and constraints, limited policy convergence did take place. While Brazil and Canada did converge on a policy approach that offered indirect state support to a private national champion, the Netherlands had adopted an approach that abandoned support for its national champion. In terms of convergence in output, in terms of the consequences and outcomes of policy, here again Brazil and Canada converged. In both cases, the output of policy was an efficient, competitive national champion in the commuter and regional aircraft sector. In the case of the Netherlands, the outcome was the demise of the national champion in the sector. Process convergence is not of relevance here.

Of all three of the countries, the impact of neo-liberalism was most significant in the Netherlands. Being a socially managed market economy, one would have expected the Netherlands to resist neo-liberalism and continue along its traditional interventionist policy path. It should have taken steps to restructure its national champion and assisted its national champion in adjusting to adverse circumstances, but this did not happen. The traditional policy of state support did not die immediately, as the government did initially make efforts to sustain its national champion. But ultimately, the new policy path resulted in a downgrading of the Dutch position in the industry, from that of prime manufacturer or integrator of regional and commuter aircraft to a risk-sharing partner, component supplier, and subcontractor. In the country where neo-liberalism could be expected to have its greatest impact, liberal Canada, neo-liberalism's impact was limited. The Canadian government did not let the market totally decide the future of its industry. Unlike the Netherlands, Canada's position in the industry did not decline as it maintained its status of having a prime manufacturer or integrator of commuter and regional aircraft. In terms of Brazil, as a state directed economy where resistance to neo-liberalism could expect to be strong, neo-liberalism did have an impact on the policy direction. Brazil did maintain its position as a prime manufacturer or integrator of commuter and regional aircraft.

The impact of neo-liberal ideas can be seen in a shift that took place in the instruments used by governments to support their national champions in the

sector. Generally speaking, there was a move away from the more direct forms of government intervention in the sector towards more indirect forms. In the Netherlands, the main instruments used to support Fokker prior to the crisis period of the mid-1980s were research and development subsidies and military contracts. The onset of the crisis period led the government to use more direct interventions including partial state ownership and distress funding, but this soon changed when the government moved to transfer ownership and financial responsibility for Fokker to DASA. The intent was to use research and development subsidies and military contracts as the main instruments of support in the post-crisis period. After the fall of Fokker, these did become the main instruments used to support the industry.

In the Canadian case, the original policy instruments used for the early part of the postwar period were military contracts and research and development assistance. With the shift towards civil aircraft production in the 1970s, the instruments became more interventionist and included government ownership, capital injections, and government funded demonstration projects to stimulate demand. In the post crisis period, the instruments used shifted back and emphasized more indirect tools such as research and development funding, export financing, and military contracts. The only exception to this was the period of Ontario government investment in de Havilland from 1992 to 1997.

The biggest shift in instruments occurred in Brazil, where there was a move away from the traditional statist instruments that were used during the period of the build-up of Embraer. During that period, the government used state ownership, funding for research and development, domestic market manipulation, protection from imports, military contracts, aircraft purchases for itself and others, and foreign technology transfer to encourage the development of Embraer. After the crisis period, the instruments of support shifted towards research and development funding, military contracts, and export financing. Gone were the more direct forms of intervention such as market manipulation and protection from imports. The only direct instrument remaining was the golden share that the government held to protect its military interests in Embraer after the company was sold.

This thesis suggests that a state-supported national champion strategy is still possible in a globalized world economy. This is particularly the case for those industries, like the aircraft industry, that are considered strategic in economic and military terms. One of the crucial factors in sustaining such a strategy is the successful performance of the national champion. As the Brazilian and Canadian cases show, a national champion that is able to achieve success by adapting to the changing techno-economic environment creates the conditions which are favourable to continued state support. The basic idea of using a national champion strategy will be perceived to be successful, and the state and other stakeholders will have an interest in seeing a successful national

champion prosper and advance. An institutional inertia builds up behind a successful national champion that acts to maintain support. A virtuous circle results, with present support building on past support.

In all three cases, the “sectoral system of innovation” was extremely important to the development of the national champion. In each country, a group of key institutions supported the development of the national champion. In Brazil, for example, Embraer’s development was supported by the CTA research organization, the Brazilian Air Force, the national development bank BNDES, the Banco do Brasil, domestic airlines, and the company’s domestic supplier base. In Canada, the development of the aerospace firms was supported by the Department of Defence, Industry Canada, the Export Development Corporation, the Ontario Ministry of Industry, Trade and Technology, and the company’s supplier base. The case of the Netherlands shows, however, that such an institutional framework may not be able to save an underperforming national champion from collapse. Fokker’s development was supported by the state, the NIVR funding agency, the NLR research agency, KLM, and the company’s supplier base. Unfortunately, this institutional support could not save the company from collapse, and a major re-orientation of this institutional framework, influenced to some extent by ideas surrounding “innovation policy”, took place in the aftermath of the collapse.

Where the national champion does not perform successfully by failing to adapt effectively to its environment, as in the Fokker case, the support for the national champion strategy is threatened. Poor performance tends to open the opportunity for neo-liberalism to undermine a national champion strategy. Neo-liberals criticize industrial policy and national champion strategies for supporting inefficient firms, and poor performance on the part of the national champion tends to confirm this assessment. Institutional support for a poor performing national champion begins to break down, particularly where that poor performance is persistent. The result is a reduction or elimination of support. It is, therefore, crucial that the national champion has the means and tools to effectively adjust to changing circumstances.

Despite the influence of neo-liberalism, both Canada and Brazil adopted a more “strategic” approach to their industries. They used government support to assist their national champions in their efforts to enter the newly emerging regional jet market and sustained that support to help maintain their position in that market. This resulted in a major trade dispute between the two countries. In addition, the development of the two national champions, and their capture of the regional jet market, led to a major shift in the locus of production in the world commuter and regional aircraft industry. As we have seen, activity has shifted from Europe, the traditional industry powerhouse, towards North and South America. Fokker, in many respects the first developer of the regional jet, reflected Europe’s difficult position in the industry. It had too many players in the

sector and conflicting national interests prevented rationalization. There was too much competition between European suppliers and these suppliers failed to effectively adapt to the changing market. European industry, European governments, and the European Union could not develop a strategy for the industry in the face of the changing nature of the market. To a great extent, national industrial rivalries in Europe prevented this from happening. Despite being the leader in the industry for most of the post-war period, Europe could not adapt. The decline in the turboprop market also hit European industry hard. By the early 2000s, Fokker, SAAB, and British Aerospace had left the industry, and Fairchild-Dornier was declared bankrupt. The European presence in the industry was left to ATR, the Franco-Italian producer of turboprops, and the remnants of Fairchild-Dornier.

The three case studies also illustrate the limitations of internationalization. In all three cases, internationalization, in the form of mergers, takeovers, subcontracting and risk-sharing partnerships, played a key role in the new policy path. Neo-liberalism, with its advocacy of an open economy and international linkages, was receptive to an increasing level of internationalization in what had traditionally been seen as a nationally-based industry – aircraft manufacturing. In two cases, mergers and takeovers seemed to lead to major difficulties. In the case of Fokker, the move to internationalize predated the crisis period, and internationalization had major negative consequences for the company. Fokker's merger with VFW in the 1960s, its joint MD-100 project with McDonnell Douglas

in the 1980s, and its takeover by DASA in the 1990s had negative consequences for the company. The VFW merger lasted 11 years and this costly adventure set the company back in terms of new product development. Despite the high hopes, it also reflected the failure of Europe to develop a viable European option due to conflicting national interests. The MDF-100 project also set the company back in terms of new product development. The takeover by DASA, which was seen by the Dutch government as a way of solving Fokker's problems, ended in the demise of the national champion after DASA withdrew from its costly commuter and regional aircraft strategy. Again, this reflected the inability of Europe to develop a strategy for the industry. Canada had a similar experience when it sold de Havilland to Boeing. The government believed that a major international aircraft manufacturer would solve de Havilland's problems, but the strategy failed when Boeing moved to sell de Havilland after failing to turn the company around. Embraer also sold a 25 percent shareholding in late 1999 to a group of French companies in the hope of achieving synergies between the two groups. It is too early to tell the outcome of this relationship, but so far there has been no problems. What emerges here illustrates the difficulties of engaging in international mergers and takeovers involving national champion firms. They often create difficulties due to the conflicting national interests involved and often end in failure.

The one area where internationalization was successful for all three companies was in the area of subcontracting and risk-sharing partnerships. As

we saw in chapter 3, rising aircraft development costs and risks pushed commuter and regional aircraft manufacturers to use subcontractors and risk-sharing partners in their aircraft development programs, and all three national champions looked at here used such strategies. Fokker was the first to do so when it used international subcontractors on the F-27 project in the 1950s. In the 1990s, Embraer and Canadair shifted to a strategy of using risk-sharing partners as their regional jet programs exposed them to major costs and risks. For all three companies, the use of subcontractors and risk-sharing partners has been a success. It has provided flexibility and allowed each company to develop new products by sharing the risks and rewards. Especially in the case of Embraer and Canadair, the move towards such strategies was an important element of their success in the 1990s and beyond. With effective strategies and strong state support, Embraer and Bombardier succeeded in seizing industry leadership from the Europeans.

What this thesis shows is that states still have options and are free to make choices in a globalized world. Techno-economic paradigm shifts do not require states to adopt a specific policy paradigm. States do have options when it comes to industrial policy, and they are not restricted by either the forces of convergence or their historical policy paths. Each state has the power to decide for itself the best option for dealing with techno-economic changes, and domestic politics plays a crucial role in determining the policy direction. Ideas, institutions,

and interests are key elements in the process that shapes the policy path and provide each country's path with its own national flavour.

APPENDIX 1: REGIONAL AND COMMUTER TURBOPROPS

<u>Manufacturer</u>	<u>Aircraft</u>	<u>First Flight</u>	<u>Seats</u>	<u>Max. Cruise Speed</u> (kph/mpg)	<u>Range</u> (km/mi)
ATR	ATR-42-300	1984	50	490/305	1000/621
	ATR-42-400		50	492/306	926/575
	ATR-42-500		50	562/350	850/528
	ATR-72-200	1988	74	514/320	860/534
BAe	Jetstream 31* 1993	1980	19	481/299	1289/801
	Jetstream 41* 1997	1991	29	546/339	1289/801
	ATP*1992	1986	72	490/305	1146/712
CASA/IPTN	CN-235-100	1983	44	455/283	1500/932
DeHavilland Canada	Dash-7-150*1988	1975	50	426/265	1985/1233
	Dash-8-100	1983	39	490/305	774/481
	Dash-8-200	N/A	39	546/339	987/613
	Dash-8-300	1987	56	531/330	870/541
	Dash-8-400	1998	74	648/403	961/597
CASA	C-212-300 Aviocar	1971	26	353/220	660/410
Embraer	EMB-110*1990	1968	19	416/259	575/357
	EMB-120	1983	30	555/345	926/575
	EMB-120ER	N/A	30	579/360	1482/925
Dornier	228-212	1981	19	435/270	635/395
	328-110	1991	34	620/385	N/A
Fairchild	Metro	1969	19	546/339	1610/1000
Fokker	Fokker 50*1997	1985	58	522/324	2038/1266
IPTN	N250-100	1995	64	555/345	1482/921
Raytheon/ Beech	King Air 350		15	583/362	2126/1321
	King Air B200	1981	14	544/338	1327/825
	1900C*1991	1982	19	496/308	1069/664
	1900D	N/A	19	524/328	1298/806
SAAB	340B	1983	37	527/328	1210/752
	2000	1992	50	685/426	2075/1289
Shorts	330-200*N/A	1974	30	352/219	875/544
	360-300*1991	1981	39	398/247	1020/634

* in Aircraft column denotes aircraft out of production. Year is the year production stopped.

Source: Flight International (27 August - 2 September 1997). "Commercial Aircraft of the World. Part I Regional/Utility Aircraft", pp. 43-70.

APPENDIX 2: REGIONAL JETS

<u>Manufacturer</u>	<u>Aircraft</u>	<u>First Flight</u>	<u>Seats</u>	<u>Max. Cruise Speed</u> (kph/mpg)	<u>Range</u> (km/mi)
BAe/Avro	BAe 146-100* ¹⁹⁹¹	1981	94	786/489	1450/901
	BAe 146-200* ¹⁹⁹¹	1982	112	783/486	1930/1199
	BAe146-300* ¹⁹⁹¹	1987	128	794/493	1850/1150
	Avro RJ70* ²⁰⁰²	1991	70-82	796/495	1409/876
	Avro RJ85* ²⁰⁰²	1992	85-100	796/495	2170/1348
	Avro RJ100* ²⁰⁰²	1992	100	797/496	1517/943
	Avro RJ115* ²⁰⁰²		116	799/497	2722/1691
Canadair	CRJ-100	1991	50	851/529	N/A
	CRJ-200		50	858/534	1825/1134
	CRJ-200ER		50	864/537	3045/1644
	CRJ-200LR		50	864/537	3700/1998
	CRJ-700	1999	70	858/534	3124/1687
	CRJ-900	2001	86	858/534	2774/1498
Embraer	EMJ-145	1995	50	821/511	1569/975
	EMJ-145ER		50	786/489	2511/1560
	EMJ-135	1998	37	833/518	3140/1696
	Embraer 170	2002	70	870/541	3104/1676
	Embraer 175		78	870/541	2405/1299
	Embraer 190		98	870/541	3119/1684
	Embraer 195		108	870/541	3334/1800
Fairchild-Dornier	328Jet	1998	32	736/458	1668/900
	728Jet		70	862/536	2650/1431
	928Jet		95	862/536	3500/1890
Fokker	F28* ¹⁹⁸⁷	1967	85	831/516	1600/994
	F70* ¹⁹⁹⁷	1993	70-79	855/531	2010/1249
	F100* ¹⁹⁹⁷	1986	107	855/531	2871/1784

* in Aircraft column denotes aircraft out of production. Year is the year production stopped.

Source: Flight International (27 August - 2 September 1997). "Commercial Aircraft of the World. Part I Regional/Utility Aircraft", pp. 43-70 and Flight International (12-18 November 2002). "Directory: World Airlines: Then There Were Two", pp. 42-65.

APPENDIX 3

Commuter and Regional Aircraft Production Lifespan

Source: Jane's All The World's Aircraft, Various Years.

Airclaims, Turbine Airliner Fleet Survey, Various Years

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Flight International (23 February 1980). "Fokker and VFW Split Up", p. 534.

Flight International (30 August 1980). "Narrowbodies for the 1980s", pp. 849-893.

Flight International (15 November 1980). "Fokker F-29 May Become a Tripartite Programme", p. 1845.

Flight International (3 December 1983). "Fokker Makes Its Move", p.p. 1455-1456.

Flight International (10 December 1983). "Fokker Hopes For Early Breakeven", p. 1513.

Flight International (10 August 1985). "Fokker 100 Breaks into US Market", p. 4.

Flight International (7 January 1989). "Lowe Outlines Canadair Future", p. 15.

Flight International (4 March 1989). "The Case For Turboprops", pp. 42-44.

Flight International (8 April 1989). "MPC Gears Up", pp. 19-21.

Flight International (24 June 1989). "Embraer Launches Regional Jet", p. 6.

Flight International (24 June 1989a). "Embraer Signs Up CBA-123 Customers", p. 11.

Flight International (20 December 1989 - 2 January 1990). "Canadair Woos IPTN", p. 17

Flight International (14 - 20 February 1990). "Canadair RJ Goes Higher, Faster", p. 27.

Flight International (28 February - 6 March 1990). "Dash 8 Series 400 Plan Restarted", p. 4.

Flight International (11 - 17 April 1990). "Embraer Moves Into Profit", p. 16.

Flight International (11 - 17 April 1990a). "CBA-123 Close to Roll-Out", p. 19.

Flight International (18 - 24 April 1990). "Bombardier Adds Lear to Jet Line", pp. 4-5.

Flight International (2 - 8 May 1990). "Embraer Sees EMB.145 Options Grow", p. 14.

Flight International (6 - 12 June 1990). "CBA-123 Flight Expected Soon", p. 18.

Flight International (29 August - 4 September 1990). "ATR Agrees DHC Deal With Boeing...", pp. 4-5).

Flight International (10 - 16 October 1990). "Fokker in Row Over EC Subsidy", p. 5.

Flight International (7 - 13 November 1990). "Fokker 130 Ready for Launch...", p. 5.

Flight International (7 - 13 November 1990a). "...DASA Confirms 130-Seat Rivalry", p. 5.

Flight International (7 - 13 November 1990b). "Workforce Cut as Embraer Suspends EMB-145 Plan", p. 4.

Flight International (14 - 20 November 1990). "Regional Competition Fires Up", p. 26.

- Flight International (5 - 11 December 1990). "European MoU Will Curb Competition", p. 5.
- Flight International (20 - 26 February 1991). "DHC Buyers to Seek State Aid", p. 16
- Flight International (27 March - 2 April 1991). "Embraer Tests New 145 as Vector Takes to the Air", p. 18.
- Flight International (1 - 7 May 1991). "Upmarket Regional", pp. 39-44.
- Flight International (22 - 28 May 1991). "European Buyers Seek Canadian Funds", p. 4.
- Flight International (22 - 28 May 1991a). "Embraer Awaits -145 Risk-Sharing Approval", p. 15.
- Flight International (22 - 28 May 1991b). "Canadair RJ Makes Initial Test Flight", p. 15.
- Flight International (5 - 11 June 1991). "Canada Considers de Havilland Sale", p. 6.
- Flight International (26 June - 2 July 1991). "Government Reverses Embraer Fortunes", p. 10.
- Flight International (26 June - 2 July 1991a). "South Africa May Take a Share in EMB-145", p. 18.
- Flight International (3 - 9 July 1991). "Embraer President Leaves Post", p. 12.
- Flight International (3 - 9 July 1991a). "Regional Jet Wars", pp. 32-33.
- Flight International (21 - 27 August 1991). "Euro-Bombardier Bid Aimed at de Havilland", p. 6.
- Flight International (2 - 8 October 1991). "CASA 300 Nearer to Definition", p. 10.
- Flight International (2 - 8 October 1991a). "ATR Bid For de Havilland Put Under EC Cloud", p. 6.
- Flight International (9 - 15 October 1991). "Boeing de Havilland/ATR Buyout Blocked by Brussels", pp. 4-5.
- Flight International (9 - 15 October 1991a). "Bombardier-Led Consortium Wins Canadian Armed Forces Training", p. 8.

- Flight International (16 - 22 October 1991). "Fokker to Launch 70-Seat Regional", pp. 4-5.
- Flight International (16 - 22 October 1991a). "France Attacks de Havilland Decision", p. 6.
- Flight International (23 - 29 October 1991). "Embraer Favours Textron for -145", p. 11.
- Flight International (6 - 12 November 1991). "Bombardier/de Havilland Re-emerges", p. 5.
- Flight International (29 January - 4 February 1992). "Bombardier Buys de Havilland", p. 5.
- Flight International (4 - 10 March 1992). "Fokker 70 Indecision Sows Confusion at Regioliner", pp. 4-5.
- Flight International (11 - 17 March 1992). "Meeting the Rationale", p. 3.
- Flight International (11 - 17 March 1992a). "Fokker and DASA Closing on Regional-Jet Alliance", p. 4.
- Flight International (18 - 24 March 1992). "CBA-123 Salvage Examined", p. 9.
- Flight International (25 - 31 March 1992). "DASA/Fokker Talks Get Underway", p. 6.
- Flight International (25 - 31 March 1992a). "Private Affairs", p. 20.
- Flight International (6 - 12 May 1992). "DASA May Reconsider Regioliner Schedule", p. 11.
- Flight International (13 - 19 May 1992). "Regioliner Delay is Key to Fokker Take-Over", p. 4.
- Flight International (3 - 9 June 1992). "Embraer Slashes Workforce Again", p. 4.
- Flight International (10 - 16 June 1992). "European Regional Deal Moves Closer", p. 8.
- Flight International (24 - 30 June 1992). "Fokker Agrees Acquisition Details", p. 8.
- Flight International (24 - 30 June 1992a). "Embraer and FMA Push CBA-123", p. 14.

- Flight International (22 - 28 July 1992). "Dutch Object to DASA Fokker Acquisition", p. 5.
- Flight International (29 July - 4 August 1992). "Dutch Minister Approves Fokker/DASA Marriage", p. 4.
- Flight International (5 - 11 August 1992). "DASA/Fokker To Take Next Step", p. 6.
- Flight International (5 - 11 August 1992a). "Europe's Way Forward", p. 22.
- Flight International (9 - 15 September 1992). "DASA and Fokker Ready to Resume Negotiations", p. 15.
- Flight International (16 - 22 September 1992). "Bombardier Sets Study Deadline", p. 26.
- Flight International (30 September - 6 October 1992). "Fokker Introduces Short-Time Working", pp 4- 5.
- Flight International (30 September - 6 October 1992a). "Embraer Sell-Off Planned in 1993", p. 13
- Flight International (21 - 27 October 1992). "New Hitch Threatens DASA/Fokker Tie-Up", p. 4.
- Flight International (4 - 10 November 1992). "Dutch Back Down on DASA Assurances", p 5.
- Flight International (25 November - 1 December 1992). "ATR Partners Eye DASA/Fokker Tie-Up", p. 4.
- Flight International (27 January - 2 February 1993). "DASA Demands More Funding For Fokker", p. 5.
- Flight International (10 - 16 February 1993). "DASA/Fokker Talks Reach Crucial State", p 5.
- Flight International (17-23 February 1993). "Rationalizing the Regionals", pp. 42-43.
- Flight International (24 February - 2 March 1993). "Fokker/DASA Alliance Route Clear", p 6.
- Flight International (3 - 9 March 1993). "Embraer/FMA Might Axe CBA-123 Project", p. 6.

Flight International (17 - 23 March 1993). "Twinjet Dilemma For New Regional Partners", p. 10.

Flight International (17 - 23 March 1993a). "Embraer Considering Bandierante Restart", p. 12.

Flight International (31 March - 6 April 1993). "Fokker Cuts Jobs", p. 4.

Flight International (31 March - 6 April 1993a). "Spain's GAMESA to Join EMB-145 Project", p. 10.

Flight International (14 - 20 April 1993). "DASA Board Approves Alliance", p. 14.

Flight International (14 - 20 April 1993a). "Embraer Records \$258 Million Loss", p. 6.

Flight International (28 April - 4 May 1993). "DASA-Fokker Tie-Up is Almost Complete", p. 10.

Flight International (5 - 11 May 1993). "Marriage Vows", p. 24.

Flight International (12 - 18 May 1993). "'Embraer Exports' to Brazil", p. 12.

Flight International (12 - 18 May 1993a). "Commuter Consolidation", pp. 38-39.

Flight International (19 - 25 May 1993). "SONACA/Enaer Join EMB-145 Team", p. 6.

Flight International (16 - 22 June 1993). "Avro Begins Talks on Launch Aid for RJX", p. 23.

Flight International (23 - 29 June 1993). "Embraer Adds New EMB-145 Partners", p. 18.

Flight International (30 June - 6 July 1993). "Regional Bandwagon", p. 32-33.

Flight International (18 - 24 August 1993). "White-Tail Costs Put Fokker Into The Red", p. 18.

Flight International (29 September - 5 October 1993). "Embraer Gains A Partner for EMB-145 Landing Gear", p. 14.

Flight International (3 - 9 November 1993). "Brazil Close to Naming Embraer Price", p. 26.

Flight International (3 - 9 November 1993a). "Embraer Decides on Extended Range EMB-145", p. 11.

- Flight International (16 - 22 March 1994). "Fokker Suffers Severe Losses", p. 16.
- Flight International (16 - 22 March 1994a). "Brazil Sets Date for Embraer Flotation", p. 6.
- Flight International (30 March - 5 April 1994). "Brazil Plans to Vet Embraer Bidders", p. 22.
- Flight International (20 - 26 July 1994). "Funds Ease Fokker Finance Load", p. 5.
- Flight International (17 - 23 August 1994). "Aerospace Top 100: Responding to Recession", pp. 22-34.
- Flight International (31 August - 6 September 1994). "Fokker Posts Record Loss", p. 25.
- Flight International (7-13 September 1994). "Back to the New Avro", p. 50.
- Flight International (14 - 20 September 1994). "DASA/Fokker Face The FAX Over Airliner", p. 28.
- Flight International (14 - 20 September 1994a, p. 22). "Bombardier Heads for 70 Seater Approval", p. 22.
- Flight International (19 - 25 October 1994). "Embraer Privatization Delayed by Congress", p. 14.
- Flight International (2 - 8 November 1994). "Embraer Losses Grow As It Waits For Private Funds", p. 18.
- Flight International (16 - 22 November 1994). "Embraer Privatization Confirmed", p. 15.
- Flight International (7 - 13 December 1994). "Embraer Goes Ahead With Privatization", p. 6.
- Flight International (14 - 20 December 1994). "First EMB-145 Order For Europe", p. 12..
- Flight International (1 - 7 February 1995). "Regional Rivals Welcome ATR's Alliance With BAe", p. 4.
- Flight International (1 - 7 February 1995a). "Agreement Will Improve BAe's Financial Fortunes", p. 4
- Flight International (22 - 28 February 1995). "Fokker Prepares For New Round of Cuts", p. 20.

- Flight International (8 - 14 March 1995). "Fokker Slashes Costs in New Restructuring Plan", p. 6.
- Flight International (22 - 28 March 1995). " Fokker Losses Hit Record High in 1994", p. 4.
- Flight International (22 - 28 March 1995a). " Bombardier Prepares for Dash-8-400 Launch", p. 6.
- Flight International (29 March - 4 April 1995). "Embraer Completes First EMB-145 Fuselage", p. 13.
- Flight International (14 - 20 June 1995). "Dash 8 Stretch Launched", p. 11
- Flight International (21 - 27 June 1995). "Bombardier Costs Dash-8-400 Development", p. 22
- Flight International (28 June - 4 July 1995). "Fokker Reveals Regional-Twinjet Configuration", p. 11.
- Flight International (28 June - 4 July 1995a). "Embraer Plans an August Roll-Out For The EMB-145", p. 12.
- Flight International (5 - 11 July 1995). "Embraer Forced to Impose Job Cuts", p. 15.
- Flight International (12 - 18 July 1995). "Fokker In Capital Crises as Losses Rise", p. 5.
- Flight International (19 - 25 July 1995). "Embraer Signs Marketing Deal With PZL", p. 21.
- Flight International (9 - 15 August 1995). "Canadian Turnaround", pp. 30-31.
- Flight International (23 - 29 August 1995). "Embraer Flies EMB-145", p. 5.
- Flight International (30 August - 5 September 1995). "Regional Winner ?", p. 26.
- Flight International (30 August - 5 September 1995a). "TAC Still Looks For Alliance to Build Regional Aircraft", p. 23.
- Flight International (13 - 19 September 1995). " Fokker Submits its Bail-Out Plan to the Dutch Government", p. 6.
- Flight International (25 - 31 October 1995). "Embraer Plans Ambitious Growth", p. 13.

- Flight International (29 November - 5 December 1995). "Embraer Test-Flies Second EMB-145", p. 11.
- Flight International (3 - 9 January 1996). "DASA Stands By Ailing Fokker", p. 12.
- Flight International (31 January - 6 February 1996). "Fokker in Rescue Talks", pp. 6-7.
- Flight International (31 January - 6 February 1996a). "DASA Folds Its Wings", pp. 6-7.
- Flight International (31 January - 6 February 1996b). "A Tales of Two Crisis", p. 34.
- Flight International (7 - 13 February 1996). "Samsung Cool on Fokker", p. 6.
- Flight International (14 - 20 February 1996). "Fokker Holds Talks With Potential Buyers", p. 12.
- Flight International (6 - 12 March 1996). "Fokker Given Two More Weeks To Secure Its Survival", p. 4.
- Flight International (6 - 12 March 1996a). "EMB-145 'Exceeds Expectations'", p. 11.
- Flight International (13 - 19 March 1996). "Canada Starts Funding Programme for Industry", p 6.
- Flight International (20 - 26 March 1996). "Fokker Bankrupt", p. 4.
- Flight International (20 - 26 March 1996a) "Inevitable End", p. 3.
- Flight International (3 - 9 April 1996). "Fokker Buyers Line Up", p. 6.
- Flight International (24 - 30 April 1996). "Embraer Forecasts End to Losses", p. 14.
- Flight International (1 - 7 May 1996). "Embraer Wins Savings From New Labour Deal", p. 14.
- Flight International (15 - 21 May 1996). "Fokkers Could Be Back In Production", p. 5.
- Flight International (22 - 28 May 1996). "Embraer Begins East Europe Sales Drive", p. 12.

- Flight International (29 May - 4 June 1996). "EMB-145 US Tour Stirs Sales Interest", p. 10.
- Flight International (12 - 18 June 1996). "Fokker Wins a Reprieve With Big KLM Order", p. 4.
- Flight International (10 - 16 July 1996). "Embraer Increases EMB-145 Cruise Speed", p. 9.
- Flight International (24 - 30 July 1996). "Stork Wraps up Fokker Aviation Deal", p. 15.
- Flight International (14 - 20 August 1996). "Russia Nears Decision on Fokker Proposal", p. 6.
- Flight International (21 - 27 August 1996). "Samsung Holds Talks in Last-Ditch Bid to Rescue Fokker", p. 4.
- Flight International (21 - 27 August 1996a) "Embraer Claims US Launch Customer", p. 6.
- Flight International (28 August - 3 September 1996). "Regional Rivalry", pp. 90 - 92.
- Flight International (4 - 10 September 1996). "Bombardier Gains Approval to offer Stretched Regional Jet", p. 15.
- Flight International (11 - 17 September 1996). "Samsung Makes Offer for Fokker", p. 4.
- Flight International (11 - 17 September 1996a). "Continental Lifts Embraer Into Regional Record Book", p. 10.
- Flight International (18 - 24 September 1996). "Embraer Evaluates Next Regional Developments", p. 14.
- Flight International (25 September - 1 October 1996). "Samsung Books Exclusive Fokker Access", p. 4.
- Flight International (2 - 8 October 1996). "Samsung Moves Slowly Over Fokker Relaunch", p. 6.
- Flight International (16 - 22 October 1996). "Samsung Presents Dutch with Fokker Business Plan", p. 5.
- Flight International (30 October - 5 November 1996). "CRJ-X Project Wins Launch Aid", p. 20.

Flight International (13 - 19 November 1996). "Samsung Steps Closer to Fokker", p. 6.

Flight International (20 - 26 November 1996). "Fokker Rescue Plan Put on Hold", p. 6.

Flight International (20 - 26 November 1996a). "Bombardier Disputes Price of de Havilland", p. 24.

Flight International (4 - 10 December 1996). "Hopes Fade for Fokker Rescue", p. 5.

Flight International (18 - 31 December 1996). "HAL Considers Taking Over Assembly of Fokker 50", p. 9.

Flight International (1 - 7 January 1997). "Embraer Studies EMB-145 Range", p. 6.

Flight International (1 - 7 January 1997a). "Embraer Will Offer an Early Warning Variant of EMB-145", p. 13.

Flight International (8 - 14 January 1997). "South Korea Calls off Samsung's Proposed Rescue of Fokker", p. 16.

Flight international (15-21 January 1997). "Bombardier Beats Embraer to ASA Deal", p. 8.

Flight International (22 - 28 January 1997). "EMB-145 Wins Portugalia Verdict Over CRJ", p. 8.

Flight international (29 January - 4 February 1997). "Bombardier Gives G0-Ahead to CRJ-X", p. 9.

Flight International (26 February - 4 March 1997). "Fokker Hopes Focus on Malaysian Rescue", p. 10.

Flight International (26 February - 4 March 1997a). "Embraer Focuses on Asian Market for Brasilia Business", p. 15.

Flight International (26 February - 4 March 1997b). "Manx Airlines Selects EMB-145", p. 16.

Flight International (26 February - 4 March 1997c). "Brit'Air Order Launches Canadair Stretched CRJ", p. 10.

Flight International (5 - 11 March 1997). "In Search of the New Jet Age", pp. 25-26.

- Flight International (12-18 March 1997). "Embraer Seeks Paris Show Launch For New 37-Seat Regional Turbofan", p. 4.
- Flight International (16 - 22 April 1997). "Latest Bid to Rescue Fokker Fades Away", p. 7.
- Flight International (23 - 29 April 1997). "Embraer Reduces Losses and Expects Return to Profitability", p. 13.
- Flight International (24 - 30 September 1997). "Embaer Launches 37-seater", p. 7.
- Flight International (7 - 13 January 1998). "Bombardier's Turn-Around on Super Tucanos Annoys Brazil", p. 5.
- Flight International (28 January - 3 February 1998). "AIR Partnership Teeters As ATR Looks To Break With BAe", p. 4.
- Flight International (4 - 10 February 1998). "Regional Brinkmanship", p. 24.
- Flight International (4 - 10 February 1998a). "Wexford Adds to Embraer Orderbook with Letter for 40 ERJs", p. 10.
- Flight International (11 - 17 February 1998). "Regional Revolution", p. 27.
- Flight International (4 - 10 March 1998). "Embraer Chief Confirms Plan for International Flotation", p. 18.
- Flight International (25 - 31 March 1998). "New Canadian System Quietens Dash 8 Cabin", p. 27.
- Flight International (15 - 21 April 1998). "Embraer Heads for Profits After Sales Soar", p. 22.
- Flight International (15 - 21 April 1998a). "Embraer Converts RJ-145 to - 135 Prototype", p. 12.
- Flight International (13 - 19 May 1998). "Continental ERJ-135 Order Leads Regional Move to 30-Seat Jets", p. 5.
- Flight International (13 - 19 May 1998a). "Brazilian Work-Out", p. 39-42.
- Flight International (20 - 26 May 1998). "Embraer Studies Market for Larger Regional Jet", p. 5.
- Flight International (27 May - 2 June 1998). "New Embraer Figures Confirm Recovery", p. 28.

Flight International (27 May - June 2 1998a). "Brazil and Canada Plan Subsidy Accord For Regional Aircraft", p. 26.

Flight International (1 - 7 July 1998). "American Eagle Confirms ERJ-135", p. 5.

Flight International (15 - 21 July 1998). "Fairchild Dornier Challenges Embraer on Interest Benefits", p. 8.

Flight International (22 - 28 July 1998). "Going Separate Ways", pp. 42-43.

Flight International (26 August - 1 September 1998). "Slimming Down", p. 36.

Flight International (9 - 15 September 1998). "Turboprop - and Proud of It", pp. 73 - 78.

Flight International (16 - 22 September 1998). "Rekkof 'Ready' to Resurrect Fokker Jet Line", p. 22.

Flight International (16 - 22 September 1998a). "Bombardier Unveils Plan for 90-Seat Jet Family", p. 6.

Flight International (23 - 29 September 1998). "Regional Jam ?", pp. 28-29.

Flight International (30 September - 6 October 1998). "Embraer Boss Holds Back on 70 - Seater Launch", p. 4.

Flight International (11 - 17 November 1998). "British Midland Goes Regional With ERJ-145s", p. 10.

Flight International (25 November - 1 December 1998). "Rekkof Gets The Green Light For Fokker Revival", p. 17.

Flight International (9 - 15 December 1998). "Deadline Looms Over Subsidy Allegations", p. 24.

Flight International (16 - 22 December 1998a). "Northwest to Decide Soon on Regional Jet Order", p. 5.

Flight International (16 - 22 December 1998b). "Low Cost is Key for Regional Jet, Airlines Tell Bombardier", p. 12.

Flight International (16 - 22 December 1998c). "Embraer Cautious on 70-set Regional Jet", p. 5.

Flight International (23 December 1998 - 5 January 1999). "Greek Air force Gives The Wink to Ericsson's Erieye System', p. 12.

Flight International (23 December 1998 - 5 January 1999a). "Embraer Demands Share of Fighter Programme", p. 13.

Flight International (6 - 12 January 1999). "Continental Express Aims For All-ERJ Fleet Within Five Years", p. 10.

Flight International (17 - 23 February 1999). "Embraer Reveals Additions to Regional Jet Family", p. 4.

Flight International (24 February - 2 March 1999). "Embraer Pondering ERJ-135 Business Aircraft Variant", p. 26.

Flight International (10 - 16 March 1999). "Bombardier and Embraer Subsidies "Were Illegal", p. 26.

Flight International (24 - 30 March 1999). "Bombardier Wins and Loses in Trade Battle With Embraer", p. 25.

Flight International (24-30 March 1999a). "Bombardier Aims For Mid-2000 Launch of BRJ-X Regional Jet", p. 10.

Flight International (14 - 20 April 1999). "Embraer Revels in Record Year", p. 28.

Flight International (21 - 27 April 1999). "Crossair Chooses ERJ-145 Regional Jet to Replace SAAB Turboprops", p. 6.

Flight International (5 - 11 May 1999). "Embraer to Roll Out Aircraft For Amazon Surveillance", p. 19.

Flight International (15 - 11 May 1999a.) "Shorter Story", p. 42-46.

Flight International (19 - 25 May 1999). "Embraer Expands ERJ Designs", p. 16.

Flight International (2 - 8 June 1999). "Embraer Assesses ALX Potential", p. 4.

Flight International (9 - 15 June 1999). "Embraer Studies ERJ Options", p. 18.

Flight International (9 - 15 June 1999a). "Military EMB-145 Makes Maiden Flight", p. 8.

Flight International (9 - 15 June 1999b). "Regional Redefinition", pp. 157-161.

Flight International (16 - 22 June 1999). "Embraer Aims For More From Military", p. 32.

Flight International (16 - 22 June 1999a). "Crossair Starts ERJ-170/190 Family Rolling", p. 4.

- Flight International (23 - 29 June 1999). "Embraer Responds to Envoy Message With Plan For Corporate ERJs", p. 26.
- Flight International (23 - 29 June 1999a). "Embraer Pushes Stretch Plan", p. 23.
- Flight International (23 - 29 June 1999b). "\$2bn Orders Take ERJ-135/145 Sales to Over 900", p. 23.
- Flight International (30 June - 6 July 1999). "Regional Wars", p. 32.
- Flight International (30 June - 6 July 1999a). "Canada Risks Wrath of WTO with P&WC Grant", p. 25.
- Flight International (18 - 24 August 1999). "BAe Talks to Embraer", p. 6.
- Flight International (18 - 24 August 1999a). "Industry Holds WTO Compliance Talks", p. 14.
- Flight International (25 - 31 August 1999). "Bombardier Searches for BRJ-X Engine and Steps Up CRJ Output", p. 10.
- Flight International (29 August - 4 September 1999). "Canada and Brazil Meet to Settle Subsidy Dispute", p. 8.
- Flight International (15 - 21 September 1999). "Embraer to Develop Armed RJ-145 Jet", p. 5.
- Flight International (22 - 28 September 1999). "Dassault Aviation Enters the Arena For Stake In Embraer", p. 26.
- Flight International (6 - 12 October 1999). "Embraer Goes Head to Head with 428Jet", p. 6.
- Flight International (6 - 12 October 1999a). "Embraer Ties Up Risk Sharing Agreements", p. 11.
- Flight International (6 - 12 October 1999b). "Bombardier Offers to Stretch Canadair Jet to 90 Seats", p. 7.
- Flight International (27 October - 2 November 1999). "Bombardier Will Decide on Regional Jets Early Next Year", p. 13.
- Flight International (1 - 7 December 1999). "Business Studies", p. 5.
- Flight International (1 - 7 December 1999a). "Embraer Aims for Year-End Launch of Corporate Jet", p. 24.

- Flight International (1 - 7 December 1999b). "Bombardier/Embraer Trade Dispute Flares Up Again", p. 22.
- Flight International (8 - 14 December 1999). "Embraer Studies Short-Field ERJ-170 for Crossair", p. 10.
- Flight International (8 - 14 December 1999a). "Dassault and Embraer Discuss Joint Venture Light Business Jet", p. 39.
- Flight International (11 - 17 January 2000). "Boeing Plans 'Automotive' Line for 717", p. 13.
- Flight International (1 - 7 February 2000). "Mesa Picks ERJ-145 For Feeders", p. 6.
- Flight International (1 - 7 February 2000a). "Austria's Rheintalflug Gears Up To Take Extra ERJ-170s", p. 15.
- Flight International (29 February - 6 March 2000). "Embraer Adds Range to Corporate RJ-135", p. 18.
- Flight International (29 February - 6 March 2000a). "Embraer Aims to Step Up Production", p. 17.
- Flight International (7 - 13 March 2000). "Early Date Set for BRJ-X Launch", p. 10.
- Flight International (4 - 10 April 2000). "Mexico Looks to Embraer to fill AEW Order", p. 8.
- Flight International (11 - 17 April 2000). "Embraer Strives for Extra Capacity to Beat Backlog", p. 22.
- Flight International (9 - 15 May 2000). "Embraer Focuses Design Attention on ERJ-190 as -170 Passes Landmark", p. 17.
- Flight International (9 - 15 May 2000a). "Brazil Could Face Sanctions", p. 26.
- Flight International (9 - 15 May 2000b). "CRJ900 Launch Delayed", p. 16.
- Flight International (16 - 22 May 2000). "Canada Appeals to WTO For Sanctions on Brazil", p. 20.
- Flight International (23 - 29 May 2000). "ATR and Embraer Alliance Could Become Full Merger", p. 25.

- Flight International (6 - 12 June 2000). "Embraer Plans to Buy Sichuan ERJ145s", p. 6.
- Flight International (27 June - 3 July 2000). "Wing Changes Air ERJ-170 Work", p. 9.
- Flight International (11 - 17 July 2000). "Embraer Expands With New Site", p. 19.
- Flight International (11 - 17 July 2000a). "New 44-Seat ERJ-140 Begins Six Month Flight Test Programme", p. 6.
- Flight International (18 - 24 July 2000). "Dassault Wants Embraer and Enaer to Co-Produce Mirage 2000-5", p. 9.
- Flight International (25 - 31 July 2000). "Bombardier Launches CRJ900", p. 9.
- Flight International (1 - 7 August 2000). "ERJ-140 Makes Air Show Debut", p. 16.
- Flight International (1 - 7 August 2000a). "Embraer Launches Business Jet", p. 22.
- Flight International (1 - 7 August 2000b). "Embraer Raises \$390 Million in Share Trading", p. 43.
- Flight international (22 - 28 August 2000). "New Bombardier Assembly Plant Follows CRJ900 Launch", p. 18.
- Flight International (5 - 11 September 2000). "Embraer Meets ERJ-170/190 Schedule as Production Looms", p. 13.
- Flight International (5 - 11 September 2000a). "Defense Bids the Focus For Embraer and New Partners", p. 23.
- Flight International (19 - 25 September 2000). "Regional Risk-Taking", pp. 52-55.
- Flight International (19 - 25 September 2000a). "Bombardier Puts BRJ-X on Hold", p. 5.
- Flight International (3 - 9 October 2000). "American Launches ERJ-140 With Order For 130", p. 5.
- Flight International (3 - 9 October 2000a). "Brasilia Conversion Enters Service in the USA", p.
- Flight International (24 - 30 October 2000). "Embraer Increases RJ Output", p. 14.

- Flight International (31 October - 6 November 2000). "Subsidy Row Re-Ignites", p. 6.
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- Flight International (27 March - 2 April 2001). "On the Move", pp. 36-37.
- Flight International (24 - 30 April 2001). "Air Wisconsin to Replace Bae146", p. 7.
- Flight International (1 - 7 May 2001). "Brazil Looks at Interim Fighter Before Delayed F-X", p. 25.
- Flight International (8 - 14 May 2001). "Brazil, Italy Link on AMX Upgrade", p. 26.
- Flight International (15-21 May 2001). "Brazil, Germany in Talks on Joining Joint Strike Fighter", p. 27.
- Flight International (29 May - 4 June 2001). "Dispute Over Northwest Decision", p. 10.
- Flight International (3 - 9 July 2001). "Embraer Set to Diversify", p. 22.
- Flight International (31 July- 6 August 2001). "Brazil/Austria To Issue Fighter RFPs", p. 22.
- Flight International (14 - 20 August 2001). "Brazilian Air Force Orders 76 ALXs", p. 14.
- Flight International (21 - 27 August 2001). "Offset Headache for Brazil Bidders", p. 19.
- Flight International (21 - 27 August 2001a). "Aerospace Top 100: Fit For The Fight", pp. 43-61.
- Flight International (28 August - 3 September 2001). "Embraer to Decide on Site for Assembling Light attack ALX", p. 21.
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