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Cartel Efficiency and the Impact of Competition Policy

by

Jorge Alberto Uriarte Landa

**A thesis submitted to
the faculty of Graduate Studies
in partial fulfillment of
the requirements for the degree of**

Doctor of Philosophy

Carleton University

Ottawa, Ontario

May 2001.

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acceptance of the thesis,

"Cartel Efficiency and the Impact of Competition Policy"

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in partial fulfilment of the requirements
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ABSTRACT

This thesis examines the price, quality and welfare effects of cartel prosecution in indicted industries in Canada. Traditional economics interprets cartels as having the only purpose of restricting output and achieving monopoly profit. More recently, several authors who stress the capacity of different organizational forms to reduce the costs of coordinating resources have argued that some cartels may be cost reducing and, thereby, potentially welfare increasing. Also, various academics have raised the concern that Canadian cartel law, by not permitting a full consideration of the welfare effects of cartels in establishing their illegality, may be discouraging welfare increasing cartels together with welfare decreasing cartels.

A theoretical model is used to examine all possible combinations of price, quality and welfare effects of cartels in light of the debate on cartels and efficiency. The thesis proceeds to assess the price, quality and welfare effects of 17 cartels prosecuted under Canadian conspiracy law. This sample size represents the number of cases for which it was possible to find price data after reviewing approximately 150 conspiracy cases completed during 1897-1997. The price effects are determined using a variation of the econometric methodology used by Sproul (1993). The possible quality effects are assessed by reviewing trial-related documents and Competition Bureau's publications and case files and determining if there were any allegations that the cartel affected quality. Finally, the price and quality effects of each cartel in the sample are examined in light of the theoretical framework previously developed in order to conclude on the welfare effects.

It is concluded that at least in seven cases or at least in two cases, depending on the

approach used, the cartels were cost reducing and welfare increasing and that prosecution of these cartels thus decreased welfare. Under both approaches it is not possible to conclude on the welfare effects of the remaining cases. These results provide support for the idea that cartels can reduce costs and thereby increase welfare. These findings also validate the importance of the concerns expressed by several academics about the welfare effects of Canadian cartel law.

ACKNOWLEDGMENT

I am especially grateful to the members of my committee: professors Keith Acheson, Rose Anne Devlin and Simon Power. Thank you very much for your invaluable advice and guidance, for your exceptional support and encouragement and for being always available when I needed your help.

I would like to thank Halldor Palsson from the Competition Bureau for his extremely valuable help during my search for information and data on the cases studied. I also want to express my sincere thanks to professors Zhiqi Chen, Donald G. McFetridge and Steven Ferris for their very useful comments and suggestions and their overall support to this project. I am equally very grateful to Ms. Ginette Lafleur for being such an excellent Graduate Administrator. Her help during all these years as a graduate student is highly appreciated.

A huge thank you to my wife Lisset for her endless support, understanding and patience. Her good humour and invaluable love played a decisive role in this project. A big thank you also to my parents, Elena and Jorge, for their precious guidance and constant support.

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1. INTRODUCTION

This thesis examines the price, quality and welfare effects of cartel prosecution in a sample of indicted industries in Canada. Traditional economics interprets cartels as having as their only purpose the restricting of output and the achievement of monopoly profit. More recently, several authors, stressing the capacity of different organizational forms to reduce the costs of coordinating resources, have argued that some cartels may be cost-reducing and, thereby, potentially welfare increasing (Bork (1978), Butz (1993), Demsetz (1992), Dick (1992), Kennish and Ross (1997), Ross (1991), Sproul (1990, 1993)). Canadian conspiracy law does not permit a full consideration of the positive and negative welfare effects of cartels in establishing their illegality. More importantly, possible counterbalancing efficiency gains generated by a cartel are no defence under the law. If the proponents of the cost reducing cartel hypothesis are right, the current Canadian approach to conspiracies discourages welfare increasing cartels together with welfare decreasing cartels. This concern has been expressed by several academics who are calling for changes to Canadian cartel law (Ross (1991), Kennish and Ross (1997), Trebilcock and Warner (1993)). This thesis intends to shed light on both the theoretical debate on the welfare effects of cartels and the Canadian cartel policy debate.

Chapter 2 describes the conspiracy law in Canada and how it has been interpreted. It highlights the fact that Canada follows a partial rule of reason approach to conspiracies. The chapter also presents recent criticism to the law in light of the new learning on cartel theory and proposals for its modification.

Chapter 3 reviews the new theoretical debate on cartels and the creation of efficiency with emphasis on the cost reduction case. The chapter then presents two theoretical models to examine all possible combinations of price, quality and welfare effects of two types of cartels: the “naked” cartel and the “complex” cartel. The “naked” cartel restricts output and drives a wedge between values and cost at the margin. The “complex” cartel also reduces costs.

Chapter 4 proposes and applies a variation of the econometric methodology used by Sproul (1993) to examine the price effects of prosecution in a sample of 17 cartels indicted under the Canadian conspiracy provisions. This sample size represents the number of cases for which it was possible to find price data after reviewing approximately 150 conspiracy cases completed during 1897-1997.

Chapter 5 extends the empirical analysis to address the possible quality effects of the cartels. It proceeds by examining if there were any allegations in the trial-related documents and Competition Bureau’s publications and case files regarding quality changes. Three definitions of quality are employed: quality-in-a-narrow-sense, the quality of sales related services and the quality of variety.

Chapter 6 examines the price and quality effects of each cartel in the sample in light of the theoretical framework developed in Chapter 3 in order to conclude on the welfare effects. Two approaches are used. The first approach assumes that prosecution deterred cartel behaviour in all cases. The second approach allows for the possibility that cartel behaviour was not deterred in those cases in which it is found that prosecution had no statistically significant effect on price.

Chapter 7 summarizes the main findings obtained. The chapter then proceeds to discuss the implications of the results for the theoretical debate on the welfare effects and cost effects of cartels and for the current cartel law debate in Canada.

The results of this study provide support for the idea that cartels can create efficiency through cost reduction and, hence, validate the concern about the welfare effects of current Canadian cartel law. It is found that at least in seven cases or at least in two cases, depending on the approach used, the cartels were cost reducing and welfare increasing and that prosecution of these cartels thus decreased welfare. In the remaining cases, under both approaches, the results are such that it is not possible to conclude on the welfare effects.

2. CANADIAN CARTEL LAW

2.1 The Law

The current Canadian prohibition against price-fixing and other horizontal arrangements is set out in section 45 of the Competition Act which prohibits those conspiracies, agreements or arrangements between competitors which have the effect of **unduly** lessening competition. The full text of section 45 is presented in appendix A.

Violations of section 45 are subject to criminal sanctions. Once the Competition Bureau begins an inquiry about potential violations of section 45, it may refer the matter to the Attorney General at any time. The Attorney General considers the Bureau's findings and decides whether to proceed with the prosecution of the defendants in a criminal court (Trebilcock and Warner (1993, p. 685)). If convicted, the defendants are liable to a maximum penalty of five years of imprisonment, a maximum fine of 10 million dollars, or both. The Attorney General, in addition to initiating a criminal prosecution, may seek an interim injunction restraining the offending conduct. In order to sustain a conviction under the conspiracy provisions, the Crown must prove beyond reasonable doubt both (i) the existence of an agreement which, if implemented, would unduly lessen competition, and (ii) that the accused intended to enter into that agreement (Trebilcock and Warner (1993, p. 686)).

By far the most common penalty or remedy in Canadian conspiracy cases has been the fine, and since 1952, the Prohibition Order has been added to the list. Between 1889 and 1952 the maximum fine for firms convicted in conspiracy cases under the Criminal Code was 10,000 dollars. Between 1952 and 1975 the size of the fine was at the discretion of the court.

A maximum of a one million dollar fine was put into effect on January 1, 1976. In June 1986, the maximum fine for a violation of section 45 (previously numbered section 32) was increased to ten million dollars in the new *Competition Act* (Stanbury (1991, p. 70)).

It should be pointed out that the conspiracy provisions have not been altered substantially since they were first enacted in 1889 (Downs and Lusk (1991, p. 151), Trebilcock and Waner (1993, p. 682), Kennish and Ross (1997, p. 23)). The few amendments that have been made to the conspiracy provisions have mostly represented attempts to clarify rather than to alter the law (Kennish and Ross (1997, p. 23)).¹

The key issue in section 45 cases is the meaning of “unduly” (Green (1990, p. 326)). The term “unduly” dates back to the original 1889 conspiracy provisions. Neither the current statute nor any of its predecessors provides a definition of “unduly”; in fact, the courts have wrestled with its definition for over a hundred years (Trebilcock and Warner (1993, p. 687)). As a practical matter, the undue lessening of competition has historically been inferred from the degree to which the parties to the agreement control the marketplace (Kennish and Ross (1997, p. 32,33)). However, the courts have not had a fixed rule in determining what share of the market the accused must account before an agreement will be held to lessen competition unduly. There have been acquittals where the market share was as high as 83 per cent, and convictions where it was as low as 56 per cent (Stanbury (1991, p. 78), quoting a

¹For example, in 1960, the provisions were qualified by exempting certain types of agreements such as cooperation in research and development as long as such agreements did not lessen competition unduly. In 1976, what is now s. 45(2) was added to clarify the meaning of “unduly” stating that the conspiracy did not need to lead to a virtual elimination of competition to be an offence. In 1986, sections 45 (2.1) and 45 (2.2) were added to clarify what is sufficient evidence of a conspiracy and proof of intent, respectively (Green (1990, p. 324), Kennish and Ross (1997, p. 23)).

former Director of Investigation and Research). Crampton and Kissack (1993, p. 590) contend that the current market threshold for undueness may be as low as a combined market share of 35 per cent.

The overall welfare effect of a cartel is irrelevant in the analysis of the undueness of a cartel agreement. A good exposition in this regard is provided by Cartwright, J. in *Howard Smith Paper Mills, Ltd. et al. v. The Queen* (1957):²

In essence the decisions referred to appear to me to hold that an agreement to prevent or lessen competition in commercial activities of the sort described in the section becomes criminal when the prevention or lessening agreed upon reaches the point at which the participants in the agreement become free to carry on those activities virtually unaffected by the influence of competition, which influence Parliament is taken to regard as an indispensable protection of the public interest; that it is the arrogation to the members of the combination of the power to carry on their activities without competition which is rendered unlawful; that the question whether the power so obtained is in fact misused is treated as irrelevant; and that the Court, except I suppose on the question of sentence, is neither required nor permitted to inquire whether in the particular case the intended and actual results of the agreement have in fact benefitted or harmed the public.

In other words, once it is established that there is an agreement to carry the prevention or lessening of competition to the point mentioned, injury to the public interest is conclusively presumed, and the parties to the agreement are liable to be convicted of the offence described in s. 498 (1) (d). **The relevant question thus becomes the extent to which the prevention and limitation of competition are agreed to be carried and not the economic effect of the carrying out of the agreement.** In each case which arises under this section the question whether the point described has been reached becomes one of fact (Emphasis added by the author).

²*Howard Smith Paper Mills, Ltd. et al. v. The Queen* (1957), 8 D.L.R (2d) 449 at 473. Section 498 is one of the section numbers that the conspiracy provisions has had in the past. The 1889 Act (An Act for the Prevention and Suppression of Combinations formed in restraint of Trade) remained the law in Canada until 1892 when it was revised in part and incorporated into the first *Criminal Code* as section 520. In 1906, section 520 was renumbered as section 498. For a detailed chronology of the conspiracy provisions see Appendix A of Stanbury (1991).

More recently, in the *PANS* decision, Gonthier J. held that:³

Section [45](1)(c) lies somewhere on the continuum between a *per se* rule and a rule of reason. It does allow for discussion of the anti-competitive effects of the agreement, unlike a *per se* rule, which might dictate that all agreements that lessen competition attract liability. On the other hand, **it does not permit a full-blown discussion of the economic advantages and disadvantages of the agreement**, like a rule of reason would. Since “unduly” in s. [45](1)(c) leads to a discussion of the seriousness of the competitive effects, but not of all relevant economic matters, one may say that this section creates a **partial rule of reason** (Emphasis added by the author).

As Trebilcock and Warner (1993) explain, on this reasoning, the “unduly” inquiry of subsection 45(1) allows courts to examine the economic background of the arrangement only to the extent necessary to determine whether the challenged agreement lessens competition to the point where the lessening is undue. The court cannot take into account any offsetting efficiency or welfare gains from the challenged agreement. In fact, Gonthier explicitly stated that: “[c]onsiderations such as private gains by the parties to the agreement or counterbalancing efficiency gains by the public lie therefore outside the inquiry under [paragraph 45(1)(c)].”⁴ According to Gonthier, the factors that courts can consider under the Canadian partial rule-of-reason inquiry are the market power of the parties and the behaviour of the parties (Trebilcock and Warner (1993, p. 687, 688)).

2.2 Criticisms of the Partial Rule of Reason Approach

The Canadian partial rule of reason approach with respect to cartels has recently come under criticism by several authors (Ross (1991), Trebilcock and Warner (1993) and Kennish

³*R. v. Nova Scotia Pharmaceutical Society*, [1992] 2 S.C.R. 606, 93 D.L.R. (4th) 36, 43 C.P.R.(3d) 1 at 650.

⁴*Ibid.* at 649-50.

and Ross (1997)). These authors contend that Canadian cartel law, by not allowing for a full consideration of positive and negative welfare effects in deciding when cartels attract liability, may be discouraging welfare increasing agreements together with welfare decreasing ones (Kennish and Ross (1997, p. 68)).

It is also argued that new developments in economic theory have shown that horizontal restraints and cooperation between competitors may, sometimes, be welfare increasing (Ross (1991, p. 863), Kennish and Ross (1997, p.27-29, 68), Trebilcock and Warner (1993, p. 683)). Kennish and Ross (1997, p. 30, 31) explain that, as a result, one of the formerly solid foundations of antitrust, namely that agreements between competitors are bad and must be deterred, is being revisited. They explain that this is clearly the case in the United States which at one time took a clear *per se* illegal approach to many types of horizontal agreements, particularly price fixing and market allocation but has recently started to back away from such an approach by reinterpreting what constitutes price fixing. They provide the example of the *Broadcast Music (BMI)* case, decided by the U.S. Supreme Court in 1979.⁵ The agreement in this case involved the creation of blanket licenses to use copyrighted music, and while there were elements of price fixing, the court concluded that they were necessary to the greater purpose of producing a new and very valuable product, the blanket licences. Therefore, the court determined that this was not price fixing and upheld the agreement under a rule of reason analysis. According to Kennish and Ross (1997, p. 31) this case is widely regarded as the first clear statement that the U.S. Supreme Court was backing away from a strict *per se* treatment of all price fixing agreements.

⁵*Broadcast Music, Inc. v. Columbia Broadcasting System*, 441 U.S. 1 (1979).

A recent decision of the U.S. Federal Trade Commission provides a good summary of the modern American approach to horizontal agreements:⁶

First, we ask whether the restraint is “inherently suspect.” In other words, is the practice the kind that appears likely, absent an efficiency justification, to “restrict competition and reduce output”?...If the restraint is not inherently suspect, then the traditional rule of reason, with attendant issues of market definition and power, must be employed. But if it is inherently suspect, we must pose a *second* question: Is there a plausible efficiency justification for the practice?...Such an efficiency defence is plausible if it cannot be rejected without extensive factual inquiry. If it is not plausible, then the restraint can be quickly condemned. But if the efficiency justification is plausible, further inquiry - a *third* inquiry - is needed to determine whether the justification is really valid. If it is, it must be assessed under the full balancing test of the rule of reason. But if the justification is, on examination, not valid, then the practice is unreasonable and unlawful under the rule of reason without further inquiry - there are no likely benefits to offset the threat to competition.

The critics of the Canadian partial rule of reason approach explain that, in contrast to the U.S. case, the new theoretical learning on horizontal restraints and inter-firm cooperation has not affected Canadian conspiracy prosecution. In this regard, Kennish and Ross (1997) explain that, the recent Supreme Court of Canada decision in the *PANS* case, which constitutes the Supreme Court of Canada’s most authoritative interpretation of section 45, is not encouraging in terms of the possibility of a rule of reason being judicially developed in Canada to deal with cases which involve less obvious criminal behaviour than naked price fixing and market division arrangements. Kennish and Ross contend that the *PANS* decision “arguably shuts the door on the possibility that the innovation or efficiency-enhancing effects of, or the pro-competitive benefits derived from, an agreement between competitors may be relied upon to offset other competition-limiting effects of the agreement” (Kennish and Ross

⁶Massachusetts Bd. of Registration in Optometry, 5 Trade Reg. Rep. ¶22,555 (F.T.C. 1988), quoted in Trebilcock and Warner (1993, p. 698).

(1997), p. 33, 34).⁷ They explain that, in this decision, the court adopted the statement from the majority judgement in the *Howard Smith* case⁸ that the statute proceeds upon the footing that the preventing or lessening of competition is itself an injury to the public and that it is not concerned with public injury or public benefit from any other stand point. As Kennish and Ross (1997) further write:

Gonthier J. then proceeded to expand upon that statement by saying that considerations such as private gains by the parties to the agreement or the counterbalancing of efficiency gains to the public lie outside an inquiry under s. 45. It was stated that competition is presumed by the Act to be for the public benefit. The only issue then is whether the agreement impairs competition to the extent that it will attract liability. In this connection, it was stated that the type of competitive impact analysis that is required by s. 45 is less than what is required in a full “rule of reason” analysis (which typically involves an in-depth inquiry into the competitive effects of an arrangement). On the other hand, it does not establish a *per se* rule (...).

Thus the test of legality under s. 45 is neither that which applies to naked restraints under prevailing U.S. jurisprudence (which are governed by the *per se* rule) or that which is applied by the U.S. courts to other agreements not covered by that rule (which are examined on a full rule of reason/economic effects basis) (Kennish and Ross (1997), p. 35, 36).

Kennish and Ross (1997) also comment on the difference between the “undueness” standard applied to conspiracy and the “substantial lessening of competition” standard applied to mergers and abuse of dominant position in the Act’s civil provisions. They explain that, in general, the latter contemplates a full rule of reason competitive analysis approach being

⁷Hughes and Sanderson (1998, p. 159, 160, 166) are more optimistic than Kennish and Ross in regards to the potential for the legal framework to reflect considerations of efficiencies. They agree that the framework corresponding to the *PANS* decision does not encompass a full rule of reason approach that explicitly recognizes potential efficiency effects of horizontal agreements. However, they contend that it is possible that some consideration of efficiency may be undertaken by the courts (if they wish to) when assessing the objective effect of the agreement to determine underlying intent.

⁸*Howard Smith Paper Mills Ltd. v. The Queen* (1957), 29 C.P.R. 6 at p. 13, 8 D.L.R. (2d) 449

taken. This means, they add, that agreements which are prosecuted under section 45, in contrast to proceedings under the merger or the abuse of dominant position sections of the Act, will not be the subject of the same comprehensive competitive impact inquiry but will be limited to examining whether the agreement brings about a serious impairment of competition. If it does, they explain, then a conviction would follow and the situation would not be redeemed by a demonstration of efficiencies generated by the agreement (Kennish and Ross (1997, p. 36)).

The differences between Canadian merger and conspiracy laws have received a lot of attention from the critics of the Canadian partial rule of reason approach to conspiracies. They point out that while Canadian cartel law has remained relatively unchanged from the original legislation passed in 1889, Canadian merger law has been significantly modified to account for the new theoretical learning on merger activities (Kennish and Ross (1997, p 23)). In 1986, Parliament removed merger review from the all-purpose criminal courts and vested it in the Competition Tribunal, a special panel of mixed judicial and lay membership, and an efficiency defence was introduced in the merger law (Trebilcock and Warner (1993, p. 683, 691, 721), Ross (1991, p. 870)). Therefore, there is, currently, a clear asymmetry between Canadian conspiracy law and merger law. Conspiracies are subject to criminal review (by criminal courts) under a partial rule of reason approach that does not allow for an efficiency defence. Mergers are subject to civil review (by the Competition Tribunal) under a full blown rule of reason that allows for an efficiency defence. It is pointed out that, as contended by Bork (1978), integration by contract should be treated symmetrically with integration by ownership (Bork (1978, p. 264), Ross (1991, p. 868)). In this regard, Ross (1991, p. 868)

explains that “At least it seems sensible to allow firms to do by contract whatever they could do by merger if their merger would not be contested.” Kennish and Ross (1997, p. 32) note that the asymmetry between cartel law and merger law implies that firms’ decisions on how to organize and structure their activities (i.e. contract integration vs. ownership integration) may be driven not by economic efficiency considerations but by competition law considerations.⁹

In summary, the critics of the Canadian partial rule of reason approach have raised two important issues. First, this approach, by not allowing a full discussion of all the positive and negative welfare effects of cartels, may be discouraging welfare increasing agreements together with welfare decreasing cartels. Second, the asymmetry between Canadian cartel and merger laws may be encouraging mergers as compared to less comprehensive organizational structures. In light of these issues, the critics of Canadian cartel law have advanced proposals for its modification. Two of these proposals are briefly discussed below.

2.2.1 Proposal by Kennish and Ross (1997)

Under Kennish and Ross’s proposal¹⁰, a second civil branch would be added to conspiracy law. Agreements that involve nothing more than agreements not to compete (i.e. “naked restraints”) would be *per se* illegal and punishable under criminal law, with heavy fines

⁹If an asymmetry were justified it is arguable that it should be asymmetric in the opposite direction to that found in current law. It might be justified to put a more demanding efficiency requirement on mergers than agreements as the former always grant the merging parties all the powers of the agreement plus additional ones.

¹⁰In their 1997 paper Kennish and Ross made several proposals, only one is presented here.

and/or jail terms.¹¹ They explain that this could be achieved by deleting the word “unduly” from section 45 and adding a clause that made it clear that the section applied only to naked restraints. Any “non-naked” agreements (i.e., those which do not have, as their sole or predominant purpose, an agreement not to compete or those which include a restraint on competition which is merely ancillary and reasonably necessary to a larger agreement), would be made subject to review by the Competition Tribunal with authority and procedures analogous to those for merger review. Therefore, the Tribunal would have the authority to order the parties to terminate or restructure an agreement, but it could not impose fines or other punishments. However, as with current merger law, failure to comply with a Tribunal order would be punishable with fines and/or prison terms under section 74 of the Act. The amendments suggested by Kennish and Ross would at a minimum state that the Tribunal must take into account efficiencies generated by the agreement and might include an explicit efficiency defence.

Kennish and Ross propose that elements of the compliance process which is now familiar in merger review should also be adopted in the review of horizontal agreements. Specifically, the Commissioner of Competition¹² would be authorized to issue advance ruling certificates

¹¹Kennish and Ross (1997) explain that “naked restraints” should be defined to include both those that are not part of a larger arrangement and those that can be severed from a larger arrangement with no loss in efficiency (on the basis that they are not reasonably necessary to the larger agreement). They explain that the latter requirement discourages firms from obvious attempts to dress up conspiracies to protect themselves from criminal liability. They also argue that, in the same spirit, agreements which are clearly broader than necessary to achieve their efficiencies should remain subject to criminal review (Kennish and Ross (1997, footnote 77, p. 57)).

¹²The Commissioner of Competition is an officer appointed by the Governor in Council under section 7(1) of the Competition Act. His/her responsibilities include the

to parties that ask for pre-clearance. The Commissioner of Competition would also be able to consider other formal and informal negotiated resolutions to perceived problems. Finally, a formal consent order process like that currently available for civil reviewable matters (section 105) would be incorporated into the new law.

According to Kennish and Ross, this proposal would remove the need for the present special provisions dealing with specialization agreements (section 86) and joint ventures (section 95) since they exemplify the kinds of agreements that would come up under the new civil branch. Kennish and Ross explain that the specialization agreement provisions represent an example under the current law of a situation where an agreement that might otherwise have been subject to the Act's criminal provisions is instead to be considered on a civil basis by the Tribunal. They explain that the joint venture exemption (section 95) provides an interesting model for what the new section might look like. It exempts joint ventures from the merger law if the elements of the joint venture which are restrictive of competition are necessary to the achievement of some larger purpose.

The challenge, as Kennish and Ross recognize, is in the drafting of the law: can wording be found that will clearly distinguish between what they have been calling "naked restraints" and all other horizontal agreements? They contend that while admittedly difficult it should not be impossible to meet this challenge and they propose specific language that they consider satisfactory for this purpose. In evaluating their own proposal, Kennish and Ross, point out several issues. First, if the law is clear, it will be easy to enforce. Naked restraints, the central

administration and enforcement of the Competition Act. It has previously been referred to as the Director of Investigation and Research and as the Commissioner.

concern of conspiracy law, will be *per se* illegal, lowering the evidentiary burden on the Crown. Second, the law will be deliberately flexible, providing criminal law support for prohibitions against the worst agreements, but permitting the evaluation of more complex cases by an expert tribunal outside the criminal law. The Tribunal will have the authority, not only to block agreements it finds objectionable, but also to restructure them to preserve their benefits, while minimizing their costs. Third, given the fact that criminal law sanctions would still exist to punish the most serious offences and that convictions should be easier to obtain with the word “unduly” removed from the law, deterrence from the most obviously anti-competitive agreements should be enhanced. At the same time this deterrence should not come at the expense of discouraging honest attempts to establish strategic alliances that create real wealth. Finally, they argue that their approach is constructed to be in harmony with merger law. As a consequence, competition law would not distort decisions about how best to organize productive activity. However firms may choose to structure their arrangements, their actions will be evaluated by the Tribunal seeking to assess the social efficiency of the arrangement.

This proposal may not completely remove the need for traditional courts to consider efficiencies. Kennish and Ross explain that in a matter the Crown has decided should go down the criminal path, the accused parties could argue that there are relevant efficiencies and if properly understood the agreement in question does not involve a naked restraint, with the result that the case should be moved to the civil branch. However, they argue, it is a considerably simpler task for a court to determine whether it is an appropriate case for

consideration by the Tribunal than to actually evaluate and balance those efficiencies with any costs of reduced competition.

While Kennish and Ross would argue that there is significant value in deleting the word “unduly” from the criminal part of a new law, it is not absolutely necessary to do so. They contend that if it was thought that retention of the word usefully protected the parties to agreements with very minor effects on competition, “unduly” could be retained without serious damage to this proposal. They explain that the reason for this is that the most important property of this proposal, the flexibility it offers for the review of complex agreements, would remain even if the word “unduly” is retained.

2.2.2 Proposal by Trebilcock and Warner (1993)

Trebilcock and Warner’s proposal contains many of the features of Kennish and Ross’s proposal described above. They too call for the bifurcation of horizontal agreements into a criminal branch (to be dealt with in the regular criminal courts) and a civil branch (for agreements to be reviewed by the Tribunal). The main difference between Trebilcock and Warner’s proposal and Kennish and Ross’s proposal is in respect to what determines into which branch a given agreement falls. Rather than trying to distinguish naked agreements from non-naked agreements, Trebilcock and Warner have focussed solely on price-fixing agreements and whether or not the agreement is secret (i.e. whether or not the Competition Bureau has been notified). If the Bureau is not notified of a price-fixing agreement, then entering into it would constitute a criminal offence, whether or not it is part of larger efficient arrangement. In fact, Trebilcock and Warner’s proposed criminal prohibition makes no reference to the agreement “unduly lessening competition”; any secret agreement to fix prices

would constitute a criminal offence. If the Bureau is notified of a price-fixing agreement, then the agreement will be subject only to prospective civil review by the Competition Tribunal. In order for the parties to make public their agreement, they would need to notify the Bureau before the agreement takes effect or within 30 days of execution of the agreement, whichever is earlier. The Bureau would then decide whether or not it wants to challenge the agreement before the Competition Tribunal. In the meantime, the parties would not need to wait for a response from the Bureau, they could proceed to implement their agreement once they have satisfied the conditions of notification. The machinery for the review of notified agreements would be analogous to that for the review of mergers. It should be noted that Trebilcock and Warner call for the introduction of an efficiency defence as part of the civil review proceedings so that horizontal integration by ownership and horizontal integration by contract are placed on a similar legal footing.

2.3 Final Remarks

This chapter has presented several important ideas. First, Canadian conspiracy law has remained basically the same as the original legislation passed in 1889: cartels have been and are illegal in Canada when they lessen competition “unduly”. As a practical matter, the undue lessening of competition has historically been inferred from the degree to which the parties to the agreement control the market place and not from an analysis of the overall welfare effect of the challenged agreement. This is why the Canadian conspiracy provisions are said to create a partial rule of reason. Second, recent developments in cartel theory supporting the idea that some cartels may be welfare increasing have led several authors to criticize the Canadian partial rule of reason approach to conspiracies. They have argued that the partial

rule of reason approach, by not allowing a full consideration of all positive and negative effects of horizontal agreements, may be discouraging both welfare increasing agreements together with welfare decreasing ones. These authors contrast this situation to Canadian merger law that has evolved to allow for efficiency considerations and to the U.S. case in which recent court decisions show that the courts' interpretation of cartel law have started to reflect the new learning on cartel theory. These critics of the Canadian approach have laid out proposals for modifications in the law that would allow for efficiency considerations and would made cartel law symmetrical to merger law.

The debate over the partial rule of reason approach and what is a proper defence is irrelevant if the expected value of being caught, successfully prosecuted and penalized does not deter cartels. In that case, the fines and penalties are a cost that the cartels are willing to bear. Introducing an efficiency defence would not affect the decision to cartelize for those that did so in its absence. The cost of cartelizing would fall for the existing cartels that could mount a persuasive efficiency defence. Some additional efficiency-generating cartels might form if this reform of the law were introduced. A line of criticism to the law, different from the one discussed in this chapter, addresses the deterrence effect emanating from Canadian conspiracy provisions. An important study in this regard is Stanbury (1991) which provides an extensive review of 100 years of conspiracy prosecution in Canada. It concludes that the conspiracy provisions have failed to deter cartel behaviour in Canada.

3. THE NEW DEBATE ON CARTELS AND EFFICIENCY

3.1 Introduction

The idea that cartels may decrease welfare is a very old one. Traditional economics interprets cartels as having as their only purpose the restricting of output and the achievement of monopoly profit. In this constrained framework, the cartel is “condemned” to have a negative effect on welfare through the mis-allocation of resources it creates. More recently, several authors, stressing the capacity of different organizational forms to reduce the costs of coordinating resources, have argued that some cartels may be cost reducing and, thereby, potentially welfare increasing (Bork (1978), Butz (1993), Demsetz (1992), Dick (1992), Kennish and Ross (1997), Ross (1991), Sproul (1990, 1993), Trebilcock and Warner (1993)). These authors provide an additional interpretation of cartels: they may be cooperative attempts to solve market problems (e.g. free-rider, opportunism, informational problems) that affect cost and that have a suboptimal non-cooperative solution. This chapter explains these new developments on cartel theory and analyses price, quality and welfare effects of cartels in this light.¹³ An important part of the discussion on the welfare effects of cartels presented in this chapter relies on the analysis provided by Bork (1978). There are two reasons for this. First, Bork (1978) provides a very complete discussion of the efficiency effects of cartels.

¹³A group of studies that also departs from the traditional interpretation of cartels is known as the theory of the core, as developed and applied by Telser (1985), Pirrong (1992) and Bittingmayer (1982). These studies contend that cartels may be a response to the empty core problem. The focus of this chapter is on the idea that cartels can be cost reducing and, thus, the empty core theory will not be addressed.

Second, his analysis is based on examples of cartels that were prosecuted under the U.S. antitrust laws. This is specially relevant because the present study will be assessing the welfare effects of a sample of prosecuted cartels.

3.2 Analysis on Horizontal Restraints and Efficiency by Bork (1978)

Bork (1978) points out that cartels can take two polar forms:

- (1) the naked cartel, which serves the only purpose of restricting output and increasing price, and thereby creates resource mis-allocation, and
- (2) the partnership, which only creates economic benefits.

Although both forms involve the agreed elimination of competition, frequently through price fixing and market division, they have exactly opposite effects on economic efficiency.

In this regard, the example of the law partnership provided by Bork is illuminating:

Many people seem to think that the formation of a partnership or joint venture somehow does not involve an agreement on prices and markets. Yet many partnerships rely upon just such agreements, and we recognize their economic utility. The typical law partnership provides perhaps the most familiar example. A law firm is composed of lawyers who could compete with one another but who have instead eliminated rivalry and integrated their activities in the interest of more effective operation. Not only are partners and associates frequently forbidden to take legal business on their own (Taft's example of a valid ancillary restraint), but the law firm operates on the basis of both price-fixing and market-division agreements. The partners agree upon the fees to be charged for each member's and associate's services (which is price fixing) and usually operate on a tacit, if not explicit, understanding about fields of specialization and primary responsibility for particular clients (both of which are instances of market division).

Nobody supposes that a law firm in New York fixes its fees or controls specialization and client contacts for the purpose of restricting output. Each firm faces the rivalry of scores or hundreds of other firms, so that output restriction is not a tenable hypothesis. The alternative hypothesis is that the partners believe the agreements make the firm more efficient. We have, therefore, a very common situation in which agreements fixing prices and dividing markets contribute to efficiency and certainly should not be held illegal (Bork (1978, p. 265)).

Bork goes on to analyse the means by which price fixing and market division can create efficiency. He argues that market division agreements can create efficiency in the following ways:

(1) Optimizing local sales effort (the free rider problem)

If several firms are promoting and selling an identical product, it is possible for a firm to “free ride” on the promotion and selling efforts of other firms. If firm A incurs the cost of promotion and sales related services (e.g. technical advice) while firm B does not, it is possible for a purchaser to obtain the information he or she needs from firm A, and then buy the product from firm B at a lower price. The free rider problem reduces promotion and the provision of sales related services to the minimum. If firms divide the market among themselves, it would no longer be possible for a consumer to get product information from one firm and then buy from a different firm. Therefore, market division is a way of solving the free rider problem, and thereby bring local sales effort up to the level that a single nationwide seller would find optimal (Bork (1978, p. 430)).

(2) Optimizing local sales effort (the size-of-the-market problem)

If particular markets are so small that they repay the efforts of no more than one seller of a single brand, local sales effort may fall below optimal levels. In this regard, Bork provides the example of a number of towns of such small size that they do not repay cultivation by more than one distributor. If two distributors are able to reach these towns, neither one may find it worthwhile to cultivate them in an intensive way, since even occasional visits by the other would decrease the first distributor’s returns below the level at which cultivation is worthwhile. Therefore, it is likely that these markets will be reached only sporadically, as

when other business requires the representative of the distributor to visit them. Market division is a way of solving this problem. Assigning the market to a single distributor would eliminate the random visits of the other, and thereby would make proper cultivation of the market worthwhile (Bork (1978, p. 432)).

(3) Minimizing the costs of providing post-sales service and minimizing the risks of customer dissatisfaction

The provision of post-sale service is important for some products. When the cost of service is included in the price of the product, the free rider problem may arise. If dealers sell to customers from distant locations, tension may arise between the selling dealer and the dealer closest to the customer about the provision of post-sale service, while the customer, who believes he or she is dealing with a single organization, becomes dissatisfied with the service provided. The selling dealer finds the provision of the servicing at a distance expensive and wishes to hold it to a minimum. In any event, the selling dealer is also likely to experience delays, whereas the other dealer, who has not received the purchase price, feels no incentive to provide the service. Market division solves this problem. If the dealers divide the market, then the local dealer has an incentive to provide good service because he or she has been paid for it, and because customer's satisfaction is now closely connected to the likelihood of selling equipment to the same customer in the future (Bork (1978, p. 433, 434)).

(4) Encouraging exchanges of information

Market division may help encourage exchanges of information between firms engaged in cooperative productive activities. If a firm receiving information from other firm can use it to injure the firm supplying it, there will be a disincentive to share information. For example,

a firm is less likely to make known to other firms any new selling or manufacturing techniques if the information may then be used competitively against it. Market division removes this disincentive to disclosure, and by doing so makes the cooperation endeavour more efficient (Bork (1978, p. 432)).

(5) Preventing overlapping use of a service whose cost is shared

Market division can serve to prevent the overlapping use of a service whose cost is shared. Bork provides the example of the cooperation of three regional breweries to share the costs of radio and television commercials through a common advertising agency. The breweries marketed their beer under separate marks and brand names. One brewer operated in the Gulf states, one in New England, and the third in the Midwest. Each commercial was used in all the three regions, only the name of the beer being changed. This sharing of efforts made the use of nationally known actors commercially feasible. The arrangement was also said to reduce production costs of the commercials by as much as a third; moreover, by taking turns testing the commercials, the brewers were able to achieve the benefits of regional testing usually available only to a national firm. The value of the arrangement would have been destroyed if the brewers had started to invade each other's markets with identical commercials. An agreement by the parties stating the areas in which each might use the commercials helps to preserve the efficiencies created by this contract integration (Bork (1978, p. 434)).

Bork (1978) also refers to the efficiencies that may be achieved by horizontal price fixing agreements. Among the efficiencies described by him are the following:

(1) Optimizing local sales effort (the free rider problem)

As was previously explained, when firms are selling an identical product, a free rider problem might arise. Price fixing is a way of solving the free rider problem. If price is fixed, it is not possible for a purchaser to obtain the information he or she needs from a firm and then to purchase from another firm at a lower price. Therefore, under price fixing, each seller of the brand is free to provide the optimal amount of selling effort without any risk of a free rider (Bork (1978, p. 435)).

(2) Providing a mechanism for the transfer of information

The suggesting or setting of prices can serve to disseminate information about proper market behaviour from those whose information or competence is superior to others. The *Nationwide Trailer Rental System (NTRS)*¹⁴ case provides an example in this respect. NTRS was an organization created to facilitate one-way trailer rental, so that persons renting trailers for one-way movements did not have to pay the expense of returning a trailer to the place from which it was rented. NTRS adopted a suggested rate schedule that was circulated to member firms, and also adopted a uniform lease agreement for members use that specified the charge for overtime use of trailers. NTRS defended this action as a necessary service to transfer information to its members, mainly small businesses. NTRS argued that it was essential for the intelligent conduct of the one-way trailer business that its members have an estimate of what rates would prove profitable and reasonable in areas to which they send

¹⁴*United States v. Nationwide Trailer Rental System, Inc.*, 156 F. Supp. 800 (D. Kan. 1957), affirmed, 355 U.S. 10 (1954).

trailers.¹⁵ The district court nevertheless held the circulation of price lists illegal under section 1 of the Sherman Act, without explaining what competition was suppressed. Given that the NTRS members were located in different cities and were not in competition with each other, it is hard to see how its practices could have been designed to eliminate competition that did not exist (Bork (1978, p. 436, 437)).

(3) Protecting one party to a joint venture against the fraud of the other

The example of *United States v. Columbia Pictures Corp.* case¹⁶ illustrates this efficiency. The pertinent part of this case dealt with an arrangement by which Gems, Inc., a completely owned subsidiary of Columbia Pictures, was granted by Universal Pictures Co., Inc, a fourteen-year exclusive license to distribute for television exhibition approximately 600 Universal feature films. The U.S. government challenged the provision for the advance classification of each Columbia and Universal film and the provision that Universal films should not be sub-licensed by Screen Gems for less than Columbia features classified as of comparable quality. Obviously, this latter term had the effect of fixing the price of Universal films with respect to Columbia films. In the absence of these provisions, it would have been possible for Screen Gems to shift income from Universal to Columbia by offering licenses for Universal films at lower rates, on the tacit understanding that the licensees would take Columbia films at correspondingly higher rates. Classification and price fixing were a means of preventing this, facilitating the division of receipts when Universal and Columbia films were licensed together for a single fee, and saving disputes afterward. The government showed no

¹⁵NTRS Jurisdictional Statement, p. 11, 355 U.S. 10.

¹⁶189 F. Supp. 153 (S.D.N.Y. 1960).

likely effect of the agreements on the general market price, and the district court properly upheld the challenged provisions (Bork (1978, p. 438, 439)).

Sproul (1990, p. 21) provides a similar example to Bork's to illustrate this efficiency. The example relates to the popular film "Star Wars" and the unpopular "The Other Side of Midnight". These films were booked jointly and distributors were able to attribute 50 percent of the revenue to each film, thereby cheating the producer of "Star Wars". This problem could have been avoided by fixing the price of one film relative to the other in advance. As Sproul explains, while this practice has a clear efficiency justification, it could be considered horizontal price fixing under U.S. law if the films involved are made by separate companies.

(4) Reinforcing a market division agreement

It was previously explained that market division agreements may create efficiency, for example by solving the free rider problem and bringing sales effort up to the optimal level. Nevertheless, when the parties to the market division agreement sell to resellers, market division agreements are circumvented. As Bork points out, it would be difficult to know whether the member of the market division agreement, whose reseller sold across territorial lines, had given a lower price with that end in view. Price fixing can be a way of reinforcing the market division agreement. This could be done, either by an agreement on the prices at which the members of the market division agreement should sell to resellers or by an agreement that the members should maintain the resale prices of their resellers (Bork (1978, p. 436)).

Bork provides the *Sealy* case as an example of a situation in which price fixing may have been serving the purpose of reinforcing a market division agreement (*United States v. Sealy*,

Inc.).¹⁷ *Sealy* was engaged in the business of licensing manufacturers of mattresses and bedding products to make and sell such products under the *Sealy* name and trade mark. At the time of the trial, there were about thirty *Sealy* licensees distributed across the United States. Almost all of *Sealy*'s stock was owned by these manufacturer-licensees. According to *Sealy* bylaws, each of its directors had to be a stockholder or a stockholder-licensee's nominee. This control of *Sealy* by its licensees caused the U.S. Supreme Court to correctly conclude that the restraints could not be classified as vertically imposed but were horizontal restraints between the controlling manufacturer-licensees. The *Sealy* licenses required the manufacturers to follow promulgated standards and specifications in order to ensure the uniformity of the products sold under the licensed name and marks. The arrangement involved both price-fixing and market division. The manufacturers agreed via *Sealy*, to impose resale price maintenance upon their outlets – a horizontal agreement between firms at the same level of the industry. They also agreed that each manufacturer should sell *Sealy*-brand mattresses and bedding products only within a designated territory. Nevertheless, each manufacturer remained free to make and sell other bedding products under other names anywhere. The manufacturer-licensees jointly contributed with funds for national advertising (Bork (1978, p. 270).

According to Bork, nothing about the *Sealy* arrangement resembled an attempt to eliminate competition in the bedding-product market, and it was impossible for the arrangement to have the purpose or the effect of restricting output. In this regard, he makes two important comments. First, new licenses were issued only to manufacturers in territories

¹⁷338 U.S. 350, 354, 355, 356, 357 (1967).

not already served by an existing licensee or which were deemed inadequately served. Geographical coverage was the main concern, and there was no attempt to bring in all or even a significant proportion of existing manufacturers. Second, there was at least one competing national manufacturer and seller of such products, together with several other groups organized on principles similar to *Sealy's*. In addition, there were many local manufacturers not involved in any group. Then, Bork argues, if the restraints could not possibly be achieving the goal of reducing output and increasing price, they must have been serving a different purpose. He offers a possible explanation to this puzzle: market division and price fixing might have been fulfilling the goal of solving free rider related problems among the *Sealy* members (Bork (1978, p. 270-274).

Bork explains that the record showed that the separate mattress manufacturers found that national advertising was a distinct advantage, but that it required a scale of operations which none of them could achieve alone. Hence, the idea of a group distributed across the nation using identical brands, names, and product specifications. Bork contends that the need for market division very likely arose from the fact that each member also engaged in considerable individual local sales and promotional effort. Such efforts may include local advertising, the employment of salesmen, the provision of information to prospective consumers, and so forth. These type of efforts cost money that can be recaptured only in the price at which the products are sold. A firm that is large enough to operate nationally under its own trademark will measure such local efforts and expenditures simply by their relation to expected sales and revenues. However, the member of a contract-integrated group, such as *Sealy*, has a special problem. Because the *Sealy* licensees were selling identical products, it would have been

possible for one licensee to let his or her neighbour incur the cost of local sales and promotional effort, and then offer a lower price that did not have to recapture those necessary expenditures. The underselling firm would thus get a free ride, and this might be what enabled it to undersell profitably. Bork explains that the objection to this behaviour from the consumer's point of view is not that the practice is unfair but that, if it persists, manufacturers in the system will decrease the level of local sales and promotional effort they are willing to do. To that extent, he adds, the group becomes a less efficient marketer than a single, fully integrated firm of the same size. That is to say, the *Sealy* system would not provide the optimal amount of local effort and would be less efficient. Market division is a way of solving this problem, leaving each member free to do the amount of local sales and promotional effort appropriate to his market (Bork (1978, p. 273, 274).

Bork explains that, in the *Sealy* case, market division alone may not have been enough to solve the free rider problem. This is due to the fact that the manufacturers sold to retailers who might cross-sell, particularly since the agreement did not control the price the manufacturers charged their retailers. Bork concludes that the agreement to maintain resale prices may have been a means of reinforcing the market division by making sure that a reseller given a low price in order to meet the competition of manufacturers of other brands could not sell in the territory of another manufacturer (Bork (1978), p. 274).

3.3 Dynamic vs. Static Analysis of Effects of Collusion

A recent literature on collusion has shifted the emphasis from an analysis of the effects of collusion in a given period towards an analysis of its effects over time. A representative study in this regard is Fershtman and Pakes (2000). These authors contend that whether an

industry can or cannot support collusion affects the incentives of firms to launch products in (or to enter) the industry and to develop the products after they are launched. They argue that the ability to collude, through its effect on firms' investment decisions, will have an impact on the variety, cost and quality of the products marketed by the industry over time, and that this can have as much or more of an effect on welfare as do the price effects of collusion. In this study, Fershtman and Pakes, provide a framework with heterogeneity among firms, investment, entry and exit. They use numerical analysis to compare a collusive environment to a non-collusive environment over time. They find that the collusive industry offers (on average) both more and higher quality products, albeit often at a higher price. They also find that (on average) price collusion induces more investment and that the resulting increases in variety and quality more than offset the impact on consumer surplus generated by the collusive prices. In light of these findings, they conclude that the presumption that collusion is necessarily bad for consumers is wrong and, on these grounds, they question the per se nature of U.S. antitrust policy toward collusion.

The effects of collusion on the incentives of firms to engage in R & D cooperation, which will be referred to later, provides an additional example of the possible beneficial effects that collusion may generate over time.

3.4 The Theory of Horizontal Restraints and Cost Reduction

This section focuses exclusively on how horizontal restraints can create efficiency in the form of cost reduction. Bork's analysis above provides some examples in which this form of efficiency creation is present. The objective here is to give additional insight in this regard.

3.4.1 Coordination between Competitors may Reduce Costs

Given the characteristics of a particular industry, some cooperation between rival firms can reduce costs. Four examples are worthy to note:

(1) Industries with economies of scale

In some industries, there might exist economies of scale on activities, such as research and development, collection and dissemination of trade information, advertising, marketing and distribution. If firms carried out such activities jointly, as opposed to independently, they would be able to exploit the economies of scale and thereby reduce costs.

(2) Industries with negative network externality on cost

Ross (1991) provides this example based on the paper by Carlton and Klammer (1983). Assume a network industry, in which each firm's actions affect the cost of rival firms. Each firm bases its decisions on private profit maximization and thus ignores its effect on costs of the rest of the firms. If firms were able to coordinate their activities so that they effectively eliminated this negative externality, they would be able to reduce costs.

(3) Industries in which firms produce a service with sequential responsibility (The U.S. railroad express industry case)

Grossman (1996) explains that in 1851 in the U.S. railroad express industry there existed a significant cost reducing potential in the coordination of the distribution activity of the firms. To illustrate this, he provides a hypothetical example of two express firms operating autonomously. If the first firm wants to transship a package from its territory to a recipient in the other's market, in the absence of some agreement to handle this procedure, the first firm's agent must go to the office of the second firm and transact for transshipment at posted

prices. If there are several packages, each must be transacted separately, again at posted prices. As the volume increases, the time and effort to process it (transaction costs) grows as well. In Grossman's example, if firms were able to somehow integrate their distribution activities they would be able to reduce cost.

(4) Industry with a need for sales coordination (The coal industry case)

This example is given by Demsetz (1992). Coal is purchased by size. A coal producer automatically creates other sizes of coal when servicing an order for a specific size. Coal manufacturers place these by-product sizes on the market for what price they can fetch because inventorying coal is considered to be too costly. If the sale price is smaller than the marketing and transportation cost of the coal, a loss is incurred.

If customer A orders large size coal from company X, then this company will automatically produce unordered smaller sizes of coal. This should be the source of coal for those who demand small nuggets. Nevertheless, suppose that customer B demands small nuggets and places his order with company Y, instead of with company X. Then Y will automatically produce an unordered quantity of large nuggets. Coordinating orders, by channelling them first to the company that have already produced the size of coal demanded, can reduce the redundancy in the supply system, and thereby reduce cost.

3.4.2 Solution to Coordination Problem: Contract Integration

One possible solution to the coordination problem in all the previous examples would be the merger of the firms concerned. However, if it is possible for the firms to solve the coordination problem without merger, they may choose contract integration (in the form of cartelization) (Bork (1978), Ross (1991), Bittlingmayer (1985)). Firms' preferred choice

between cartel and merger will be determined by which of the two arrangements provides a higher net gain. On the one hand, contract integration represents attempts by the firms to achieve many of the advantages of the coordination and cooperation possible within a single firm without the hierarchies and bureaucracies of large organizations (Kennish and Ross (1997, p. 29)). Also, contract integration may be a means of avoiding any dis-economies from merger, if they existed. On the other hand, under merger, firms would not be faced with cartel related costs and problems, such as agreement break ups, opportunistic behaviour and the cost of policing and enforcing the cartel.

Below, I refer to specific institutional arrangements (or contracts) other than merger that could be used to solve the coordination problem in the previous examples.

(1) Industries with economies of scale

Firms could pool funds together and create an agency. This agency would perform those functions in which economies of scale exist. By centralizing those functions, economies of scale would be exploited and costs reduced.

(2) Industries with negative network externality on cost

Carlton and Klammer (1983) contend that as long as the number of firms is small, one solution would be for the firms to design a system of bilateral side payments that reflects the externality on costs. By eliminating the effect of the externality, this system would achieve cost reduction.

(3) Industry in which firms produce a service with sequential responsibility (The U.S. railroad express industry case)

As Grossman (1996) contends, a way around the coordination problem would be for the firms to contract and form a jointly operated distribution network that allows transshipment according to a regular, manageable formula. In this regard, Grossman (1996) argues that although the U.S. railroad express cartel (1851-1913) involved price fixing and market division, it was also an effort by its five members to create and administer a cost saving joint distribution network. He explains that the network simplified transshipment enormously. Instead of transacting for each package separately, the agent for the first firm handed over express material to the transshipper. Weight of the whole shipment was recorded since railroad transportation costs depended partly on weight. Finally, waybills were transferred, and the transshipper took charge of all materials. Given that this was repeated many times at railway depots across the country, express firms were able to total up their transshipment volume with one another and settle at regular intervals. The system allowed for rapid transfer of thousands of packages daily. Grossman (1996) points out that the cost reducing effect of the cartel was the key to its stability. In this respect, he explains that because cost was dependent on collusion, the cartel members could both under-price entrants and punish defectors.

(4) Industries with a need for sales coordination (The coal industry case)

Demsetz (1992) explains that a possible solution in this case is for the firms concerned to pool funds together and create a sales agency. The sales agency would be able to coordinate coal orders to eliminate the redundancy in the supply system. Demsetz also recognizes other alternative solutions such as an intervening layer of brokers. However, he points out that the sales agency may be the cheapest way to accomplish coordination in this case. He states that

if each coal producer has his own price schedule, the broker's problem in serving customers expeditiously becomes very complex. Producers who plan to take a longer time to deliver might offer lower prices. A unique price schedule attached to delivery commitment would significantly simplify the broker's mission. But then, Demsetz argues, we have the essentials of a sales agency.

3.4.3. The Need for Horizontal Restraints

In all of the examples mentioned above, the firms are rival competitors and, for this reason, they are faced with the risk of competing away the gain (i.e. cost reduction) achieved through cooperation. The degree of market competition among the concerned firms is crucial to the degree of gain dissipation that may occur. Katz (1986) provides a very good summary of this proposition for the case of R&D cooperation:

Whether the net incentive effect of cooperation is positive or negative largely depends on the strength of product-market competition. When product-market competition is intense and cooperative R&D reduces the cost of multiple firms, competition among these firms will lead them to dissipate much of the potential gains from the innovation by lowering product prices. In the limit, if the firms were Bertrand competitors in a homogeneous product market with a constant returns to scale technology and equal unit costs of production, any cost reduction brought about by shared R&D would cause the equilibrium price to fall by the full amount of the cost reduction. Consumers would appropriate all of the economic gains of the cooperative R&D, and firms would have no incentive to conduct R&D under a cooperative agreement. At the other extreme, if the firms conducting the joint R&D sold their final outputs in unrelated product markets, there would be no negative pecuniary externalities, and the net incentive effects of cooperation would be positive. For markets in which the firms are product-market rivals, but are less than perfectly competitive, the net effect of a cooperative agreement may be to raise or to lower private incentives to engage in R&D (Katz (1986), p.529).

Moreover, when cooperation implies joint investments, each cooperating firm has an incentive to reduce its contributions to the minimum and/or to increase output in order to

augment its share of the cooperatively produced benefit. In order to increase output, firms may be tempted to undercut each other prices and/or to increase sales related services and quality, increasing cost. Therefore, this type of free rider problem also creates a risk of dissipating the potential gain from cooperation.

Horizontal restraints, such as price fixing and market division, can cure the problems described above. By restricting competition among the cooperating firms, the restraints would prevent them from competing away the gain that made cooperation worthwhile in the first place (Sproul (1993, p.741), Butz (1993, p. 74), Dick (1993, p. 51-55)).

3.5. Empirical Evidence on Cost Reducing Cartels

A new debate on cartels and efficiency has emerged, in particular, several authors have argued that cartels may potentially reduce costs and thereby increase welfare. The theoretical debate has been active. Simulations or numerical analysis have also provided some insight into how complex dynamic models such as that of Fershtman and Pakes (2000) operate. The number of empirical studies addressing the cost reducing cartel hypothesis is small and there is a clear need for additional empirical research.

The study on the U.S. railroad express cartel by Grossman (1996) and the analysis of the ocean shipping conferences by Butz (1993), summarized below, are instances of cartels that conducted cost reducing activities. Nevertheless, in terms of the debate on cartels and efficiency, the key question is to determine if the cost reducing activities would still be realized in the absence of the cartel. That is, the crucial question is if horizontal restraints, such as price fixing and market division, are or are not necessary conditions for the materialization of cost reduction.

Butz (1993) tackles the issue of whether U.S. ocean shipping conferences, which receive antitrust immunity and therefore can fix rates, constitute legalized cartels that serve the only purpose of increasing price and reducing output. He explains that conferences members engage in cost reducing cooperative agreements such as: vessel-sharing agreements, space-charter agreements and electronic data interchange agreements. He contends that whatever market power conferences may (or may not) wield, they also help to coordinate their members' joint investments and thereby allow the historically small firms in this industry to exploit vast network economies (akin to those in other transportation industries) that small firms could not achieve on their own. Reitzes (1993, p.84) criticizes Butz's study. He explains that although the study shows that ocean shipping conferences create efficiencies, it does not provide sufficient evidence to conclude if those efficiencies would still be realized in the absence of collective rate fixing.

Dick (1992) examines a sample of 16 U.S. export cartels which are granted antitrust immunity under the Webb-Pomerene Export Trade Act. He tests the hypothesis that the Webb-Pomerene exemption facilitates the exercise of market power against the hypothesis that these cartels achieve cost reduction by centralizing sales-related functions that members previously had performed individually. Among such functions are operating overseas sales agencies, market research and development, collection and dissemination of trade information, freight and insurance rate negotiation, advertising, licensing and credit services, and lobbying of domestic and foreign governments. His finding, that cartel operation on average raised export volumes by 15 per cent and lowered export prices by an average 7.6 per cent in any given year, supports the cost reducing hypothesis. In an analogous study for the case of 12

Japanese export cartels, Dick (1993) tests the cartel anti-competitive hypothesis versus the hypothesis that collusion may achieve cost reduction or/and increase quality. He finds that the signs of the cartels' price and quantity effects are consistent with an anti-competitive hypothesis in only three of the 12 industries. In the remaining nine industries the signing of the export price and volume effects is consistent with both the cost reduction hypothesis and the quality assurance hypothesis.

Concerned about the possibility that cartels may reduce costs, Sproul (1993) tackles the following question: Does antitrust prosecution of cartels promote competition and thereby reduce prices, or does it destroy cost reducing cooperative arrangements among sellers, and thus increase prices? In a survey of 25 cases he finds that prices gradually rise by about seven per cent over the four years following an indictment. He also finds that prices subsequent to an indictment are negatively correlated with the severity of penalties. Sproul (1993) concludes that these findings suggest either that penalties are not severe enough or that economically efficient (cost reducing) conspiracies are being penalized.¹⁸

¹⁸As Sproul (1993) explains the finding that prices subsequent to an indictment are negatively correlated with the severity of penalties may have two possible interpretations. First, it may mean that the more flagrant violators tend to receive harsher penalties and also tend to reduce their prices more (or raise them less) after the indictment. Second, it may mean that penalties are not severe enough to deter cartel behavior. In order to shed light on this issue, Sproul (1993) used the fact that antitrust penalties were substantially raised in 1976 and divided his sample of cases into two groups. He found that the prices charged by firms in the "after 1976" group were lower than the prices charged by firms in the "before 1976" group (although prices were lower for the new cases than for the old, there was still not significant drop in price resulting from the indictment). He concluded that these results were consistent with the interpretation that penalties were not severe enough. In this regard, it should be noted that if penalties are not severe enough (non-deterrence) one would expect prices not to change after prosecution. However, Sproul finds prices gradually to increase after an indictment. Therefore, the non-deterrence hypothesis is questionable unless one argues that the conspiracies might have been stopped during prosecution and gradually resumed

Butz's study examines an industry while it operates under a cartel regime, and thereby his results do not allow to determine if the cost reducing activities would still be carried out in the absence of the cartel. In contrast to Butz's approach, the Dick and Sproul studies involve a comparison of the cartel regime status versus the "absence of cartel" regime status for each industry. Dick examines the effect of the creation of cartels, and Sproul explores the effect of the destruction of cartels. For this reason, the Dick and Sproul studies do help to shed light on to what extent horizontal restraints are or are not necessary conditions for cost reduction. Dick's finding that on average price falls and output rises after the creation of cartels, and Sproul's finding that an average of prices rose after the destruction of cartels, are both supportive of the hypothesis that in those cases horizontal restraints were necessary conditions for cost reduction.

3.6 Theoretical Models

3.6.1 Introductory Note

The remaining part of this chapter uses two models to examine in detail the price and welfare effects of conspiracies in light of the recent developments on cartel theory. The analysis focuses exclusively on the case of cartels with market power. The price and welfare effects of two types of cartels versus a competitive regime are examined:

- (1) The "naked" cartel: An agreement among competitors not to compete along some dimensions that is either not part of a larger agreement that creates efficiency in the form of cost reduction or that can be severed from such larger agreement with no sacrifice to efficiency.¹⁹

afterwards. Sproul (1993) did not elaborate on this point.

¹⁹The definition of a "naked" cartel basically corresponds to what Ross (1991) defines as "naked" agreements with the exception that Ross did not limit the scope of efficiency

- (2) The “complex” cartel: An agreement among competitors not to compete along some dimensions that is part of a larger agreement that creates efficiency in the form of cost reduction and that is merely ancillary and reasonably necessary to the larger agreement. That is, if the agreement not to compete is severed from the larger agreement, there is loss of efficiency.²⁰

First, a model in two variables, price and output, is presented. In this context, the “naked” cartel versus competition comparison corresponds to the traditional cartel analysis presented in most microeconomic textbooks. The analysis of the “complex” cartel versus competition “borrows” from Williamson (1968)’s two-variable model on the effect of a merger that both increases price and reduces cost and adapts it to the cartel case.

Although the two variable model in price and output has the advantage of providing a simple framework to examine the price and welfare effects of cartels, it may be inappropriate if the cartel also affects the quality of the product. In that case, the possible combinations of price and welfare effects of the cartel should be examined using a theoretical framework in which quality is also a decision variable. In order to provide such a framework, the second half of this section extends the analysis to a model in three variables: price, output and quality. In this model, efficiency creation takes the form of a reduction in the cost of producing both output and quality. In this three variable model, the “naked” cartel versus competition comparison is based on Spence (1975)’s analysis on the distortions created by a monopoly when quality is an additional choice variable. The effects of a “complex” cartel versus competition are explored by “marrying” Spence and Williamson’s frameworks. That is,

creation to cost reduction (Ross (1991, p. 875)).

²⁰The definition of a “complex” cartel is quite similar to what Kennish and Ross (1997) call a “non-naked” agreement with the exception that these authors did not limit the scope of efficiency creation to cost reduction (Kennish and Ross (1997, p. 55)).

Spence's model is modified so that a cartel not only has the effect of distorting price/output and quality decisions but it also creates efficiency through cost reduction.

In the three variable framework, the variable quality is to be interpreted along three different dimensions: quality-in-a-narrow-sense, the quality of sales related services and the quality of variety. Quality-in-a-narrow-sense requires a measure of performance (e.g. horsepower, weight, communication transmission capacity) that is a monotonic measure of quality. Sales related services are services that bridge the information gap between a potential buyer and the seller and create a more efficient bundle of product, for example, pre-purchase information, warranty services, post purchase information and the like. The quality of variety is an assessment of the set of product qualities offered for sale. This interpretation of quality is wider than the one used by Spence (1975) who was concerned only with quality-in-a-narrow-sense. However, the discussion on cartels and efficiency creation presented in this chapter suggested that cartels can also affect the provision of sales related services and the set of product types available in a particular industry. In order to capture all these effects the interpretation of the variable "quality" was expanded to include not only quality-in-a-narrow-sense, but also, sales related services and variety.

When "quality" is interpreted as "variety", the price and output variables in the three variable model should be thought of as weighted averages of prices and quantities of a set of product types respectively. In such a context, the quality variable is interpreted as a measure of the number of product types to be produced. It should be noted that this way of modelling variety has several advantages. First, it allows an exploration of the possible effects of a cartel on variety or on the quality of sales related services using the simple framework that examines

the effects of a cartel on quality-in-a-narrow-sense. In this regard, it should be stressed that it is important to keep this chapter's models as simple and general as possible because they will be used to examine the effects of cartels in 17 different industries operating at different periods of time. Each of these cartels has its own peculiarities. A more refined model might be appropriate if the empirical focus were on a single cartel operating in a particular industry. Second, this way of modelling variety allows for multi-product firms, a possibility that is omitted in other variety models that assume, unrealistically, that each firm produces only one product type.²¹

The following assumptions are made for both models:

Assumption 1

For the case of the two variable model assume that there are two possible technologies: an efficient technology, for which the cost function equals $C(x(p))$; and an inefficient technology, for which the cost function equals $C^i(x(p))$. Assume that for any p :

$$C(x(p)) < C^i(x(p))$$

$$C_x(x(p)) < C_x^i(x(p)) \Rightarrow C_p(x(p)) > C_p^i(x(p))$$

For the case of the three variable model assume that there are two possible technologies: an efficient technology, for which the cost function equals $C(x(p, q))$, and an inefficient technology, for which the cost function equals $C^i(x(p, q))$. Assume that for any (p, q) :

$$C(x(p, q), q) < C^i(x(p, q), q)$$

$$C_x(x(p, q), q) < C_x^i(x(p, q), q) \Rightarrow C_p(x(p, q), q) > C_p^i(x(p, q), q)$$

$$C_q(x(p, q), q) < C_q^i(x(p, q), q)$$

²¹This assumption is characteristic of many papers from the often cited papers of Spence (1976) and Dixit and Stiglitz (1977) to the recent dynamic analysis of Fershtman and Pakes (2000).

Assumption 2

Assume that an industry can operate under two possible regimes: a cartel regime, in which firms act as a single monopolist, or a competitive regime, in which both price and quality are determined competitively.

Assumption 3

Prosecution of an industry that is operating under the cartel regime effectively achieves deterrence. That is, after prosecution the industry becomes competitive.

Assumption 4

Assume that there are two types of industries:

- (1) **Type-I-industry:** This industry type uses the efficient technology under both the cartel and the competitive regime. Therefore, the formation of a cartel in this industry has no effect on the technology that is used. A cartel formed in this industry will be referred as a “naked” cartel.
- (2) **Type-II-industry:** This industry type uses the efficient technology under the cartel regime but it uses the inefficient technology under the competitive regime. Therefore, the formation of a cartel in this industry allows the firms to use a technology that is superior to the one being used under the competitive regime. A cartel formed in this industry will be referred as a “complex” cartel.

Assumption 5

Assume that a competitive regime that uses the efficient (inefficient) technology achieves welfare maximization given the efficient (inefficient) technology. In other words, a competitive regime that uses the efficient (inefficient) technology achieves the same result as a welfare maximizing planner that is constrained to using the efficient (inefficient) technology.²²

Notice that assumption 4 in this model implies that a cartel always uses the efficient technology, irrespectively of if it is a “naked” cartel or a “complex” cartel. A cartel is

²²One way of thinking of such a planner is to imagine a planner that is operating in a “world” in which the best available technology is the efficient (inefficient) technology. In this context, assumption 5 could be interpreted as indicating that the First Welfare Theorem conditions are met under the competitive regime in this efficient (inefficient) technology “world”.

“naked”(“complex”) when the competitive regime in the industry in which it operates uses the efficient (inefficient) technology.

There are three possible regimes in both models:

- **Regime 1:** Competitive regime that uses the efficient technology,
- **Regime 2:** Cartel regime that uses the efficient technology, and
- **Regime 3:** Competitive regime that uses the inefficient technology.

By construction, the type-I-industry operates either under regime 1 (when it is competitive) or under regime 2 (when it is cartelized). The type-II-industry operates either under regime 3 (when it is competitive) or under regime 2 (when it is cartelized).

3.6.2 Two Variable Model

In this section a model in two variables, price and quantity, is used to explore the price and welfare effects of a “naked” cartel versus a competitive regime and a “complex” cartel versus a competitive regime. One could consider this model as a special case of the next section’ s three variable model (price, quantity, quality) with quality held constant. A summary of the results obtained is presented in the top section of table 1. The table also shows the expected effect of prosecution.

The following notation is used:

p: Price

x: Quantity

($\bar{p}$, $\bar{x}$): Equilibrium price and quantity of competitive regime under efficient technology

($\bar{\bar{p}}$, $\bar{\bar{x}}$): Equilibrium price and quantity of competitive regime under inefficient technology

Table 1. Theoretically Possible Price, Quality and Welfare Effects of Cartels

TWO VARIABLE MODEL						
Cartel Type	Effects of Cartel on:			Effects of Prosecution on: (Assuming deterrence)		
	Price	Quality	Welfare	Price	Quality	Welfare
"Naked"	Rises	n/a	Falls	Falls	n/a	Rises
"Naked"	Not possible for a "naked" cartel to decrease price					
"Naked"	Not possible for a "naked" cartel to have no effect on price					
"Complex"	Rises	n/a	Ambiguous	Falls	n/a	Ambiguous
"Complex"	Falls	n/a	Rises	Rises	n/a	Falls
"Complex"	No effect	n/a	Rises	No effect	n/a	Falls
THREE VARIABLE MODEL						
Cartel Type	Effects of Cartel on:			Effects of Prosecution on: (Assuming deterrence)		
	Price	Quality	Welfare	Price	Quality	Welfare
"Naked"	Rises	Rises	Falls	Falls	Falls	Rises
"Naked"	Rises	Falls	Falls	Falls	Rises	Rises
"Naked"	Falls	Falls	Falls	Rises	Rises	Rises
"Naked"	Not possible for a "naked" cartel to decrease price and increase quality					
"Naked"	No effect	Falls	Falls	No effect	Rises	Rises
"Naked"	Not possible for a "naked" cartel to have no effect on both price and quality					
"Naked"	Not possible for a "naked" cartel to have no effect on price and increase quality					
"Naked"	Rises	No effect	Falls	Falls	No effect	Rises
"Naked"	Not possible for a "naked" cartel to decrease price and have no effect on quality					
"Complex"	Rises	Rises	Ambiguous	Falls	Falls	Ambiguous
"Complex"	Rises	Falls	Ambiguous	Falls	Rises	Ambiguous
"Complex"	Falls	Falls	Ambiguous	Rises	Rises	Ambiguous
"Complex"	Falls	Rises	Rises	Rises	Falls	Falls
"Complex"	No effect	No effect	Rises	No effect	No effect	Falls
"Complex"	No effect	Rises	Rises	No effect	Falls	Falls
"Complex"	No effect	Falls	Ambiguous	No effect	Rises	Ambiguous
"Complex"	Rises	No effect	Ambiguous	Falls	No effect	Ambiguous
"Complex"	Falls	No effect	Rises	Rises	No effect	Falls

Note: "n/a" stands for not applicable

$(\bar{p}, \bar{x})$: Equilibrium price and quantity of cartel regime under efficient technology

$X(p)$: Demand function

$C(x(p))$: Cost function (efficient technology)

$C^i(x(p))$: Cost function (inefficient technology)

$W(p)$: Welfare function (efficient technology).

$W^i(p)$: Welfare function (inefficient technology)

$\pi(p)$: Cartel profit function under the efficient technology

Regime 1: Competitive Regime that Uses the Efficient Technology

Assumption 5 implies that the regime 1 price level is the welfare maximizing price level under the efficient technology. Therefore, the competitive regime problem under the efficient technology is equivalent to that of a planner that maximizes welfare under the efficient technology:

$$\text{Max}_p W(p) = \int_p^{\infty} X(v)dv + pX(p) - C(x(p))$$

$$W_p(p) = pX_p - C_p(x(p)) = 0 \quad (1)$$

Regime 2: Cartel that Uses the Efficient Technology

A cartel that uses the efficient technology solves the following problem:

$$\text{Max}_p \pi(p) = pX(p) - C(x(p))$$

$$\pi_p(p) = X(p) + pX_p(p) - C_p(x(p)) = 0 \quad (2)$$

Regime 3: Competitive Regime that Uses the Inefficient Technology

Assumption 5 implies that the regime 3 price level is the welfare maximizing price level under the inefficient technology. Therefore, the competition problem under the inefficient technology is equivalent to that of a planner that maximizes welfare under the inefficient technology:

$$\text{Max}_p W^i(p) = \int_p^{\infty} X(v)dv + pX(p) - C^i(x(p))$$

$$W_p^i(p) = pX_p(p) - C_p^i(x(p)) = 0 \quad (3)$$

Regime 2 vs. Regime 1: “Naked” Cartel versus Competition

A “naked” cartel is a cartel that operates in the type-I-industry. Therefore, in order to examine the price and welfare effects of a “naked” cartel versus competition, it is necessary to compare regime 2 versus regime 1. In this context, price and welfare under regime 2 will be interpreted as price and welfare of a “naked” cartel.

From equation 1 (regime 1) and equation 2 (regime 2), it can be seen that:

$$\pi_p(p) = X(p) + W_p(p) \Rightarrow \text{When } W_p(p) = 0, \pi_p(p) > 0$$

Therefore, a “naked” cartel (regime 2) always charges a higher price than the competitive regime (regime 1) (i.e. $\bar{p} > \dot{p}$).

Both regimes 1 and 2 use the efficient technology. Recall that the regime 1 price level is the welfare maximizing price level under the efficient technology. Then, it can be concluded that because a “naked” cartel (regime 2) always charges a higher price than the competitive regime (regime 1), a “naked” cartel always decreases welfare. This result is illustrated in figure 1. In the notation adopted here:

$$\begin{aligned}
 W(\bar{p}) &< W(\dot{p}) \\
 \Leftrightarrow \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C(x(\bar{p})) &< \int_{\dot{p}}^{\infty} X(v) dv + \dot{p}X(\dot{p}) - C(x(\dot{p}))
 \end{aligned}$$

Regime 2 versus Regime 3: “Complex” Cartel versus Competition

A “complex” cartel is a cartel that operates in the type-II-industry. Therefore, in order to examine the price and welfare effects of a “complex” cartel versus competition, it is necessary to compare regime 2 versus regime 3. In this context, price and welfare under regime 2 will be interpreted as price and welfare of a “complex” cartel.

Equation 2 (regime 2) implies that:

$$\bar{p} = \frac{C_p(x(\bar{p})) - X(\bar{p})}{X_p(\bar{p})}$$

Figure 1. Welfare Effect of a Change from a Competitive Regime to a “Naked” Cartel Regime

Welfare (competition) = $W(\bar{p}) = A + B + C + D + E - \text{fixed cost}$

Welfare (cartel) = $W(\dot{p}) = A + B + C - \text{fixed cost}$

Net welfare effect = $W(\bar{p}) - W(\dot{p}) = -(D + E)$

Equation 3 (regime 3) implies that:

$$\bar{p} = \frac{C'_p(x(\bar{p}))}{X_p(\bar{p})}$$

Therefore:

A “complex” cartel (regime 2) charges a higher price than the competitive regime (regime 3) (i.e. $\bar{p} > \bar{p}$) if:

$$\frac{C_p(x(\bar{p})) - X(\bar{p})}{X_p(\bar{p})} > \frac{C'_p(x(\bar{p}))}{X_p(\bar{p})}$$

A “complex” cartel (regime 2) charges a lower price than the competitive regime (regime 3) (i.e. $\bar{p} < \bar{p}$) if:

$$\frac{C_p(x(\bar{p})) - X(\bar{p})}{X_p(\bar{p})} < \frac{C'_p(x(\bar{p}))}{X_p(\bar{p})}$$

Williamson (1968) showed that a merger (or other combination) that both increases price and reduces cost has an ambiguous effect on welfare. Figure 2 illustrates this result for the case of a “complex” cartel. Figure 2 is basically the same figure as the one used by Williamson, except for the fact that he assumed constant marginal cost.

It can be concluded from figure 2 that a “complex” cartel that increases price with respect to the competitive regime:

- Decreases welfare when: $D - (E + F) < 0 \Leftrightarrow W(\bar{p}) - W^i(\bar{p}) < 0$

Figure 2. Welfare Effect of a Change from a Competitive Regime to a “Complex” Cartel Regime when the Cartel Price is Higher than the Competitive Price

Welfare (competition) = $W^i(\bar{p}) = A + B + C + E + F - \text{fixed cost}$

Welfare (cartel) = $W(\bar{p}) = A + B + C + D - \text{fixed cost}$

Net welfare effect = $W(\bar{p}) - W^i(\bar{p}) = D - (E + F)$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C(x(\bar{p})) < \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C^i(x(\bar{p}))$$

- Increases welfare when: $D - (E + F) > 0 \Leftrightarrow W(\bar{p}) - W^i(\bar{p}) > 0$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C(x(\bar{p})) > \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C^i(x(\bar{p}))$$

If the price level under the cartel regime is lower than the price level under the competitive regime then both consumer welfare and profits are higher under the cartel than under competition. Therefore, welfare is unambiguously higher under the cartel than under competition. This lack of ambiguity on the welfare effect is illustrated in figure 3. In the notation adopted here:

$$\text{If } \bar{p} < \bar{p} \Leftrightarrow \frac{C_p(x(\bar{p})) - X(\bar{p})}{X_p(\bar{p})} < \frac{C_p^i(x(\bar{p}))}{X_p(\bar{p})}, \text{ then: } W(\bar{p}) > W^i(\bar{p})$$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C(x(\bar{p})) > \int_{\bar{p}}^{\infty} X(v) dv + \bar{p}X(\bar{p}) - C^i(x(\bar{p}))$$

3.6.3. Three Variable Model

This section compares a cartel regime to a competitive regime when quality is an additional choice variable. Spence (1975) conducted this type of analysis for the monopoly case. If one assumes that the “naked” cartel case is similar to the monopoly case (see

Figure 3. Welfare Effect of a Change from a Competitive Regime to a "Complex" Cartel Regime when the Cartel Price is Lower than the Competitive Regime Price

Welfare (competition) = $W^i(\bar{p}) = A + B$ - fixed cost

Welfare (cartel) = $W(\bar{p}) = A + B + C + D + E + F$ - fixed cost

Net welfare effect = $W(\bar{p}) - W^i(\bar{p}) = C + D + E + F$

assumption 6), Spence's results directly illustrate the price, quality and welfare effects of a "naked" cartel vs. competition. This is the strategy that is followed below to examine the "naked" cartel effects (see also appendixes B and C). In order to explore the "complex" cartel effects Spence's framework is modified to allow for cost differences between the competitive regime and the cartel regime. A summary of the results obtained is presented in the bottom section of table 1. The table also shows the expected effect of prosecution.

The following notation is used:

p : Price

x : Quantity

q : Quality

$(\bar{p}, \bar{x}, \bar{q})$: Equilibrium price and quantity of competitive regime under efficient technology

$(\bar{p}^i, \bar{x}^i, \bar{q}^i)$: Equilibrium price and quantity of competitive regime under inefficient technology

$(\bar{p}, \bar{x}, \bar{q})$: Equilibrium price and quantity of cartel regime under efficient technology

$X(p, q)$: Demand function

$C(x(p, q), q)$: Cost function (efficient technology)

$C^i(x(p, q), q)$: Cost function (inefficient technology)

$W(p, q)$: Welfare function (efficient technology).

$W^i(p, q)$: Welfare function (inefficient technology)

$\pi(p, q)$: Cartel profit function under the efficient technology

Regime 1: Competitive Regime that Uses the Efficient Technology

Assumption 5 implies that the regime 1 price-quality level is the welfare maximizing price-quality level under the efficient technology. Therefore, the competitive regime problem under the efficient technology is equivalent to that of a planner that maximizes welfare under the efficient technology:

$$\text{Max}_{p,q} W(p,q) = \int_p^{\infty} X(v,q)dv + pX(p,q) - C(x(p,q),q)$$

$$W_p(p,q) = pX_p(p,q) - C_p(x(p,q),q) = 0 \quad (1.1)$$

$$W_q(p,q) = \int_p^{\infty} X_q(v,q)dv + pX_q(p,q) - C_q(x(p,q),q) = 0 \quad (1.2)$$

It will be useful for the rest of the analysis to depict graphically the solution to the regime 1 problem. A typical configuration is illustrated in figure 4.²³ The solution to the competitive regime problem under the efficient technology is given by the intersection of schedules $W_p = 0$ and $W_q = 0$, represented by point 1 in figure 4. This figure also shows the typical

²³Figure 4 reproduces part of the diagrammatic framework used by Spence (1975) in the sections of his paper dealing with the regulation of monopoly (see figure 4, p. 423 and figure 5, p.427 of his paper). In this chapter, this analytical framework is used (and extended) to explore the price, quality and welfare effects of a “naked” cartel versus competition and of a “complex” cartel versus competition. Spence (1975) did not elaborate on the properties of the schedules in figure 4. See appendix B for a formal analysis of some of these properties.

Figure 4. Regime 1 Equilibrium

shape of an isowelfare curve. Welfare is maximized at point 1 and the farther an isowelfare is from point 1 the lower the level of welfare it represents.

Regime 2. Cartel that Uses the Efficient Technology

A cartel that uses the efficient technology solves the following problem:

$$\text{Max}_{p,q} \pi(p,q) = pX(p,q) - C(x(p,q), q)$$

$$\pi_p(p,q) = X(p,q) + pX_p(p,q) - C_p(x(p,q), q) = 0 \quad (2.1)$$

$$\pi_q(p,q) = pX_q(p,q) - C_q(x(p,q), q) = 0 \quad (2.2)$$

Graphically, the solution to the cartel problem under the efficient technology would be given by the intersection of schedules $\pi_p = 0$ and $\pi_q = 0$.

Regime 3: Competitive Regime that Uses the Inefficient Technology

Assumption 5 implies that the regime 3 price-quality level is the welfare maximizing price-quality level under the inefficient technology. Therefore, the competitive market's problem under the inefficient technology is equivalent to that of a planner that maximizes welfare under the inefficient technology:

$$\text{Max}_{p,q} W^i(p,q) = \int_p^{\infty} X(v,q)dv + pX(p,q) - C^i(x(p,q), q)$$

$$W_p^i(p,q) = pX_p(p,q) - C_p^i(x(p,q), q) = 0 \quad (3.1)$$

$$W_q^i(p,q) = \int_p^{\infty} X_q(v,q)dv + pX_q(p,q) - C_q^i(x(p,q), q) = 0 \quad (3.2)$$

Graphically, the solution to the competitive regime problem under the inefficient technology would be given by the intersection of schedules $W_p^i = 0$ and $W_q^i = 0$.

Regime 2 versus Regime 1: “Naked” Cartel versus Competition

A “naked” cartel is a cartel that operates in the type-I-industry. Therefore, in order to examine the price, quality and welfare effects of a “naked” cartel versus competition, it is necessary to compare regime 2 to regime 1. In this context, price, quality and welfare under regime 2 will be interpreted as price, quality and welfare of a “naked” cartel.

From equation 1.1 (regime 1) and equation 2.1 (regime 2) it can be seen that:

$$\pi_p(p, q) = X(p, q) + W_p(p, q) \Rightarrow \text{When } W_p(p, q) = 0, \pi_p(p, q) > 0$$

Therefore, at any given level of quality a “naked” cartel (regime 2) chooses a higher level of price than a competitive regime (regime 1). This implies that in a figure similar to figure 4, schedule $\pi_p = 0$ will always be below schedule $W_p = 0$.

From equation 1.2 (regime 1) and equation 2.2 (regime 2) it can be seen that:

$$\pi_q(p, q) = W_q(p, q) - \int_p^\infty X_q(v, q)dv \Rightarrow \text{When } W_q(p, q) = 0, \pi_q(p, q) < 0$$

Therefore, at any given level of price a “naked” cartel (regime 2) chooses a lower quality level than a competitive regime (regime 1). This implies that in a figure similar to figure 4, schedule $\pi_q = 0$ will always be below schedule $W_q = 0$.

Recall that the regime 2 price-quality level (i.e. $(\bar{p}, \bar{q})$) is given by the intersection of schedules $\pi_p = 0$ and $\pi_q = 0$, while the regime 1 price-quality level (i.e. $(\hat{p}, \hat{q})$) is given by

the intersection of schedules $W_p = 0$ and $W_q = 0$. Figure 5 reproduces the graphical representation of the regime 1 equilibrium from figure 4. Because schedules $\pi_p = 0$ and $\pi_q = 0$ lie below schedules $W_p = 0$ and $W_q = 0$, respectively; the regime 2 price-quality level (i.e. $(\bar{p}, \bar{q})$) must lie somewhere in the (p, q) space that lies below both schedules $W_p = 0$ and $W_q = 0$. This space is represented by the shaded area in figure 5.

It can be seen from figure 5 that there are three possible price-quality effects of a “naked” cartel (regime 2) with respect to the competitive regime (regime 1):²⁴

- If $(\bar{p}, \bar{q})$ is located in the shaded area section corresponding to quadrant I (for example point 2a, then the “naked” cartel increases both price and quality,
- If $(\bar{p}, \bar{q})$ is located in the shaded area section corresponding to quadrant II (for example point 2b, then the “naked” cartel increases price and reduces quality, and
- If $(\bar{p}, \bar{q})$ is located in the shaded area section corresponding to quadrant III (for example point 2c, then the “naked” cartel decreases both price and quality.

Figure 5 shows that it is not possible for a “naked” cartel (regime 2) to reduce price and increase quality with respect to the competitive regime (regime 1). Notice that the possible (p, q) space for the “naked” cartel equilibrium (i.e. the shaded area) lies outside quadrant IV.

Both regimes 1 and 2 use the efficient technology. Recall that the regime 1 price-quality level (point 1 in figure 5) is the welfare maximizing price-quality level under the efficient

²⁴The results below rely on the following implication of figure 5: The subset of (p, q) points that lies below schedules $W_p = 0$ and $W_q = 0$ includes points from quadrants I, II and III; but not from quadrant IV. Notice that this implication must hold given the characteristics of schedules $W_p = 0$ and $W_q = 0$ proved in appendix B.

Figure 5. Possible (p,q) Space for the Regime 2 Equilibrium and for the Regime 3 Equilibrium

technology. Figure 5 shows that point 1 lies outside the possible (p, q) space for the regime 2 price-quality level (i.e. the shaded area). Therefore, a “naked” cartel (regime 2) always decreases welfare. In the notation adopted here:

$$W(\bar{p}, \bar{q}) < W(\hat{p}, \hat{q})$$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C(x(\bar{p}, \bar{q}), \bar{q}) < \int_{\hat{p}}^{\infty} X(v, \hat{q}) dv + \hat{p}X(\hat{p}, \hat{q}) - C(x(\hat{p}, \hat{q}), \hat{q})$$

Regime 2 versus Regime 3: “Complex” Cartel versus Competition

A “complex” cartel is a cartel that operates in the type-II-industry. Therefore, in order to examine price, quality and welfare effects of a “complex” cartel versus competition, it is necessary to compare regime 2 to regime 3. In this context, price, quality and welfare under regime 2 will be interpreted as price, quality and welfare of a “complex” cartel. The section starts by comparing regime 3 to regime 1 to show that in a figure similar to figure 4, the possible (p, q) space for the regime 3 equilibrium (i.e. $(\hat{p}, \hat{q})$) is the same as the possible (p, q) space for the regime 2 equilibrium (i.e. $(\bar{p}, \bar{q})$). Then, the section proceeds to compare regime 2 to regime 3.

From equation 1.1 (regime 1) and equation 3.1 (regime 3) it can be seen that:

$$W_p^i(p, q) = W_p(p, q) + C_p(x(p, q), q) - C_p^i(x(p, q), q)$$

$$\Rightarrow \text{When } W_p(p, q) = 0, W_p^i(p, q) > 0$$

Therefore, at any given level of quality a competitive regime that uses the inefficient technology (regime 3) chooses a higher price level than a competitive regime that uses the efficient technology (regime 1). This implies that in a figure similar to figure 4, schedule $W_p' = 0$ will always be below schedule $W_p = 0$.

From equation 1.2 (regime 1) and equation 3.2 (regime 3) it can be seen that:

$$W_q^i(p, q) = W_q(p, q) + C_q(x(p, q), q) - C_q^i(x(p, q), q)$$

$$\Rightarrow \text{When } W_q(p, q) = 0, W_q^i(p, q) < 0$$

Therefore, at any given level of price a competitive regime that uses the inefficient technology (regime 3) chooses a lower quality level than a competitive regime that uses the efficient technology (regime 1). This implies that in a figure similar to figure 4, schedule $W_q^i = 0$ will always be below schedule $W_q = 0$.

Recall that the regime 3 price-quality level (i.e. $(\tilde{p}, \tilde{q})$) is given by the intersection of schedules $W_p' = 0$ and $W_q^i = 0$, while the regime 1 price-quality level (i.e. $(\hat{p}, \hat{q})$) is given by the intersection of schedules $W_p = 0$ and $W_q = 0$. Because schedules $W_p' = 0$ and $W_q^i = 0$ lie below schedules $W_p = 0$ and $W_q = 0$, respectively, the regime 3 price-quality level (i.e. $(\tilde{p}, \tilde{q})$) must lie somewhere in the (p, q) space that lies below both schedules $W_p = 0$ and $W_q = 0$. Therefore, the possible (p, q) space for the regime 3 price-quality level is the same

as the possible (p, q) space for the regime 2 price-quality level, represented by the shaded area in figure 5.

Figure 6 reproduces the graphical representation of the regime 1 equilibrium from figure 4. Recall that the possible space for the regime 2 price-quality level (i.e. $(\bar{p}, \bar{q})$) and the regime 3 price-quality level (i.e. $(\check{p}, \check{q})$) is given by the area below both schedules $W_p = 0$ and $W_q = 0$. Points 2d to 2j are examples of possible locations for the regime 2 price-quality level (i.e. $(\bar{p}, \bar{q})$). Point 3 in figure 6 represents a possible location for the regime 3 price-quality level (i.e. $(\check{p}, \check{q})$). This figure also shows an isowelfare that has been derived using the welfare function under the efficient technology. This isowelfare represents a welfare level that is equivalent to the welfare level attained at point 3.²⁵ The isowelfare divides the possible (p, q) space for the regime 2 equilibrium (i.e. $(\bar{p}, \bar{q})$) into two subsets. The horizontally (vertically) shaded area represents the subset of the possible (p, q) space for the regime 2 equilibrium (i.e. $(\bar{p}, \bar{q})$) for which the welfare level is higher (lower) than the welfare level at point 3. Below, figure 6 is used to explore price, quality and welfare effects of a “complex” cartel (regime 2) vs. a competitive regime (regime 3).

It can be seen from figure 6 that there are four possible price quality effects of a “complex” cartel (regime 2) with respect to the competitive regime (regime 3):

²⁵Notice that because the isowelfare has been derived using the welfare function under the efficient technology, it cannot pass through point 3. The isowelfare that passes through point 3 (not drawn in figure 6) represents a higher welfare level than the one attained at point 3. This is because this isowelfare represents the welfare level given the price-quality choice at point 3, assuming that the efficient technology is being used. Nevertheless, by construction the technology that is used at point 3 is the inefficient one and not the efficient one.

Figure 6. Price, Quality and Welfare Effects of the “Complex” Cartel versus the Competitive Regime

- If $(\bar{p}, \bar{q})$ is located in the (either vertically or horizontally) shaded area section corresponding to quadrant I, then the “complex” cartel increases both price and quality (for example, points 2d and 2e),
- If $(\bar{p}, \bar{q})$ is located in the (either vertically or horizontally) shaded area section corresponding to quadrant II, then the “complex” cartel increases price and reduces quality (for example, points 2f and 2g),
- If $(\bar{p}, \bar{q})$ is located in the (either vertically or horizontally) shaded area section corresponding to quadrant III, then the “complex” cartel reduces both price and quality (for example, points 2h and 2i), and
- If $(\bar{p}, \bar{q})$ is located in the (either vertically or horizontally) shaded area section corresponding to quadrant IV, then the “complex” cartel reduces price and increases quality (for example, point 2j).

Any (p, q) in the shaded area in figure 6 lies below both schedules $W_p = 0$ and $W_q = 0$,

thus starting at any point in this area, welfare increases (decreases) when price decreases (increases) and when quality increases (decreases). Therefore, the isowelfare must have a positive slope in the shaded area region in figure 6. This implies that the isowelfare cannot cross the shaded area subsection that lies inside quadrant IV. Then, it can be concluded from figure 6 that a “complex” cartel (regime 2) that reduces price and increases quality with respect to the competitive regime (regime 3), unambiguously increases welfare (for example, point 2j). In the notation adopted here:

If $\bar{p} < \bar{p}$ and $\bar{q} > \bar{q}$ then $W(\bar{p}, \bar{q}) > W^i(\bar{p}, \bar{q})$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C(x(\bar{p}, \bar{q}), \bar{q}) > \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C^i(x(\bar{p}, \bar{q}), \bar{q})$$

Figure 6 also shows the following:

- A “complex” cartel (regime 2) that increases both price and quality with respect to the competitive regime (regime 3) has an ambiguous effect on welfare. It may increase welfare (for example point 2d) or it may decrease welfare (for example point 2e),
- A “complex” cartel (regime 2) that increases price and decreases quality with respect to the competitive regime (regime 3) has an ambiguous effect on welfare. It may increase welfare (for example point 2f) or it may decrease welfare (for example point 2g), and
- A “complex” cartel (regime 2) that reduces both price and quality with respect to the competitive regime (regime 3) has an ambiguous effect on welfare. It may increase welfare (for example point 2h) or it may decrease welfare (for example point 2i)

In the previous three cases, in the notation adopted here:

A “complex” cartel increases welfare if $W(\bar{p}, \bar{q}) > W^i(\bar{p}, \bar{q})$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C(x(\bar{p}, \bar{q}), \bar{q}) > \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C^i(x(\bar{p}, \bar{q}), \bar{q})$$

A “complex” cartel decreases welfare if $W(\bar{p}, \bar{q}) < W^i(\bar{p}, \bar{q})$

$$\Leftrightarrow \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C(x(\bar{p}, \bar{q}), \bar{q}) < \int_{\bar{p}}^{\infty} X(v, \bar{q}) dv + \bar{p}X(\bar{p}, \bar{q}) - C^i(x(\bar{p}, \bar{q}), \bar{q})$$

3.7 Final Remarks

This chapter has presented the argument, advanced by several authors, that some cartels may be cost reducing and, thereby, welfare increasing. This relatively recent view of cartels differs from the traditional economics proposition that cartels always decrease welfare. The next three chapters intend to shed light on the debate on the cost and welfare effects of cartels

by conducting an empirical study using a sample of 17 cartels prosecuted under the Canadian conspiracy provisions. The two theoretical models developed in this chapter will be used later as testing frameworks to evaluate the empirical results obtained.

4. EMPIRICAL ANALYSIS OF PRICE EFFECTS

4.1 Goal

What has been the effect of Canadian cartel prosecution on the prices of the indicted firms? The objective of this chapter is to shed light on this question. Traditional economics predicts that breaking up a cartel reduces price. More recently, several researchers have argued that some cartels may be potentially cost reducing: prosecuting cost reducing cartels might lead to price increases and not to price decreases.

4.2 Literature Review

I am not aware of any econometric study concerned with the effect of Canadian antitrust prosecution on the prices charged by the indicted firms. In fact, I have found very few studies dealing with this issue, and all of them use U.S. data. Kindahl and Stigler (1970) analysed nine industries indicted for price fixing between 1959 and 1964. They found that average price reductions ranged between 0.7 per cent and 4.4 per cent depending on the technique used. Newmark (1988) found that an antitrust indictment had virtually no effect on the price of bread in Seattle. Block and Feinstein (1986) examined the highway construction industry and found that more severe penalties lead to lower prices not only in the state in which the indictment took place but also nationwide. The most recent study is Sproul (1993). As explained in chapter 3, Sproul (1993) studied 25 conspiracy cases filed between 1973 and 1984. His results are very interesting: on average prices are found to gradually rise by about seven per cent over the four years following an indictment.

Some researchers have studied the effect of prosecution on profits or investment. Feinberg (1980), and Choi and Philippatos (1983) found that prosecution has mildly negative effects on profitability. Bittlingmayer (1999) investigated the statistical association between antitrust case filings and investment for 21 major U.S. industries. He found that each extra antitrust case filing is associated with a decline of investment in the same industry and in each of the 21 industries.

Some studies have analysed the effect of collusion on profits, quality, variety, output, or prices. Asch and Seneca (1976) found that collusion is associated with lower profits. Folster and Peltzman (1993) analysed Swedish legal cartels and found output to fall substantially when cartels are formed and to rise when they are dissolved. They found no clear evidence of price changes due to cartel activity. Other relevant studies in this regard, already discussed in chapter 3, are Dick (1992) and Fershtman and Pakes (2000).

4.3 Data

This study, as explained in the next section, uses related products to predict what the price of the conspiracy product would have been in the absence of prosecution. In addition to Canadian data, I use prices of related products from the United States as potential price predictors (adjusting for exchange rate fluctuations). It was possible to find price data for the product and the predictors for 17 cases out of approximately 150 Canadian conspiracy cases completed in the period 1897-1997. The 17 cases were completed between 1936 and 1995. They represented 13.3 per cent of the cases completed during this sub-period. This sample compares favourably to the most comparable study on this matter (Sproul (1993)) which found usable price data for 25 out of roughly 400 U.S. price fixing cases for the period 1973-1984.

The main sources of information on each case were legal documents reporting the court decisions on these cases and Competition Bureau documents (particularly annual reports, reports on specific cases, and case files). Appendix D provides a complete list of the information sources used in each case. This appendix also presents summaries of the cases together with labels (e.g. “Coal”, “Fertilizer”) that I have assigned to each case. I will be referring to the cases by these labels.

Canadian price data were obtained from publications from the Dominion Bureau of Statistics (former name of Statistics Canada), Statistics Canada and CANSIM. All the American data were obtained from the Producer Price Index Survey of the Bureau of Labor Statistics public database (LABSTAT). It was possible to find monthly price data in all cases except Fertilizer. In this case, quarterly data was used instead.

4.4 Methodology

4.4.1 Introduction

The methodology used in the present study is a variation of the methodology used by Sproul (1993) in the section of his paper concerned with assessing the price effect of U.S. antitrust prosecution. Sproul had previously presented this methodology in his 1990 thesis dissertation. I had initially decided to use the same methodology as Sproul’s for several reasons. First, Sproul’s study is concerned with the same question as the present chapter: to determine the effect of cartel prosecution on the prices of the indicted firms. Second, Sproul’s is the most recent study dealing with this issue. Third, using the same methodology as Sproul’s study would have allowed and eased the comparison between his findings for the United States and my findings for Canada. However, after carefully examining the

appropriateness of Sproul's methodology in light of the characteristics of the sample of cases used in the present study I decided that a variation of Sproul's method was required.

4.4.2 Description of the Methodology

As Sproul explains, the basic question for an industry is whether price rises or falls after an event such as an indictment, the ending of a conspiracy, or the imposition of penalties. This requires predicting what the price would have been in the absence of the event. As Sproul did, I follow Kindahl and Stigler (1970) and use related goods as predictors of the price-fixed goods. The good selected as a predictor of price must satisfy at least three requirements:

- It must be sold under similar conditions of supply and demand,
- its price must not be significantly affected by the prosecution event; and
- prior to the event, it must produce a high R^2 in the equation that will be used to predict price.

The first two criteria are subjective and that is a clear limitation of this methodology. The example of the metal culverts case, which will be presented later, illustrates the way in which these criteria were applied.

To measure the third criterion (High R^2), the following model is estimated, via least squares, separately for each of the potential predictors.^{26 27}

²⁶The model is estimated using EViews software. EViews uses nonlinear least squares regression techniques in estimating AR models, see EViews 3 User's Guide, p. 308-309 and the Technical Appendix.

²⁷I have followed Sproul (1993) and applied the same model specification across all cases. This approach has the advantage of making the results comparable across industries. Adopting a different specification for each case would have been required if the main purpose of the methodology was to model each industry. However, the main goal of the methodology is not to explain the dependant variable in each industry but to forecast its value into the future.

$$\log(Y_t) = c + \log(X_t)\beta + u_t$$

$$u_t = \rho u_{t-1} + \varepsilon_t$$

In this equation Y_t represents the price that I intend to predict and X_t represents the price of the potential predictor. It is important to point out that the regressions are run using all data available until the observation prior to the event, and the estimated parameters are used to predict price after the event. It is possible that the variable with the best fit before the event will not have the best fit when the period after the event is also considered. But, as Sproul argues, “goodness of fit over the entire sample is not what we are looking for in a predictor. Such a predictor is likely to be picking up the effect of the event and therefore would not meet the second selection criterion: that the predictor should not be affected by the event in question.” (Sproul 1993, p. 745). In applying the third criterion attention was paid to the stationarity of the estimated autoregressive process for the error terms. In some instances the estimated autoregressive process turned out to be nonstationary. The approach followed was to select the predictor producing the highest R^2 and also meeting the requirement that the estimated autoregressive process was stationary.²⁸

Once a predictor is found, the sample is extended to include 24 months of data after the event. The results of the regression run for the period prior to the event are then used to dynamically forecast the price of the product over the 24 months following the event.²⁹ Then,

²⁸The stationarity condition for an AR(1) process is that the autoregressive parameter should be less than one in absolute value. EViews automatically reports whether or not this condition is satisfied.

²⁹For an explanation of the Dynamic Forecast technique, see EViews 3 Users' Guide, p. 380-381.

a Chow Forecast Test³⁰ is used to determine if the deviations of the forecasted price from the actual price are statistically significant or not at a five per cent significance level.³¹ If the Chow Forecast Test indicates that such deviations are not statistically significant, it is concluded that prosecution had no effect on price during the 24 months following the event. If the Chow Forecast Test indicates that such deviations are statistically significant, it is concluded that prosecution led to a price change during this period. In these cases, in order to conclude on the direction of the price effect of prosecution, the average ratio of the actual price over the forecasted price over the 24 month period following the event is computed. For those cases in which this ratio is greater than one, it is concluded that prosecution led to a price increase. For those cases in which this ratio is smaller than one, it is concluded that prosecution led to a price decrease.

As mentioned above I have decided to use a five per cent significance level to separate “significant” and “non-significant” price effects. In order to satisfy the curiosity of any reader interested in knowing how sensitive these results are to the selection of other significant levels, I will report the p statistics for each case in the relevant tables.

The methodology will be applied to only one event: the alleged end of the conspiracy (EOC). The alleged end of the conspiracy is the end of the conspiracy date stated in the indictment and should not be literally interpreted. The period of the conspiracy in the indictment corresponds to the period of time for which court admissible conspiracy evidence

³⁰The Chow Forecast Test is also known as Chow’s Predictive Test. For a description of this test, see the EViews 3 User Guide, p. 349-350; Kennedy (1998, p. 230-231), Baltagi (1999, p. 172).

³¹The Chow Forecast Test statistic can be shown to be equivalent to testing whether or not the second period’s set of observations falls within the prediction confidence interval formed by using the regression from the first period’s observations (Kennedy (1998, p. 231)).

was found. Obviously, this is not necessarily the true period of the conspiracy. It was possible to find the alleged end of the conspiracy date as stated in the indictment for 14 cases. In one of these cases, Boxes, although the alleged end of the conspiracy date as stated in the indictment was December 1954, it was contended in a report by the Restrictive Trade Practices Commission (RTPC) that the conspiracy was still ongoing on December 1959. Given that the data on this case starts on January 1956, I decided to use the latter date. In three cases, the alleged end of the conspiracy date as stated in the indictment was not available. In Roof and Coal it was possible to infer the alleged end of the conspiracy date from an RTPC report and the legal documents respectively. In Gypsum, it was not possible to find nor to infer the alleged end of the conspiracy date. In this case, I decided to use the earliest prosecution event for which a date was available: the “information” date.³²

In order to illustrate how the methodology was applied, I present below the example of the metal culverts case.

Applying The Methodology: The Culverts Case

The arrangements among the manufacturers in this conspiracy case covered those culverts or drainage pipes made of galvanized copper-bearing steel. In order to meet the first criterion to select the predictor, i.e. that it be sold under similar conditions of supply and demand as the conspiracy product, I decided to search for price data on copper and/or steel, on products using copper and/ or steel as an input, on pipes or tubes, and on metal products broad indices.

Data were found for the following price indices:

³²The “information” is a statement of the alleged offence, where and when it occurred, and the identity of those alleged to have broken the law. Depending on the procedures used for legal proceedings, an information may have been laid for the purpose of seeking an indictment or for applying for a prohibition order (Gorecki (1979, p. 66,67)).

Canadian price indices:

- Copper ingots, refinery shapes
- Copper plate, sheet and strip
- Copper alloy, bars, rods and shapes
- Copper alloy, plate, sheet and strip
- Concrete reinforcement bars
- Rails
- Structural shapes, steel
- Structural steel shapes, unfab., heavy and inter.
- Steel shapes, unfab. bar size
- Aluminum pipe and tubing
- Pipe and tubing, carbon steel
- Line pipe, trans. natural gas and oil
- Copper pipe and tubing
- Cast iron pipe
- Iron and steel pipe fittings
- Total – all commodities

(Note: The total-all commodities price index was also included as one of the potential predictors in all cases)

U.S. price indices:

- Metals and metal products
- Steel mill products
- Finished steel mill products
- Pipe, black, carbon 100 ft.
- Pipe, galvanized, carbon 100 ft.
- Pressure tubing, carbon 100 ft.
- Steel structural shapes 100 lb.
- Steel sheets, h. r., carbon 100 lb.
- Steel sheets, c. r., carbon 100 lb.
- Steel sheets, galvanized, carbon 100 lb.
- Steel sheets, c. r., stainless lb.
- Steel sheets, electrical, alloy 100 lb.
- Steel strip, c. r., carbon 100 lb.
- Steel strip, c. r., stainless
- Steel strip, h. r. carbon 100 lb.
- Fabricated steel pipe and fitting job.

The conspirators were big manufacturers with control over the whole Canadian market.

It is very likely that they produced other lines or types of pipes. In order to avoid the risk of

using predictors that were manufactured by the conspirators and that therefore might be affected by prosecution (second criterion to select the predictor), I decided to exclude the following Canadian price indices:

- Pipe and tubing, carbon steel
- Line pipe, trans. Natural gas and oil
- Copper pipe and tubing
- Cast iron pipe
- Iron and steel pipe fittings

The alleged end of the conspiracy date as stated in the indictment was August 31, 1967.

Data on the prices of the product and the remaining predictors were available starting on January 1961. In order to meet the third criterion to select the predictor, the regression model described above was estimated separately using each of the remaining predictors for the period January 1961 - July 1967. The regression using the Canadian price index "Structural steel shapes, unfab. heavy and inter." as the predictor, yielded an R^2 of 0.958453 which was the highest of all the regressions considered.

The sample was extended to include 24 months after the alleged end of conspiracy date and the price of the product was dynamically forecasted over this 24 month period using the data available on the price of "Structural steel shapes, unfab. heavy and inter." A Chow Forecast Test was performed. The Chow Forecast F-statistic was equal to 0.618910, implying that no statistically significant price change occurred at a five per cent significant level. Therefore, it was concluded that in this case prosecution did not lead to a statistically significant price change during the 24 months following the EOC date.

Clearly, in cases like Culverts in which it was concluded that prosecution did not affect price, it is not necessary to compute the average ratio of actual to predicted price for the 24 months after the alleged EOC date. There is no point in determining the direction of the price

effect of prosecution if there was no price effect. This step was only relevant in those situations in which the Chow Forecast Test statistic suggested a statistically significant change in price. This was the case, for example, in Pork where the average ratio of actual to forecasted price over the 24 months following the EOC date was equal to 0.948485. Because this ratio is lower than one, it was concluded that prosecution led to a statistically significant price fall during the period analysed in Pork.

4.5 Variation to Sproul's Methodology versus Sproul's Original Methodology

4.5.1. Differences between both Methodologies

Six main differences exist between the original Sproul's methodology and the variation of it being used in this chapter:

- Sproul estimates a model in levels without any correction for autocorrelation. I use a model that works in logs and corrects for first order autocorrelation.
- Sproul focuses on the indictment date while I focus on the alleged EOC date.
- Sproul forecasts price over 48 months after the selected event (i.e. the indictment). I forecast price over 24 months after the selected event (i.e. the alleged end of the conspiracy).
- Sproul focuses on the aggregate price effect of prosecution. I focus on the case-by-case price effects of prosecution.
- Sproul does not use any statistical test in his study to assess if the price effects are statistically significant. I use a Chow Forecast Test.
- Sproul uses a plot of the average (across cases) ratio of actual to forecasted price to conclude on the direction of the aggregate price effect of prosecution. I examine the average ratio of actual to forecasted price in each conspiracy case to conclude on the direction of the price effect of prosecution (This is done only for those cases in which the Chow Forecast Test indicated that there was a statistically significant change in price).

The Estimated Model

Sproul (1993) ran separate OLS linear regressions of the price he intended to forecast against a constant and each of the potential price predictors. He worked with the levels of the variables.³³ When this specification was run using the data of this study, the calculated value of the Durbin Watson test statistic was typically very low. This suggests the presence of positive first order autocorrelation in the error terms. Applying OLS in the presence of autocorrelated disturbances leads to inefficient estimation and invalid inference procedures (DiNardo and Johnston (1997, p. 176), Kennedy (1998, p. 123)). Also, the reliability of the Chow Forecast Test F-statistic is not obvious in the presence of autocorrelation because this statistic has an exact finite sample F-distribution only if the errors are independent, and identically, normally distributed (EViews 3 Users' Guide, p. 349-350).

It should be noted that typically both the dependant and the independent variables are trending. Consequently, the low value of the Durbin Watson test statistic may reflect spurious correlation rather than an AR(1) disturbance process *per se*. However, it is well known that making an AR(1) correction ameliorates this concern (Granger and Newbold (1974)). In order to address these potential problems, it was decided to correct the model for first order autocorrelation.^{34 35}

³³Sproul (1993) did not explicitly stated that he worked with the levels of the variables. However, it was possible to find out that this was the case by redoing one of his cases.

³⁴An alternative approach would have been to introduce a time trend in the regression.

³⁵Nicholls and Pagan (1984) have shown that if the Chow Forecast Test is applied to a model that has been corrected for autocorrelation, it needs to be modified in order to produce correct results (Nicholls and Pagan (1984, p. 298-301)). In their paper, they present the appropriate modification of the test that should be used in this case. A concern here was that the EViews Users' Guide did not explain if such a modification was incorporated into this Econometrics software. In order to address this concern, the modified Chow Forecast Test proposed by Nicholls and Pagan (1984) was replicated for one of the cases in the sample. It

Although Sproul (1993) worked with the levels of the variables, it could be argued that using logs may be preferred because it may help reduce potential problems with heteroskedasticity. Also, as explained above, during the selection-of-a-predictor stage, in some of the candidate forecasting equations, the estimated autoregressive process of the error terms turned out to be nonstationary. Working with logs decreased the frequency with which this nonstationary problem emerged in comparison to the case in which the equations were estimated in levels. In light of these facts and given that the methodology produced qualitatively similar price effect conclusions irrespective of if logs or levels were used, I decided to work with logs.

The Event

Selecting what date to use from which to judge the effect of prosecution is not a simple matter. Some cartels may have decided to end the conspiracy as soon as prosecution was begun; some may have stopped conspiring somewhere in the middle of the prosecution process, some may have decided to wait until the end of prosecution when the matter was definitely resolved via conviction or acquittal; and some may not have stopped conspiring at all. The longer the prosecution period and the higher the number of prosecution events, the more difficult the task of choosing a relevant date to assess its effect. Both the length of prosecution and the number of prosecution events are certainly an issue in the context of Canadian cartel prosecution and particularly in the sample of Canadian cases examined in this study. As can be seen in table 2, prosecution of the Canadian conspiracy cases used in this study has not been an expeditious process. For example in Boxes, 16 years passed from when

produced identical results as those produced by EViews when the Chow Forecast Test was applied to the autocorrelation corrected model, thereby, dissipating the referred concern.

Table 2. Relevant Dates

Case Label	Inquiry	Alleged EOC (As stated in)	Indictment	Fines	EOP
Coal	n/a	September 1933 (Legal Documents)	September 1933	12399	12940
Rubber	n/a Report by the Commissioner made public: June 1952	October 31, 1952 (Indictment)	N/A Sometime between October 31, 1952 and April 8, 1953	September 25, 1953 (First Fines)	20494
Roof	June 14, 1952 RTPC report submitted to Minister of Justice: August 29, 1955	June 14, 1952 (RTPC Report)	N/A True Bill: January 11, 1957*	21191	21326
Pulpwood	n/a Director submitted Statement of Evidence to RTPC: February 28, 1957	December 31, 1954 (Indictment)	October 1958	22081	22081
Boxes	1953	December 1959 (RTPC Report) December 1954 (Indictment)	N/A True Bill: September 9, 1963*	24456	25287
Culverts	1966	August 31, 1967 (Indictment)	N/A True Bill: September 8, 1972*	27409	27854
Lamps	n/a RTPC report submitted to Minister of Justice: January 14, 1971	August 25, 1967 (Indictment)	N/A True Bill: May 17, 1972*	28227	28227
Tubing	June 1973	December 31, 1972 (Indictment)	28452	28772	28772
Gypsum	n/a "Information" laid: September 30, 1976	N/A	28570	28612	28612
Fertilizer	February 1973	January 16, 1976 (Indictment)	28367	No fines	29233

Continued on next page

Table 2.- Continued

Case Label	Inquiry	Alleged EOC (As stated in)	Indictment	Fines	EOP
Sugar	n/a "Information" laid: May 31, 1973	May 31, 1973 (Indictment)	N/A Committal to Trial: April 13, 1974	28768	29419
Felts	n/a Inquiry evidence referred to Attorney General of Canada: July 1976	July 31, 1974 (Amended Indictment)	N/A Committal to Trial: July 13, 1978	29279	February 1983
Pork	February 1980	June 30, 1976 (Indictment)	December 9, 1983 (First Indictment)	December 9, 1983 (First Fines)	32195
Gases	33002	May 31, 1990 (Indictment)	September 1991 (First Indictment)	September 1991 (First Fines)	35737
PANS	December 1982	June 16, 1986 (Indictment)	33023	No fines	34057
AQPP	September 1988	September 30, 1988 (Indictment)	December 16, 1993 (First Indictment)	34837	34837
Pipe	34526	September 30, 1990 (Indictment)	September 1995	September 1995	September 1995

Source: The information presented in this table was gathered from the trial related documents and Competition Bureau reports and case files. A complete list of the sources of information available in each case is presented in Appendix D.

Note: "n/a" stands for not available.

"In the provinces of Ontario, Nova Scotia and Prince Edward Island the Attorney General of Canada preferred the Indictment before a Grand Jury during most of the period 1960/61-1974/75. The Grand Jury had discretion in deciding whether to grant the Bill of Indictment. When the Grand Jury decided to grant the Bill of Indictment, the action was referred to as saying that the Grand Jury had returned a True Bill. In the rest of the Canadian provinces, the Attorney General of Canada preferred a Bill of Indictment before a superior court. In these provinces, the court then ordered a trial and, as opposed to the Grand Jury (in the three referred provinces), had no discretion in this matter (Gorecki (1979, p. 68-70)).

the inquiry on the case was begun until the prosecution ended. At the same time, there are many prosecution events that seem sufficiently important to be considered as good date candidates from which to assess the price effect of prosecution. The beginning of the inquiry, the publication of a report on the case (valid for the old cases), the laying of an “information”, the laying of an indictment, the opening of the trial, sentencing by a lower Court, sentencing by higher Courts (valid for appealed cases), the imposition of fines and the end of the prosecution are just some examples.

What event/date should one choose? Sproul chose the indictment event as the prosecution event to be examined. He explains that he decided to focus on the indictment date based on the following reasons:

- The indictment date is more subject to government control than, for example, the ending of a conspiracy;
- the indictment date is known with greater precision than any other event; and
- in his sample, data for the indictment date were available for more cases.

However, Sproul pointed out that the selection of the prosecution event to be examined is not a simple issue and that a reasonable argument could be made to choose an event different from the indictment. In this regard, he said:

We would like to know at what point “the jig is up” for a price-fixing conspiracy, since that is the point from which all expected future penalties can be judged to have their effects. The preceding analysis examined prices before and after the indictment, but a reasonable case could be made for selecting some other significant event. Likely candidates include the end of the conspiracy (as estimated by the Department of Justice), imposition of government penalties, or civil awards (Sproul (1993, p. 750)).

In order to account for this concern, Sproul checked the robustness of his results (at the aggregate level) to a change in the event. He examined three additional events, besides the indictment: the alleged end of the conspiracy as recorded in the indictment, the imposition of

government penalties and the imposition of civil awards. He found that the results (at the aggregate level) were not sensitive to the choice of event. In all cases, the plot of the average (across cases) ratio of actual to predicted price showed a clear upward trend after the event considered. Two important issues should be noted in this regard. First, Sproul did not explain if the results at the level of individual cases were also robust to a change in the event. Second, in all the events he used the same predictor in each case: the predictor with the highest R^2 prior to the indictment event. This is not explicit in his 1993 paper but it is clearly stated in his thesis dissertation. In his thesis, he explains that it is possible that the predictor that fits best prior to the indictment would not be the best fitting predictor prior to another chosen event. However, he argues that using separate predictors for each time period would increase the chances of selection bias, and that because there were often only two or three candidates for the predictor in a given case, it would only rarely be that any advantage would be gained.

Would it be appropriate to follow Sproul and focus on the indictment date in this study?

I believe the answer to this question is no. I explain the relevant considerations below.

Sproul's methodology uses all available data prior to the selected event first to choose the predictor that will be used and then to estimate the cartel regime relationship as a means to predict the cartel price after the event. If the true ending of the conspiracy date precedes the selected event date, the methodology would lead to the inclusion of observations belonging to a period of competitive behaviour together with cartel regime observations in the period used to first select the predictor and then to estimate the cartel regime relationship. In fact, the higher the number of competitive observations included in this period relative to the number of cartel observations:

- the lower the likelihood that the predictor chosen will be the one with the highest R^2 under cartelization, and

- the lower the likelihood that the estimated cartel regression will be actually representative of the cartel regime relationship (due to both the fact that the predictor being used may not be the most appropriate one and that the regression has been estimated using observations belonging to both competition and cartel regimes)

Because the processes of selecting the predictor and of estimating the cartel regime regression are both flawed when the mixing regimes problem is present, the prediction of the cartel price will also be flawed in the presence of such problem.

The farther away the selected prosecution event is from the beginning of prosecution, the higher the likelihood that firms may have ended the conspiracy prior to the selected event (in response to the prosecution process), and thus, the higher the likelihood that the mixing regimes problem will be present. Boxes illustrates this point. Assume that the last prosecution event, the end of prosecution (EOP), is chosen. The chances that firms' cartel behaviour changed before this event are very high because prosecution started approximately 16 years before the EOP date (See table 2). This discussion suggests that early prosecution events should be preferred to later prosecution events. It could be contended, following this way of reasoning, that the event to use should be the beginning of prosecution because in this way the chances of having the mixing regimes problem would be reduced. However, such an approach is not necessarily correct. It is possible that firms decided to continue conspiring for a while after prosecution begun. Some support for this possibility is found in table 2. The table shows that in cases such as Boxes, Culverts, Fertilizer and PANS, the alleged EOC date as stated in the indictment is subsequent to the beginning of the inquiry date (i.e. the beginning of prosecution date). The alleged end of the conspiracy date in the indictment is not necessarily the true end of the conspiracy date. However, this date conveys a useful piece of information: it is the date up to which the Government/Crown found court admissible

evidence of conspiracy behaviour to make its case. This, in turn, strongly suggests that the conspiracy was at least still ongoing up to that date. In light of these comments, the fact that in some cases in table 2 the beginning of inquiry date precedes the alleged end of the conspiracy date strongly suggests that firms continued conspiring after the beginning of prosecution at least until the alleged EOC date. Clearly, in such cases using the beginning of prosecution date to assess the effect of prosecution would be misleading. On these grounds the alleged EOC date is preferable to the beginning of prosecution date.

Would any prosecution event subsequent to the alleged EOC date, such as the indictment, be preferable to the alleged EOC date? My opinion is that the answer to this question is no. The fact that the Crown/Government considered that there was court admissible conspiracy evidence up to the alleged EOC date makes it unlikely that the conspiracy actually ended prior to that date and thus reduces the chances of facing a mixing regimes problem. No other subsequent prosecution event offers a similar piece of information that would allow to use its date and at the same time be certain that the likelihood of having the mixing regimes problem has not been significantly increased. Therefore, I decided to focus on the alleged EOC date and not on the indictment date, as Sproul did.

It could be argued that if the alleged EOC date and the indictment date were very close to each other, then using either the indictment date or the alleged EOC date would make no significant difference. In fact, the concern that a mixing regimes problem may be created by using the indictment date instead of the alleged EOC date would be reduced. However, in the sample of cases used in the present study this is not the case. In fact, the average number of months across cases between the alleged end of the conspiracy and the indictment date is 41. Pork, AQPP and Culverts show the highest numbers of months between both dates: 89, 63

and 60 months, respectively. Therefore, following Sproul and using the indictment date would significantly increase the risk of creating a mixing regimes problem. Finally, it should be noted that in Sproul's sample the average number of months between the alleged EOC and the indictment was 21 months, almost half the average for the sample in the present study. Therefore, in Sproul's study the likelihood of obtaining different results using the indictment date versus using the alleged EOC date may have been lower than in the present study.

It could seem that Sproul's analysis of the alleged EOC event when he checks the robustness of his results is similar to the analysis proposed here, however this is not the case. Recall that when Sproul checks the robustness of the results to using other events different from the indictment, he does not change the predictor. That is, for each case, in all events, he uses the predictor with the best fit prior to the indictment date. Sproul's approach reduces the mixing regimes problem during the estimation of the cartel relationship but it still leaves the door open for the mixing regimes problem to lead to a flawed selection of the predictor. The variation of Sproul's methodology proposed here is different. I propose to use the alleged EOC date but also to use the predictor with the best fit prior to the alleged EOC date. This variation of the methodology reduces the mixing regimes problem both during the selection of the predictor and during the estimation of the cartel regime relationship.

Forecasting Period after the Event

Sproul (1993) forecasted price over a period of 48 months after the indictment date. In most of his cases the number of months with available data prior to the indictment date (the event he decided to use), and therefore the size of the estimation period, was close to or greater than 100 months. The situation in the sample of cases used in the present study is different. While in some cases the number of months with available data prior to the alleged

EOC (the event I decided to use) and thus the size of the estimation period is greater than 200 months, in seven cases this number is smaller than 80 months. In fact, in four cases out of these seven cases the size of the estimation period is between 41 and 48 months. In light of these facts and also taking into account that, as Sproul points out, the quality of the prediction diminishes over time, I have decided to forecast over a period of months after the event shorter than 48. I will forecast over 24 months.

Aggregate Price Effect and Case-by-Case Price Effect

The main goal of Sproul (1993) was to assess the aggregate price effect of prosecution. Although he breaks down the results by industry by showing the plots of actual and forecasted prices, and comments on some of these plots, he does not provide a complete case-by-case analysis of the price effect of prosecution. His main finding that price gradually rises after an indictment is based on the plot of the average (across cases) ratio of actual to forecasted price over the 48 months after the indictment.

In the present study it is very important to examine the price effect of prosecution on a case by case basis. A key objective of the present study is to “tie” price effects to quality effects of cartels. It is not possible to conduct such analysis at the aggregate level because although it was possible to find price data that could be aggregated across cases, no similar data were found for the quality variable. Therefore, in order to tie price effects to quality effects of cartels one needs to proceed on a case by case basis. In other words, for each case it is necessary to analyse the price effect of prosecution in light of the available information on the quality variable.

Use of a Statistical Test

Sproul (1993) did not use any statistical test to assess if the price effects were statistically significant. This poses a serious concern because if the differences between the values of the actual price and the forecasted price are not statistically significant, then the appropriate conclusion should be that there was no price effect. In order to address this concern, the present study uses a Chow Forecast Test to assess the statistical significance of the differences between the values of the actual price and the forecasted price.

Ratio of Actual Price over Forecasted Price: Plot versus Average

Sproul (1993) based his conclusion on the aggregate price effect of prosecution on a plot of the average (across cases) ratio of actual to forecasted price over the 48 months following the indictment. Although Sproul (1993) does not provide a complete case-by-case analysis of the price effect, he does break down the results by industry by showing the plots of actual versus forecasted price for each case. However, as Sproul points out in his thesis, such plots do not quite answer the question of whether price increases or decreases after the indictment. The problem arises in those cases in which the actual price is sometimes above, sometimes below the forecasted price and thus the answer depends on the month one uses to make the comparison.

The same type of criticism applies to plots of the ratio of actual to forecasted price at both the individual and aggregate levels. In such a case, it is possible for the ratio to be sometimes above and sometimes below one, and again, the answer would be different depending on the month used. It should be noted that at the aggregate level Sproul (1993) was not faced with this problem because the actual price was above the forecasted price in basically all 48 months following the indictment. He did run into this problem in individual cases but because his

main goal was to examine the aggregate price effect and not the individual price effect he limited himself to commenting only on the price effects of those cases in which the problem was absent. Clearly, an additional problem, not mentioned by Sproul (1993), of using this approach to conclude on the price effect is the lack of a statistical test. This problem, as explained above, has been addressed in the present study by introducing a Chow Forecast Test. Having said this, it is still necessary to come up with a rule that allows the direction of the price effect to be determined in those cases in which the Chow Forecast Test implies that there was a statistically significant change in price.

In order to be able to reach a conclusion on the direction of the price effect, I will examine, in each conspiracy case, the average ratio of actual to forecasted price over the 24 month period following the alleged EOC date. The idea of using an average to deal with this problem is present in Sproul's work and also in Kindahl and Stigler (1970). The approach Sproul follows in his thesis and his 1993 paper for inter-industry comparisons is to examine the average ratio of actual to forecasted price for each industry over intervals of three, six, 12, 24 and 48 months after the event in question (Sproul (1990, p. 57), Sproul (1993, p. 749)). However, it must be noted that Sproul does not use this approach when assessing the price effect of prosecution. In both, his 1993 paper and in his thesis, he uses the approach of examining the average ratio of actual to forecasted price in a later section dealing with the effect of certain types of penalties on price. In his thesis, he also uses this approach partially in a section dealing with the robustness of the results (at the aggregate level) to the exclusion of the individual cases showing the highest divergence between actual and predicted price (Sproul (1990, p. 83)). In this section of his thesis, he examines the price effect of some, but not all, individual cases by looking at the average ratio of actual to forecasted price over the

48 months following the indictment. Kindahl and Stigler (1970) also used averages to conclude on the case by case price effects of a charge (complaint or indictment). They used two approaches. One approach compared the average price index in the three and nine months preceding the indictment date to the average price index in the succeeding three and nine months. The other approach conducted a similar comparison but first adjusted the pre- and post-complaint prices for movements of similar commodities not involved in the case (using the price index of the other commodities of the same general category). In the present study, the 24 month average was selected over the three, six, 9 and 12 month averages in order to allow for any gradual price effect to materialize. The 24 month average was selected over the 48 month average for the reasons explained in the section “Forecasting period after the event”.

4.5.2. Applying the Methodology of Sproul (1993) to Canadian Data

I have decided to modify Sproul’s original methodology before proceeding to assess the price effect of prosecution in the sample of Canadian cases used in this study. However, in order to satisfy the curiosity of any reader interested in knowing what the results would look like if the original Sproul’s methodology was used, I present them in appendix E. This appendix also presents a summary of Sproul’s methodology.

4.6 Results

The results obtained by applying the variation of Sproul’s methodology proposed in this chapter are presented in tables 3, 4 (second and third columns) and 5. Table 3 shows the conspiracy product and the price index used for it. The second and third columns of table 4 present the price predictor used in each case with its associated R^2 . Table 5 shows the Chow Forecast Test results, the average ratios of actual to forecasted prices (when applicable) and

Table 3. Conspiracy Product and Price Index Used for It

Case Label	Description of the conspiracy product	Price Index used for the conspiracy product
Coal	Anthracite coal and coke (Quebec City, Montreal and other districts) Level: Wholesale and retail	Anthracite coal (Province of Quebec) Average retail price Source: DBS publications (Code: n/a)
Rubber	Rubber products (Canada) Level: Wholesale and retail	Rubber and its products (Canada) Wholesale price index Source: DBS publications (Code: n/a)
Roof	Asphalt and tar roofing materials and related products (Canada) Level: Wholesale	Residential building roofing materials (Canada) Wholesale price index Source: DBS publications (Code: n/a)
Pulpwood	Pulpwood (Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island)) Level: Wholesale Note: Nova Scotia and Prince Edward Island were not included in the indictment	Pulpwood (Canada) Wholesale price index Source: DBS publications (Code: n/a)
Boxes	Container grades of paperboard and corrugated shipping containers made therefrom (Canada) Level: Wholesale	Corrugated box manufacturers (Canada) ISPI Source: Statistics Canada publications (Code: n/a)
Culverts	Steel culverts (corrugated steel pipe) (Ontario and Quebec) Level: Wholesale	Culvert pipe, corrugated metal (Canada) IPPI Source: CANSIM (Code: D691867)
Lamps	Electric large lamps (Canada) Level: Wholesale	Incandescent lamps, large sizes (Canada) IPPI Source: CANSIM (Code: D692292)
Tubing	Electric welded mechanical steel tubing (Ontario) Level: Wholesale Note: 70% of Canada's steel tubing consumption occurred in Ontario. Also, the accused firms accounted for 90% of the tubing manufactured in Canada in 1968.	Mechanical steel tubing (Canada) IPPI Source: CANSIM (Code: D691737)
Gypsum	Gypsum wallboard (Inquiry at national level. Indictment related to Manitoba, Saskatchewan, Alberta and British Columbia) Level: Wholesale	Gypsum wallboard (Canada) ISPI Source: CANSIM (Code: D542330)

Continued on next page

Table 3.- *Continued*

Case Label	Description of the conspiracy product	Price Index used for the conspiracy product
Fertilizer	Chemical fertilizer (Western Canada) Level: Wholesale and retail Note: The firms were manufacturers, none (except one) sold directly at the retail level. The Crown alleged they had agreed on the retail price.	Fertilizer (Western Canada) FPI Source: CANSIM (Code: D605475)
Sugar	Refined and raw sugar (Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland) Level: Wholesale	Refined sugar (Canada) IPPI Source: CANSIM (Code: D691157)
Felts	Papermaker felts (Canada) Level: Wholesale	Papermaker felts (Canada) IPPI Source: CANSIM (Code: D691413)
Pork	Slaughter hogs and pork products (Alberta, British Columbia and Saskatchewan) Level: Wholesale	Smoked hams-cooked, ready to serve (Alberta) ISPI Source: CANSIM (Code: D501340)
Gases	Compressed oxygen, nitrogen, argon, carbon dioxide and hydrogen sold or supplied in liquid form (Canada) Level: Wholesale	Oxygen (Canada) IPPI Source: CANSIM (Code: D692468)
PANS	Prescription drugs and pharmacists' dispensing services (PDAPDS) sold or offered for sale to subscribers or beneficiaries of private pre-paid prescription insurance plans. PDAPDS sold or offered for sale for cash or on credit to the public (Nova Scotia) Level: Retail	Medicinal and pharmaceutical products (Nova Scotia) CPI Source: CANSIM (Code: P103087)
AQPP	Oral contraceptive pills and prescription narcotics sold to the cash market (Province of Quebec) Level: Retail	Prescribed medicines (Quebec) CPI Source: CANSIM (Code: P105088)
Pipe	Ductile iron pipe in the mid-size range (Canada) Level: Wholesale	Cast iron pipe (Canada) IPPI Source: CANSIM (Code: D691747)

Notes: The information in the column "Description of the conspiracy product" was gathered from the trial related documents and Competition Bureau reports and case files. A complete list of the sources of information available in each case is presented in Appendix D. "n/a" stands for not available.

Table 4. Predictors and R-squares

Case Label	First Best Predictor	R ²	Second Best Predictor	R ²
Coal	Total Retail Price Index (Index numbers of retail prices, rents and costs of services) (Canada) Retail Price Index Source: DBS publications (Code: n/a)	0.864552	Non-metallic minerals and their products (Canada) Wholesale price index Source: DBS publications (Code: n/a)	0.860551
Rubber	Rubber, except natural rubber (U.S.) PPI Source: LABSTAT (PPI code: WPU0711)	0.993952	Rubber and plastic products (U.S.) PPI Source: LABSTAT (PPI code: WPU07)	0.993472
Roof	Residential building materials (Canada) Wholesale price index Source: DBS publications (Code: n/a)	0.953373	All commodities (Canada) Wholesale price index Source: DBS publications (Code: n/a)	0.953279
Pulpwood	Woodpulp (U.S.) PPI Source: LABSTAT (PPI code: WPU0911)	0.974458	Pulp, paper, and allied products; chemical, sulphite, bleached short ton (U.S.) PPI Source: LABSTAT (PPI code: WPU09110121)	0.96531
Boxes	Pulp, paper, and allied products; corrugating medium, semi-chemical m. sq. ft. (U.S.) PPI Source: LABSTAT (PPI code: WPU09140111)	0.726413	Total manufacturing industries (Canada) ISPI Source: CANSIM (Code: D500000)	0.723805
Culverts	Structural steel shapes unfab. heavy & inter. (Canada) IPPI Source: CANSIM (Code: D691842)	0.958453	Structural shapes, steel (Canada) IPPI Source: CANSIM (Code: D691841)	0.957394
Lamps	Electric lamps/bulbs and parts (U.S.) PPI Source: LABSTAT (PPI Code: WPU1177)	0.989179	Electrical machinery and equipment (U.S.) PPI Source: LABSTAT (PPI Code: WPU117)	0.989162
Tubing	Mechanical tubing, welded, carbon (U.S.) PPI Source: LABSTAT (PPI Code: WPU10170624)	0.963618	Structural shapes, steel (Canada) IPPI Source: CANSIM (Code: D691841)	0.962168
Gypsum	Miscellaneous non-metallic mineral products industries (Canada) ISPI Source: CANSIM (Code: D542301)	0.999329	Total manufacturing industries (Canada) ISPI Source: CANSIM (Code: D500000)	0.995629

Continued on next page

Table 4.- Continued

Case Label	First Best Predictor	R ²	Second Best Predictor	R ²
Fertilizer	Fertilizer materials (U.S.) PPI Source: LABSTAT (PPI Code: WPU0652) (Converted from monthly to quarterly data)	0.977084	Mixed fertilizers (U.S.) PPI Source: LABSTAT (PPI Code: WPU0651) (Converted from monthly to quarterly data)	0.974918
Sugar	Raw cane sugar PPI Source: LABSTAT (PPI Code: WPU02520101)	0.958341	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.946421
Felts	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.994861	Textile products and apparel (U.S.) PPI Source: LABSTAT (PPI Code: WPU03)	0.994469
Pork	Smoked hams-cooked, ready to serve (Ontario) ISPI Source: CANSIM (Code: D501279)	0.973807	Hams, boiled - ready to serve (Ontario) ISPI Source: CANSIM (Code: D502277)	0.971669
Gases	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.995784	n/a	n/a
PANS	Medicinal and pharmaceutical products (Canada) CPI Source: CANSIM (Code: P100202)	0.998935	Medicinal and pharmaceutical products (Ontario) CPI Source: CANSIM (Code: P106087)	0.998819
AQPP	Prescribed medicines (Alberta) CPI Source: CANSIM (Code: P109088)	0.990755	Prescribed medicines (Yellowknife) CPI Source: CANSIM (Code: P112088)	0.989931
Pipe	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.99957	Iron and steel (U.S.) PPI Source: LABSTAT (PPI Code: WPU101)	0.999555

Note: "n/a" stands for not available

Table 5. Chow Forecast Test, Average Price Ratios and Conclusions on Price Effects of Prosecution when the First Best Predictor is Used

Case Label	Chow Forecast Test			Average ratio of actual to forecasted price over the 24 month period after the alleged EOC date	Conclusion on price effect of prosecution
	F statistic	Probability	Statistically significant price effect at 5% significance level?		
Coal	1.619127	0.052678	No	n/a	No effect
Rubber	0.325143	0.998421	No	n/a	No effect
Roof	0.077387	1.000000	No	n/a	No effect
Pulpwood	0.241190	0.999910	No	n/a	No effect
Boxes	0.412471	0.989717	No	n/a	No effect
Culverts	0.618910	0.910782	No	n/a	No effect
Lamps	0.119370	1.000000	No	n/a	No effect
Tubing	12.98772	0.000000	Yes	1.146248	Rises
Gypsum	2.431116	0.000537	Yes	0.982522	Falls
Fertilizer	7.503086	0.000001	Yes	1.134238	Rises
Sugar	2.722979	0.000056	Yes	1.460994	Rises
Felts	2.398375	0.000583	Yes	1.024748	Rises
Pork	1.939683	0.032815	Yes	0.948485	Falls
Gases	0.631581	0.916398	No	n/a	No effect
PANS	2.482753	0.000912	Yes	0.986668	Falls
AQPP	0.829398	0.685401	No	n/a	No effect
Pipe	2.893000	0.000007	Yes	0.901253	Falls

Note: "n/a" stands for "not applicable".

the conclusion on the price effects of prosecution. As can be seen from table 5, in the 24 months following the alleged EOC date, it is found that in nine cases prosecution had no effect on price: Coal, Rubber, Roof, Pulpwood, Boxes, Culverts, Lamps, Gases and AQPP. In four cases it is concluded that prosecution led to a price increase: Tubing, Fertilizer, Sugar and Felts. In four cases it is concluded that prosecution led to a price fall: Gypsum, Pork, PANS and Pipe. It is interesting to notice that most of the cases for which prosecution had no effect on price are old cases.

In interpreting these price effects it is important to highlight several issues. First, the Pulpwood case referred to a buying cartel. The conspirators were pulp and paper companies combining to fix the prices to be paid to farmers and small producers of pulpwood. Therefore, assuming that this was a “naked” cartel, prosecution should be expected to increase price. Interestingly, in this case, this study finds that prosecution had no effect on price during the period analysed. Second, the Pork case was a conspiracy involving both the output and the input. In Pork, the accused firms were meat packers who allegedly were conspiring to reduce the price of hogs (the input) and increase the price of pork products (the output). Unfortunately, in this case it was possible to find data only for the price of the output and not for the price of the input. Therefore, it was possible to analyse the price effect of prosecution on the price of the output but not on the price of the input. If one assumes that this was a “naked” cartel, prosecution should be expected to have increased the price of the input. However, under a similar assumption, the expected effect of prosecution on the price of the output is not obvious. For example, in this specific case if the reduction in cost that the conspirators achieved by conspiring to reduce the price of the input was significant enough, it is theoretically possible that the overall effect of the conspiracy on the price of the output

was to decrease it. In such a case, prosecution would have led to an increase in the price of the output. However, notice the results obtained in this study do not support this theoretical possibility because, in Pork, it is found that prosecution led to a statistically significant fall in the price of the output (pork products). Finally, in Pipe, according to the legal documents and reports on the case, the conspiracy was agreed to but it was not put into place. If this is correct, prosecution should have had no effect on price in this case. Interestingly, this study finds that prosecution led to a statistically significant price fall in this case. This result casts doubts on the hypothesis that the conspiracy was not put into place.

4.7. Robustness of the Results

Robustness of the Results to a Change in the Predictor

In order to assess the robustness of the results to a change in the predictor used, the methodology was applied using the second best predictor instead of the first best predictor. The results are shown in tables 4 (fourth and fifth columns) and 6. The fourth and fifth columns of table 4 show the price predictor used with its associated R^2 . Table 6 shows the Chow Forecast Test results, the average ratios of actual to forecasted prices (when applicable) and the conclusion on the price effects of prosecution. As can be seen by comparing tables 5 and 6, the conclusions on the price effect of prosecution were fairly robust to a change in the predictor. In fact, in 13 cases the conclusion on the price effect was the same. In two cases, Gypsum and Pork, the conclusion changed from “prosecution led to a price fall” to “no effect”. Only in one case, PANS, the conclusion was totally reversed, from a price decrease to a price increase. In one case, Gases, after the criteria to select the predictors were applied, only one predictor was left. Therefore, in this case it was not possible to examine the robustness of the results to a change in the predictor.

Table 6. Chow Forecast Test, Average Price Ratios and Conclusions on Price Effects of Prosecution when the Second Best Predictor is Used

Case Label	Chow Forecast Test			Average ratio of actual to forecasted price over the 24 month period after the alleged EOC date	Conclusion on price effect of prosecution
	F statistic	Probability	Statistically significant price effect at 5% significance level?		
Coal	1.576872	0.062924	No	n/a	No effect
Rubber	0.196614	0.999980	No	n/a	No effect
Roof	0.094880	1.000000	No	n/a	No effect
Pulpwood	0.587502	0.932688	No	n/a	No effect
Boxes	0.345036	0.997051	No	n/a	No effect
Culverts	0.676167	0.863606	No	n/a	No effect
Lamps	0.117777	1.000000	No	n/a	No effect
Tubing	11.38482	0.000000	Yes	1.113177	Rises
Gypsum	0.933805	0.559046	No	n/a	No effect
Fertilizer	7.172789	0.000002	Yes	1.130554	Rises
Sugar	6.275039	0.000000	Yes	1.494975	Rises
Felts	2.456680	0.000422	Yes	1.059409	Rises
Pork	1.528819	0.117954	No	n/a	No effect
Gases	No second best predictor available				
PANS	2.814380	0.000192	Yes	1.025562	Rises
AQPP	0.731394	0.794212	No	n/a	No effect
Pipe	2.948794	0.000004	Yes	0.883634	Falls

Note: "n/a" stands for "not applicable".

Robustness of the Results to a Change in the Period

This chapter's methodology focuses on the alleged EOC event in order to reduce the likelihood that a mixing regimes problem is present in the period used first to select the predictor and then to estimate the cartel regime relationship (the period). Choosing the EOC date reduces the chance that the preceding observations were generated under competition because that event date is likely a conservative estimate by the prosecution of the timing of the actual dismantling of the cartel. That is, using the alleged EOC event reduces the chance that a mixing regimes problem is present towards the end of the period. However, it is also possible for the mixing regimes problem to arise towards the beginning of the period. Recall that this chapter's methodology uses all observations for which data were available prior to the alleged EOC event. If the true beginning of the conspiracy date occurs after the earliest date for which data were available, then a mixing regimes problem would exist towards the beginning of the period. In such a case, the period used first to select the predictor and then to estimate the cartel relationship would contain a set of competitive regime observations at the beginning followed by a set of cartel regime observations from the date the conspiracy actually started.

One way of accounting for the mixing regimes problem towards both the beginning and the end of the period would be to use only those observations belonging to the alleged end of the conspiracy period as stated in the indictment. The fact that the Government/Crown had court admissible evidence that the conspiracy was ongoing during this period reduces the chances that the period will include competitive regime observations at the beginning, the end or anywhere. It should be noted though that this approach produces the benefit of minimizing the mixing regimes problem at the cost of reducing the number of observations used to select

the predictor and to estimate the cartel relationship. Because the researcher has no way of knowing the true conspiracy period it is not obvious if this approach will be an overall improvement with respect to the methodology used in the chapter. For example, if in all these cases the conspiracies were secretly ongoing for many years, then it may very well be that the methodology used in the chapter will not create a mixing regimes problem towards the beginning of the period by using all available data prior to the alleged EOC date. Under such circumstances restricting the period of observations to the alleged conspiracy period would produce no benefit at all at the cost of reducing the number of observations and, thereby, distorting the selection-of-the-predictor stage and the quality of the estimation of the cartel regime relationship.

The tradeoff between reducing the number of observations and accounting for the mixing regimes problem also arises when one is deciding if subsequent events to the alleged EOC date should be used. For example, using the end of prosecution instead of the alleged EOC date will produce the benefit of increasing the number of observations at the cost of increasing the likelihood of a mixing regimes problem. The reader may be wondering why this type of argument was overlooked when the alleged EOC date was selected as the event to use. Recall that all the discussion about the selection of the event revolved only around the goal of reducing the mixing regimes problem. The reason that, in selecting the prosecution event, it was decided to give more weight to the mixing regime problems than to the reduction in the number of observations has to do with an asymmetry in the information available to this researcher. On one hand, I knew that “to the right” of the alleged end of the conspiracy date there was a situation (i.e. prosecution) that was likely to trigger a change in the cartel behaviour of the firms. On the other hand, information of this type was not available to me

for the period “to the left” of the alleged beginning of the conspiracy date. That is, given the information available to this author, the likelihood that the mixing regimes problem was present “to the right” of the alleged end of the conspiracy date was higher than the likelihood that this problem was present “to the left” of the beginning of the conspiracy date.

Although it is not obvious that by restricting the period to the alleged conspiracy period an improvement on the methodology will be obtained, it is worthwhile determining if it makes any difference in the results produced. There are four cases in the sample to which the approach proposed here cannot be applied: Gypsum, Gases, AQPP and Pipe. In Gypsum, the alleged period of the conspiracy was unknown. In the other three cases the alleged conspiracy period did not include enough observations so that the econometric analysis could be conducted. As table 7 shows, in eight of the remaining 13 cases, the earliest available date for which there were data available occurred after the alleged beginning of the conspiracy. These cases are: Rubber, Roof, Pulpwood, Boxes, Tubing, Felts, Pork and PANS. Clearly, in these eight cases, using all available observations prior to the alleged EOC date generates the same set of observations than using only observations belonging to the alleged conspiracy period. Therefore, it can be concluded that this chapter’s results for these eight cases still hold if one restricts the period to the alleged conspiracy period. This leave us with only five cases to which it is necessary (and possible) to apply the proposed approach in order to conclude if the results are robust to a change in the period. These cases are: Coal, Culverts, Lamps, Fertilizer and Sugar. The results obtained for these five cases are presented in table 8.³⁶ By comparing table 8 to table 5, it can be seen that the conclusions on the price effects of

³⁶It is interesting to notice that in all the five cases, except Fertilizer, the selection of the predictor process generated the same predictor as when all data prior to the alleged EOC date were used.

Table 7. Earliest Date with Available Data and Alleged Conspiracy Period

Case Label	Price data starting from:	Alleged conspiracy period (As stated in or inferred from:)
Coal	January 1926	1929-September 1933 (Legal documents)
Rubber	January 1948	1936-October 1952 (Indictment)
Roof	January 1946	Started long before World War II, stopped during wartime controls, restarted after the end of the wartime controls until June 14, 1952 (RTPC Report)
Pulpwood	January 1948	April 3, 1947-December 31, 1954 (Indictment)
Boxes	January 1956	January 1947-December 1959 (RTPC Report) January 1947-December 1954 (Indictment)
Culverts	January 1961	November 1, 1962-August 31, 1967 (Original Indictment) December 31, 1965-August 31, 1967 (Amended Indictment)
Lamps	January 1956	January 1, 1959-August 25, 1967 (Indictment)
Tubing	January 1969	January 1, 1968-December 31, 1972 (Indictment)
Gypsum	January 1964	It was not possible to infer or find the alleged conspiracy period for this case
Fertilizer	1 st quarter of 1961	January 1, 1965-January 16, 1976 (Indictment)
Sugar	January 1956	January 1, 1960-May 31, 1973 (Indictment)
Felts	January 1961	April 1, 1952-July 31, 1974 (Amended Indictment)
Pork	January 1973	January 1, 1965-June 30, 1976 for counts 1, 2 and 5 January 1969-June 30, 1976 for counts 2 and 3 (Indictment)
Gases	January 1961	June 1, 1989-May 31, 1990 (Indictment)
PANS	September 1978	January 1, 1974-June 16, 1986 for count 1 July 1, 1976-June 16, 1986 for count 2 (Indictment)
AQPP	January 1985	December 1, 1987-September 30, 1988 (Indictment)
Pipe	January 1956	January 1990-September 30, 1990 (Indictment)

Note: The information regarding the alleged conspiracy period was gathered from the trial related documents and Competition Bureau reports and case files. A complete list of the sources of information available in each case is presented in Appendix D.

Table 8. Chow Forecast Test, Average Price Ratios and Conclusions on Price Effects of Prosecution for 5 cases when the Alleged Conspiracy Period is Used

Case Label	Chow Forecast Test			Average ratio of actual to forecasted price over the 24 month period after the alleged EOC date	Conclusion on price effect of prosecution
	F statistic	Probability	Statistically significant price effect at 5% significance level?		
Coal	1.637136	0.066237	No	n/a	No effect
Culverts	0.724436	0.809009	No	n/a	No effect
Lamps	0.095429	1.000000	No	n/a	No effect
Fertilizer	5.791728	0.000059	Yes	1.120204	Rises
Sugar	2.341042	0.000832	Yes	1.41462	Rises

Note: "n/a" stands for "not applicable".

prosecution in these five cases when the alleged conspiracy period is used are the same as when all observations prior to the alleged EOC date are used.

In summary, it has been possible to address the concern about the possible existence of a mixing regimes problem towards the beginning of the period in 13 cases in the sample. The concern was addressed by re-applying the methodology using only data belonging to the alleged conspiracy period as opposed to using all data prior to the alleged EOC date. In these 13 cases the results were robust, thereby, dissipating the concern of a mixing regimes problem at the beginning of the period. These cases are: Rubber, Roof, Pulpwood, Boxes, Tubing, Felts, Pork, PANS, Coal, Culverts, Lamps, Fertilizer and Sugar. It was not possible to address the concern about the possible existence of a mixing regimes problem towards the beginning of the period in Gypsum, Gases, AQPP and Pipe. As table 7 shows, in Gases, AQPP and Pipe, the alleged conspiracy period represented a very small fraction of the total period with available data prior to the alleged EOC date. This fact, although worth noting, should not be taken as an indication that the mixing regimes problem was present in these cases. Recall that the alleged conspiracy period is the period of time for which the Crown/Government had court admissible evidence of conspiracy behaviour and therefore it cannot be interpreted as the true conspiracy period.

Note on the Robustness of the Results to a Change in the Event

Sproul (1993) examined the robustness of his results (at the aggregate level) to a change in the event used. I do not think that it is appropriate to examine the robustness of the results to a change in the event. The problem is that it is theoretically possible to have cases in which the results are reversed even if they were correct. The reasons for this are the same I presented previously to defend the selection of the alleged EOC as the event to be considered.

An example helps illustrate this point. Assume that there is a case in which the cartel activity actually stopped at the alleged EOC date. In this case, the selection of a subsequent event such as the indictment will lead to a mixing regimes problem. As previously explained, under a mixing regimes problem the methodology will produce flawed results. In this context, it is possible that the results are reversed.

4.8 Final Remarks

A clear and important implication of the results obtained in this chapter is that, contrary to the traditional economic view of cartels, prosecution did not lead to a price fall in 13 of the cases examined. In four cases prosecution led to statistically significant price increases. In nine cases no statistically significant price effect was observed. In only four cases did prosecution lead to a statistically significant price fall.

Sproul (1993) concluded that, in his sample of U.S. cases, the aggregate effect of prosecution was to increase prices gradually. The present study's finding that prosecution did not decrease price in 13 cases and that it increased price in four of these 13 cases provides additional evidence in this regard to the one provided by Sproul (1993). The finding that, in some cases, prosecution increased prices is particularly relevant given the fact that this study, as opposed to Sproul (1993), uses a statistical test to assess the statistical significance of the price effects. That is, this study finds that, in some cases, prosecution led to statistically significant price increases. In contrast, Sproul (1993) found that prosecution gradually increased prices without testing if the price increases were statistically significant.

For reasons explained in this chapter this study uses a variation of the methodology used by Sproul (1993). It should be noted that the finding that prosecution did not decrease price (obtained for 13 cases) also holds (at the aggregate level) when the original Sproul's

methodology is applied to the sample of Canadian conspiracy cases used in this study. This can be seen in appendix E, by examining the chart corresponding to the indictment event (i.e. the event on which Sproul focussed).

Why did price not fall? The analysis from chapter 3 provides two possible explanations to why prosecution did not lead to a price fall in 13 cases. One explanation may be that the cartel was a “complex” welfare increasing cartel that allowed the firms to reduce costs through the use of a technology that was superior to the one they used under competition. An alternative explanation may be that the cartel was a “naked” (welfare decreasing) cartel that decreased quality with respect to the competitive regime. In the cases in which no price effect was observed, an additional possible explanation, is that prosecution did not deter cartel behaviour during the period analysed.

If cartel quality effects were not important, then the observed price effects of prosecution could be interpreted using the two variable model theoretical framework presented in chapter 3. The relevant information concerning this model is summarized in the top section of table 1. Clearly, if one abstracted from quality and assumed that prosecution deterred cartel behaviour during the 24 months following the alleged EOC date³⁷, the finding that prosecution did not lead to a price fall in 13 cases would strongly suggest that these cartels were “complex” welfare increasing cartels that allowed the firms to reduce costs through the use of a technology that was superior to the one they used under competition. However, if cartel quality effects were important, it would no longer be possible to make this assertion. In such a case, one would need to interpret the price effects in the context of the three

³⁷An implicit assumption here is that the cartels were operating effectively prior to the alleged EOC date..

variable model presented in the chapter 3. The relevant information concerning this model is summarized in the bottom section of table 1. As can be seen from this table, if cartel quality effects were important, information on price effects is not enough to conclude on cartel welfare effects. In this framework, an alternative explanation to the finding that price did not fall in 13 cases is that these were “naked”(welfare decreasing) cartels that decreased quality with respect to the competitive regime.

Clearly, in the absence of any information on quality effects, this chapter’s price effect results cannot be used to make conclusions on the cartel welfare effects. In order to address this problem the next chapter extends this research towards the quality dimension.

5. EMPIRICAL ANALYSIS OF QUALITY EFFECTS

5.1. Introduction

The objective of this chapter is to use the legal reports and the Competition Bureau reports and case files available to the author on each conspiracy case to determine if they contained any references to quality effects of the cartel. This chapter follows the same interpretation of quality as chapter 3. That is, quality is to be interpreted along three different dimensions: quality-in-a-narrow-sense (including packaging), the quality of sales related services and the quality of variety.

Appendix D summarizes the sources of information that were available for each case. It should be stressed that the availability of information differed significantly across cases. For example, in some cases, it was possible to access the Competition Bureau case file while in others it was not possible. In some cases, no legal reports were found while in others extensive legal reports on the court decisions were available. It should also be noted that the cases span a period of six decades and that the type of public information available on conspiracy cases has changed over time. For example, while in some of the old cases, the Restrictive Trade Practices Commission produced extensive reports with details of the conspiracy allegations, this practice was later abandoned and therefore this type of information was not available for any of the relatively recent cases.

The information used in this chapter comes from two sources: the Competition Bureau (case file, annual reports, specific reports) and legal documents. In the case of the information produced by the Competition Bureau one would expect that it would put the emphasis on the welfare decreasing effects of a cartel and not on the welfare increasing effects if they exist.

In the case of legal documents, they report the position of the Crown, the accused and the judge. If Canadian cartel law operated as a full blown rule of reason, under which all negative and positive welfare effects of a cartel must be discussed in court, one would expect the information coming from the legal documents not to be biased: the Crown would emphasize all the welfare decreasing elements, the accused would emphasize all the welfare increasing elements and the judge would look at the overall welfare effect. However, as explained in chapter 2, Canada does not have a full blown rule of reason. Instead, Canada uses a partial rule of reason that “filters” the type of evidence and discussion that may take place in court. Under Canadian cartel law, the key issues in deciding if a cartel should be convicted are the proof that there was an agreement with the effect of unduly lessening competition and the proof that the accused intended to enter such an agreement (Trebilcock and Warner (1993, p. 686)). Possible welfare increasing effects of a cartel are irrelevant in the conviction decision. In fact, if the accused intended to make a defence based on possible welfare increasing effects such evidence would be quickly dismissed as irrelevant under Canadian cartel law. Therefore, the characteristics of Canadian cartel law and jurisprudence will bias the discussions and evidence that is presented in court towards the negative welfare effects and away from positive welfare effects.

The fact that the sample of cases in this study spans about 60 years implies that there is an additional element biasing the information presented towards negative welfare effects and away from positive welfare effects: the status of development of cartel economic theory at the time of the trial. As explained in chapter 3, cartel theory has been evolving over time from a view that cartels always decrease welfare towards a view that cartels may create efficiency and thus either increase or decrease welfare. The status of development of cartel theory at the

time of the trial will definitely influence the type of arguments the defence is going to make in court. For example, it is conceivable that the indicted firms in an early case were trying to solve free rider problems. Given the status of cartel theory at the time of the trial one should not expect the lawyer of the accused to present the free rider argument as we know it today. Instead, in the old cases, the free rider argument would arise in a very primitive form (or would not arise at all). In other words, all else equal, the older the case the greater the bias in the information being used towards negative effects and away from positive effects.

5.2. Methodology

All the available information on each case was reviewed in order to determine if there were any allegations that quality changed during the cartel regime with respect to the competitive regime. Irrespective of the source of the allegations (a party representing the accused, a party representing the Crown or a neutral party), the following approach was used:

- If no allegations were found it was concluded that the cartel had no effect on quality;
- if there were only allegations that quality increased, it was concluded that the cartel may have increased quality but it did not decrease quality; and
- if there were only allegations that quality decreased, it was concluded that the cartel may have decreased quality but it did not increase quality.

No attempt was made to question the validity of the allegations due to two reasons. First, analysing the validity of the allegations would have required an in-depth analysis on a-case-by-case basis which is beyond the scope of this thesis. Second, in many instances there was not enough information available to the author to examine the validity of the allegations. For example, in *Lamps*, the trial judge conceded that one of the objectives of the cartel may have been to provide better service to the ultimate customers (29 C.P.R. (2d), p. 35).

Unfortunately, no explanation of how the arrangement may have had the such effect was found in the sources of information available to the author.

In some cases it was possible to find information on the product's type and characteristics, on whether the conspirators were producers of the conspiracy products, and on the importance of sales related services. Although this information was not used to conclude on the quality effects, it is presented because it helps assess the likelihood of changes in quality from the competitive regime to the cartel regime. For example, in those cases in which the product (or product lines) was described as homogeneous; or those cases in which the conspirators were not the producers of the conspiracy product, it is unlikely that the cartel had an effect on quality-in-a-narrow-sense.

This chapter assumes the absence of quality effects if no allegations in this regard are found in the information examined. Recall that the information reviewed is biased towards containing negative welfare effects of the cartels as opposed to positive welfare effects. In light of this bias, while not finding any information of quality effects implies that it is highly unlikely that the cartel had any welfare decreasing quality effects, it is not obvious that the same is true for possible welfare increasing quality effects. Therefore, the approach used in the chapter is conservative in the sense that it will be efficient at "capturing" welfare decreasing quality effects but it is likely to "miss" possible quality improving effects associated with an efficient cartel.

5.3. Quality-in-a-Narrow-Sense Effects

The results are summarized in table 9 under the heading "quality-in-a-narrow-sense". In three cases, Boxes, Sugar and Felts, there was information suggesting that quality-in-a-narrow-sense may have changed. Two of these three cases, Boxes and Sugar, were alleged

Table 9. Quality Effects of Cartels with respect to the Competitive Regime

Case	ANY INFORMATION SUGGESTING CHANGES IN:													QUALITY EFFECT OF CARTEL (With respect to competitive regime)
	QUALITY-IN-A-NARROW-SENSE				SALES RELATED SERVICES				VARIETY					
	Direction of effect not clear	Decreasing effects		Increasing effects		Decreasing effects		Increasing effects		Decreasing effects	Increasing effects			
		Restraint	Restraint	Restraint	Other	Restraint	Restraint	Restraint	Other		Restraint	Restraint	Other	
Coal														No effect
Rubber						X				X				Maybe falls, did not rise
Roof										X				Maybe falls, did not rise
Pulpwood														No effect
Boxes	X									X				Maybe changed but direction not clear
Culverts									X					Maybe rises, did not fall
Lamps									X	X				Maybe changed but direction not clear
Tubing									X					Maybe rises, did not fall
Gypsum														No effect
Fertilizer												X		Maybe rises, did not fall
Sugar		X				X								Maybe falls, did not rise
Felts					X				X	X				Maybe changed but direction not clear
Pork														No effect
Gases														No effect
PANS														No effect
AQPP														No effect
Pipe														No effect

to involve restraints on quality-in-a-narrow-sense. In the remaining 14 cases there was no information suggesting that quality-in-a-narrow-sense may have changed.

Information Relating to Restraints on Quality-in-a-Narrow-Sense

In Boxes, according to the trial judge, the evidence showed that the agreement between the accused companies was effective not only in respect to the fixing of prices but also with respect to the types of inputs to be used. For example, he explained, the use of what was known as B Flute material rather than A Flute was to be discouraged, even though the B Flute would be more economical for the consumer for certain purposes (51 C.P.R., p. 182). In other words, according to this information, the cartel imposed restraints on quality-in-a-narrow-sense. Unfortunately, no reference was made in regards to if the quality of the B Flute material was higher or lower than the quality of the A Flute material. Therefore, according to the available information on Boxes, quality-in-a-narrow-sense changed from the competitive regime to the cartel regime. However, the direction of the change is not clear.

In Sugar, part of the theory of the Crown was that the accused had an agreement to maintain their market shares and that the accused had restricted competition among themselves not just in regards to prices but also in regards to packaging (i.e. quality-in-a-narrow-sense) and advertising (i.e. sales related service) (26 C.P.R. (2d), p. 101). In this regard, the defence stated that advertising and packaging were not important dimensions of competition in the industry (26 C.P.R. (2d), p. 101).

Information Relating to Issues other than Restraints on Quality-in-a-narrow-sense

In Felts, the accused argued in court that the emphasis of the trade was not on price but on product performance, life and quality (i.e. quality-in-a-narrow-sense), all calling for constant development in technology and considerable research; and on speed of shipping and

customer servicing (i.e. sales related services) (143 D.L.R. (3d), p. 709, 712; 52 C.P.R. (2d), p. 194, 207). The accused contended that these variables and not price were the ones their customers (paper mills) held as their prime consideration. In this regard, the position of the accused was that they had restricted competition with respect to prices, terms and conditions of sales and import restrictions because their customers never sought price competition but rather competition on performance and service (143 D.L.R. (3d), p. 712). They referred to the importance of earning business on performance rather than buying business on price (143 D.L.R. (3d), p. 709). Also, learned counsel for the accused argued that if there was collusion in the matter of pricing, the accused had engaged in brisk competition among themselves in product performance, servicing customers and technological advance during the indictment period (52 C.P.R. (2d), p. 207). In fact, one of the arguments presented by these firms in their appeal of the trial court decision was that the trial court considered only the agreement as to pricing practices, terms and conditions of sale and import restrictions, and it did not take into consideration the highly competitive nature of the Canadian market in other respects (143 D.L.R. (3d), p. 712). A witness called for the defence during the trial, who was an officer of one of the firms that bought the accused companies' products, explained that product performance was of prime consideration. However, the same witness made it clear in Court that he had not intended to mean that price was not also an important factor (52 C.P.R. (2d), p. 194). In light of this information, it is concluded that in Felts, quality-in-a-narrow-sense at least did not fall during the cartel with respect to competition; and it may have even increased during the cartel.

5.4. Sales Related Services Effects

The results are summarized in table 9 under the heading “sales related services”. As it can be seen from the table, in six cases there was information suggesting that the cartels had effects on the provision of sales related services. Two of these cases involved restraints on the provision of sales related services. In 11 cases no information suggesting that the cartel affected the provision of sales related services was found.

Information Relating to Restraints on the Provision of Sales Related Services

In Sugar, as explained above, the allegations of the Crown implied that the accused firms had restricted competition among themselves in regards to advertising (See section on “quality-in-a-narrow-sense”).

In Rubber, according to the section of the Commissioner’s report³⁸ on this case that dealt with the mechanical rubber products affected by the conspiracy, the documentary evidence showed that although requests by customers were recorded from time to time asking for specific guarantees as to the length of service or satisfactory operation, they were uniformly refused (Report of Commissioner, p. 92-95).

Information Relating to Issues other than Restraints on the Provision of Sales Related Services

In Felts, Tubing and Lamps, there was information suggesting a shift from price competition towards competition across other dimensions. In Felts, as explained in the section on quality-in-a-narrow-sense, the accused firms contended that they had declined competition with respect to prices, terms and conditions of sales and import restrictions because their customers never sought price competition but rather competition on performance and service

³⁸The Commissioner later became the Director of Investigation and Research and more recently the Commissioner of Competition.

(See section on quality-in-a-narrow-sense). In Tubing, according to the information in the Bureau file, the industry had been characterized by highly competitive activities, price cutting, a variety of discounts and, according to the producers, low profits. It is also explained that against this background, the steel tubing producers engaged in efforts to stabilize prices, increase profits and replace price competition with competition in terms of services, delivery and salesmanship. In Lamps, the records of a 1959 February meeting showed that, according to an official from one of the accused firms, one of the purposes of the 1959 plan was to improve what he described as chaotic marketing conditions where price cutting had largely replaced selling (RTPC report, p. 8). Also, in the trial, the judge conceded that one of the objectives of the arrangements may have been to provide better service to the ultimate customers (29 C.P.R. (2d), p. 35). In fact, he had explained earlier that one of the exhibits presented in court suggested that the 1961 sales plan arrangements attempted to remove the emphasis from prices to sales and service (29 C.P.R. (2d), p. 26).

In Culverts, documentary evidence and testimony revealed that among the possible reasons behind the decision to eliminate price competition was a need to increase the level of promotion of the industry product in order to face keen competition from concrete pipe manufacturers to whom the metal culvert industry was losing market. The Corrugated Metal Pipe Institute (CMPI) had been created in 1961, and its stated goal was to promote the industry product via product and market research, engineering promotion, advertising, public relations and informing customers on the comparative merits of the metal culverts vis-à-vis competing products. The operations of the CMPI were directed by a Board of Directors which met about once a month. Day-to-day operations of the CMPI were placed in the hands of an Engineer-Manager who also had the function of promoting the acceptance and use of

corrugated metal pipe. There was evidence that the CMPI had actually been carrying out this type of promotion related activities. For example, the CMPI had conducted an extensive market study, had prepared a technical manual, had studied a wide variety of technical problems and had conducted symposia (RTPC report, p. 10). The information gathered during the investigation on this case revealed that the accused were of the view that the intense price cutting prevailing in the industry was making it really difficult for the CMPI to achieve its promotional goal. In particular, the accused considered that due to intense price cutting, the industry's products were being sold at unprofitable prices which made resources unavailable for long term promotion of metal culvert (RTPC report, p. 21, 22).

5.5. Variety Effects

The results are summarized in table 9 under the heading "variety". In five cases there were allegations that the cartels decreased variety. In one case, Fertilizer, there was information suggesting that the cartel may have increased variety.

Information Relating to Restraints on Variety

Five cases were alleged to involve restraints on variety: Lamps, Boxes, Rubber, Roof and Felts. In all these cases such restraints were alleged to lead to a reduction, as opposed to an increase, in variety.

In Lamps, the Crown alleged that the agreement had the effect of eliminating product choice in the commercial and industrial (C & I) market. The Crown allegations were based on a single piece of evidence: a confidential memorandum of Sylvania, one of the accused corporations (29 C.P.R. (2d), p. 57). The memorandum read in part as follows:

Competition has indicated concern over the number of 750 hour lamps that Sylvania still offer to the C & I market. You will note from the attached page the exact lamps that competition have available. Indications are that competition will add more 750 hour lamps if we continue to offer the existing entire family, and we are all in agreement that this

would not be in keeping with our main objective of recent years to reduce the number and quantity of types that have to be supplied to the C & I market (29 C.P.R. (2d), p. 57).

The trial judge argued that the memorandum must be read in the context of the industry structure. He said that reading it in context he could not say that the reduction in the number and type of lamps *per se* showed detriment. He argued that it could be a sign of new developments or rationalization in the industry to phase out uneconomic lines because of lack of demand (29 C.P.R. (2d), p. 57).

In Rubber, according to the section on the Commissioner's report on this case that dealt with the mechanical rubber products affected by the conspiracy, the firms were alleged to have reached an agreement in regards to the range and specifications of products (Report of Commissioner, p. 47). In this same section, it is alleged that there was a mutual understanding among the companies that they would not introduce a new or different product until the matter had been discussed and an agreement had been reached upon price and time of release (Report of Commissioner, p. 101). The Commissioner's report, argued that a result of the reduction in range and simplification of lines during the wartime controls period compared with the pre-war period was that it had the effect of holding down costs of manufacturing, and thus containing the upward pressure on price ceilings. The Commissioner's report contended that the companies recognized that with the removal of Government controls the continuation of some wartime restrictions on range would benefit them by keeping manufacturing costs lower, though the consumer would no longer have the guarantee that in giving up the choice of a wider variety of products, he/she would get in exchange lower prices (Report of Commissioner, p. 102, 103). The Commissioner's report made similar allegations in the case of the rubber footwear products affected by the conspiracy (Report of Commissioner, p. 590, 486). In this regard, the Commissioner's report presented an excerpt

of an interview with a member of the industry. A partial reproduction of such excerpt is presented below:

Answer. (...) I know one of the great losses of the industry was due to wastes in range. During the war we cut down our distribution costs and laid off a lot of salesmen, and closed warehouses around the country, which had a real beneficial effect in getting our costs down. And it was thought that the sales managers, under the rubber control period, had done a splendid job. And that is what we wanted them to do - to continue to do - along the line of keeping costs down in our industry.

Question. You say the main item in that was to retain the limited range?

Answer. Yes, the limited range, primarily, and to keep costs down (...) (Report of Commissioner, p. 486).

In Roof, according to the RTPC report on the case, the evidence indicated that there was a clear understanding among the manufacturers that new products would not be introduced without prior discussions among them (RTPC report, p. 2). The RTPC report contended that since the war the manufacturers had by agreement restricted the number of products produced and in some cases stopped producing products being produced. The RTPC report also explained that the manufacturers also had taken active steps to standardize existing lines (RTPC report, p. 2,3). According to the RTPC report, the reasons advanced by the manufacturers for stopping production of an item were either that the product was a poor one or that there was no public demand for it. The RTPC report, argued that these reasons did not afford a complete explanation. The RTPC report contended that in the case of cheap lines there was evidence that part of the motivation was the fact that if these lines were not available, the purchaser would be forced to take the more expensive one. As to the alleged lack of demand, the RTPC report stated that this did not appear to be supported by the evidence (RTPC report, p. 2,3). According to the RTPC report, the accused denied that there was any agreement or understanding among them to eliminate or restrict the introduction of lines of products. The accused also argued that standardization of the products in the industry

had been fostered by the Canadian government both as a defence economy measure starting at the initial years of World War II and as a step in the program to establish a National Building Code. Additionally, the accused said that standardization had resulted in lower prices of the products and that minimum specifications for products were an effective method of ensuring the quality of a home-owner's roof. The accused contended that apart from Government restrictions, a full range of specifications, sizes and colours were always and always had been available to meet the demand for asphalt roofing in Canada (RTPC report, p. 15).

In Boxes, according to one of the legal reports on the case, the agreement pertained not only to the fixing of prices but also extended to the adoption of agreed upon specifications for the container board and shipping containers, involving on occasion the postponement of the adoption of new and superior techniques and products (59 C.P.R., p. 102).

In Felts, the Crown alleged that the firms agreed to delay the introduction of advanced products to the detriment of the consumers (52 C.P.R. (2d), p. 193, 195). The trial judge disagreed with the Crown's contention. In this regard, he said:

The theory of the Crown is to the effect that the accused would have delayed the introduction of advanced products to the detriment of the consumers. The example given is the marketing of 'needled felts'. That there were delays in this area is clear from the proof but the contention of the defence to the effect that where there was apparent delay it was caused by the wish to avoid premature marketing of a product whose efficacy had not been fully proven raises a doubt in my mind that in this area there was an intention and an agreement to lessen or prevent competition by delays in introducing more sophisticated products (52 C.P.R. (2d), p. 195).

Information Relating to Issues other than Restraints on Variety

In Fertilizer, according to the information on the Competition Bureau file on the case, the manufacturers engaged in considerable cooperation through sale and swap agreements. The Bureau file explains that one of the rationales behind such agreements was that they enabled

manufacturers to acquire products they themselves did not manufacture and thus to maintain full product lines (Bureau file: 3722-MC02). The trial judge, in his Judgement, referred to the effect of these agreements on variety. He said that these agreements placed fertilizer for sale in the retail market in a far number greater of hands in a particular market area or zone and that this would have the effect of increasing competition rather than preventing or lessening competition ([1980] 2 W.W.R., p. 717, 718).

5.6. Comments on the Quality Effects in Light of Additional Information

In some cases it was possible to determine the type of product involved in the conspiracy and whether the accused firms were producers of the conspiracy product or not. This information is presented in table 10. All else equal, the likelihood that quality-in-a-narrow-sense is affected by a cartel should be lower if the conspiracy product is homogeneous and/or the conspirators are not producers than if the opposite is true. It is interesting to notice that in two of the three cases in which there were allegations that quality in-a-narrow-sense was affected by the cartel, Boxes and Felts, the product was described as tailor-made and the accused firms were producers of the conspiracy product. In the other case in which there were allegations that quality-in-a-narrow-sense was affected, Sugar, the product was described as homogeneous and the firms were producers. Recall that in this case the allegations concerned the packaging of the product. In AQPP and PANS it was highly unlikely that quality-in-a-narrow-sense was affected because the firms were not producers of the conspiracy product. This is consistent with the fact that in these two cases no allegations of changes in quality-in-a-narrow-sense were found.

In AQPP and PANS, it is concluded in this chapter that the provision of sales related services was not affected by the cartel based on the fact that there were no allegations in this

Table 10. Additional Information

Case Label	Product type	Producers?
Coal	?	Yes ^a
Rubber	?	Yes
Roof	?	Yes
Pulpwood	?	No ^b
Boxes	Tailor-made	Yes
Culverts	Homogeneous	Yes
Lamps	Homogeneous	Yes
Tubing	Homogeneous	Yes
Gypsum	?	Yes
Fertilizer	Homogeneous	Yes
Sugar	Homogeneous	Yes ^c
Felts	Tailor-made	Yes
Pork	?	Yes ^d
Gases	?	?
PANS	?	No
AQPP	?	No
Pipe	Homogeneous	Yes

Note: “?” means that the sources of information reviewed did not contain information to fill out the cell in question.

^a Not the accused but the co-conspirators.

^b The accused produced pulpwood for their own consumption. However, the conspiracy product concerned the pulpwood that the accused purchased in the market.

^c The conspiracy was alleged to affect both raw and refined sugar. The accused were producers of refined sugar.

^d The conspiracy was alleged to affect hogs and pork products. The accused were producers of pork products (meat packers) and bought hogs as an input.

regard. However, it is worth noting that in these two cases the provision of sales related services was a very important variable in the cartelized industries. These two cases involved the retail pharmaceutical industry. Retail pharmacies sell a product composed of two components: the prescribed drug and the service of dispensing that drug. The price of the product includes a cost portion plus the dispensing fee of the drug. (Cadsby and Tapon's 1994 report, p. 44, [1995] R.J.Q., p. 1500). Service to the customer with respect to location, hours of operation, quality of advice, record keeping, range and depth of inventory, availability of delivery services, and range of non-drug products is crucial for the success of pharmacies (Cadsby and Tapon's 1994 report, p. 32).

5.7. Final Remarks

The conclusions on the overall quality effects of the cartels with respect to the competitive regime are presented in the last column of table 9. As can be seen from the table it is concluded that:

- The cartel had no effect on quality in eight cases: Coal, Pulpwood, Gypsum, Pork, Gases, PANS, AQPP and Pipe,
- The cartel may have decreased quality but it did not increase quality in three cases: Rubber, Roof and Sugar,
- The cartel may have increased quality but it did not decrease quality in three cases: Culverts, Tubing and Fertilizer,
- The cartel may have affected quality but the direction of the effect is not clear in three cases: Boxes, Lamps and Felts.

Recall from the discussion in the conclusions of chapter 4 that the main reason why it was necessary to extend this research towards the quality dimension was that in the absence of any quality information it was not obvious which of the two theoretical frameworks presented in the chapter 3 should be used to assess the welfare effects of the cartels. The

choice of theoretical framework is crucial because each model may lead to very different welfare effect conclusions. For example, while in the two variable model that abstracts from quality effects, a cartel that decreases price or has no effect on price is always welfare increasing, this is not the case under the three variable model that allows for cartel quality effects. A main finding of this chapter is that in nine out of 17 cases there was information suggesting that quality was affected by the cartel. The welfare effects of these nine cases will be examined using the three variable framework in the next chapter. For the sake of simplicity, the welfare effects of the remaining eight cases, in which there was no information suggesting quality effects, will be examined using the two variable theoretical framework that abstracts from quality.

6. WELFARE CONSEQUENCES OF THE CARTELS AND PROSECUTION

6.1. Introduction

The objective of this chapter is twofold. The first half of the chapter combines the analysis and results from chapters 3, 4 and 5 in order to conclude on the welfare effects of the sample of cartels in this study. The second half of the chapter explores the trial-related information, Bureau publications and files available on each conspiracy case in search for possible “hints” of efficiency creation effects. This type of information is presented and discussed for those cases in which it was found.

6.2. Welfare Effects Analysis

6.2.1. Methodology

The methodology used to conclude on the welfare effects of the cartels consists of three steps. First, the information on the price effect of prosecution, presented in table 5, is used to infer the price effect of the cartels. If prosecution increased price, it is concluded that the cartel was price decreasing. If prosecution decreased price, it is concluded that the cartel was price increasing. If prosecution had no effect on price, two approaches are used. The first approach assumes that in all these cases prosecution deterred cartel behaviour during the period analysed and concludes that these cartels had no effect on price. The second approach allows for the possibility that in all these cases prosecution did not deter cartel behaviour during the period analysed implying that it is not possible to infer the price effect of the cartel from the absence of a significant impact of prosecution on price. There are two reasons why the non-deterrence possibility is allowed for. First, a line of criticism to the Canadian

conspiracy provisions contends that they have failed to deter cartel behaviour (Stanbury (1991). Second, this study analyses the price effect of prosecution during the 24 months following the alleged EOC date. Even if prosecution deterred cartel behaviour, it is possible that it did so at a point in time not covered by this period.

The second step uses the information on the quality effects of the cartels, presented in table 9, to select the theoretical model from chapter 3 that provides the most appropriate analytical framework in each case. The two variable model that abstracts from quality is used in those cases in which there were no alleged quality effects. The three variable model that introduces quality is used in those cases in which there were alleged quality effects.

The third step takes the information on the price and quality effects of each cartel in the sample, and examines it in the context of the appropriate theoretical model to determine all theoretically possible cartel types and welfare effects that are consistent with the price and quality effects of the cartel in question. For each cartel in the sample, the relevant section of table 1 (two variable model or three variable model section) is used to determine all theoretically possible cartel types that are consistent with its price and quality effects. Because table 1 presents the welfare effects associated with each cartel type, “tying” each cartel to all its theoretically possible cartel types also “produces” all theoretically possible welfare effects that the cartel in question may have. In those cases in which all the theoretically possible welfare effects point in the same direction, it is concluded that the cartel affected welfare in that direction. In those cases in which the theoretically possible welfare effects point in different directions, no conclusion on the cartel welfare effect is obtained.

The process described above and its results are presented in tables 11 and 12. Table 11 refers to the case in which it is assumed that prosecution deterred cartel behaviour in those

Table 11. Welfare Effects Allowing for Quality Considerations and Assuming that in Cases in which Prosecution Had No Effect on Price There Was Deterrence at the Alleged EOC Date

CASES ANALYSED USING TWO VARIABLE MODEL (ABSTRACTING FROM QUALITY)							
Case Label	Price effect of prosecution (From Table 5)	Inferred price effect of cartel	Quality effect of cartel (From Table 9)	Effect of cartel		Effect of prosecution	
				Welfare (Based on Table 1)	CS	Welfare	CS
Coal Gases AQPP	No effect	No effect	No effect	Rises	No effect	Falls	No effect
Gypsum Pork PANS Pipe	Falls	Rises	No effect	?	Falls	?	Rises
OTHER CASES (ABSTRACTING FROM QUALITY)							
Pulpwood	No effect	No effect	No effect	Rises	No effect*	Falls	No effect*
CASES ANALYSED USING THREE VARIABLE MODEL (INTRODUCING QUALITY)							
Fertilizer Tubing	Rises	Falls	Maybe rises, did not fall	Rises	Rises	Falls	Falls
Sugar	Rises	Falls	Maybe falls, did not rise	?	?	?	?
Felts	Rises	Falls	Maybe changed but direction not clear	?	?	?	?
Culverts	No effect	No effect	Maybe rises, did not fall	Rises	Rises or no effect	Falls	Falls or no effect
Rubber Roof	No effect	No effect	Maybe falls, did not rise	?	Falls or no effect	?	Rises or no effect
Lamps Boxes	No effect	No effect	Maybe changed but direction not clear	?	?	?	?

Note: "?" means "not possible to conclude".

*In the Pulpwood case this column refers to the welfare effect on the sellers of the pulpwood to the conspirators. Recall that Pulpwood was an input conspiracy.

Table 12. Welfare Effects Allowing for Quality Considerations and Assuming that in Cases in which Prosecution Had No Effect on Price It is Possible that There Was No Deterrence at the Alleged EOC Date

CASES ANALYSED USING TWO VARIABLE MODEL (ABSTRACTING FROM QUALITY)							
Case Label	Price effect of prosecution (From Table 5)	Inferred price effect of cartel	Quality effect of cartel (From Table 9)	Effect of cartel		Effect of prosecution	
				Welfare (Based on Table 1)	CS	Welfare	CS
Coal Gases AQPP	No effect	?	No effect	?	?	?	No effect
Gypsum Pork PANS Pipe	Falls	Rises	No effect	?	Falls	?	Rises
OTHER CASES (ABSTRACTING FROM QUALITY)							
Pulpwood	No effect	?	No effect	?	?	?	No effect ^a
CASES ANALYSED USING THREE VARIABLE MODEL (INTRODUCING QUALITY)							
Fertilizer Tubing	Rises	Falls	Maybe rises, did not fall	Rises	Rises	Falls	Falls
Sugar	Rises	Falls	Maybe falls, did not rise	?	?	?	?
Felts	Rises	Falls	Maybe changed but direction not clear	?	?	?	?
Culverts	No effect	?	Maybe rises, did not fall	?	?	?	Falls or no effect
Rubber Roof	No effect	?	Maybe falls, did not rise	?	?	?	Rises or no effect
Lamps Boxes	No effect	?	Maybe changed but direction not clear	?	?	?	?

Note: "?" means "not possible to conclude".

^aIn the Pulpwood case this column refers to the welfare effect on the sellers of the pulpwood to the conspirators. Recall that Pulpwood was an input conspiracy.

cases in which it did not affect price. Table 12 allows for the possibility that in these cases prosecution may have not deterred cartel behaviour during the period analysed. These tables also present the cartel effects on consumer surplus and the effects of prosecution on both consumer surplus and welfare. The consumer surplus effects of the cartel were obtained by examining the inferred price effect and the quality effect of each cartel. The consumer surplus effects of prosecution were obtained by examining the observed price effect of prosecution and the quality effects of the cartel. Clearly, all else equal, an increase (decrease) in price or a decrease (increase) in quality decreases (increases) consumer surplus. Notice that the one-to-one correspondence between observed price effect of prosecution and inferred price effect of the cartel does not hold if one assumes that in those cases in which prosecution did not affect price it was possible that the cartel was not deterred during the period analysed. This explains why in table 12 there are seven cases in which it is possible to conclude on the consumer surplus effect of prosecution but it is not possible to conclude on the consumer surplus effect of the cartel.

It should be noted that chapter 3's models were not appropriate to analyse the Pulpwood case because this case refers to an input conspiracy. Thus, the present chapter tables do not "tie" the Pulpwood cartel to theoretical cartel types from chapter 3. The Pulpwood case results were obtained conducting an analogous analysis as with the rest of the cases but accounting for the fact that this was an input conspiracy. Although the remaining 16 cases in the sample were considered as output conspiracies, it should be pointed out that the Pork case was actually a combination of both an output conspiracy and an input conspiracy. Recall from chapter 5 that in Pork it was concluded that the cartel had no quality effects. In this case, it was possible to examine only the price effect of prosecution on the output and not the input.

It was found that prosecution decreased price during the analysed period, implying that the cartel increased the price of the output. Because the overall effect of the conspiracy was to increase the price of the output it was decided that the input side of the conspiracy could be ignored to conclude on the direction of the welfare effects. Therefore, the two variable model of chapter 3 was used to conclude on the direction of the welfare effects in this case.³⁹

6.2.2. Results Assuming Deterrence

Table 11 summarizes the results obtained if it is assumed that in all the cases in which prosecution did not affect price, prosecution deterred cartel behaviour. In 10 cases it is not possible to conclude on the welfare effects. In the remaining seven cases it is concluded that the cartels were welfare increasing and that prosecution of these cartels decreased welfare during the period analysed.

Table 11 also shows the consumer surplus effects. In four cases it is not possible to conclude on the consumer surplus effects. In two cases the cartels increased consumer surplus and prosecution decreased it. In one case the cartel either increased or did not affect consumer surplus while prosecution either decreased or did not affect consumer surplus. In four cases the cartels and prosecution had no effect on consumer surplus. In two cases the cartels either decreased or did not affect consumer surplus while prosecution either increased

³⁹Notice that such an approach would have been inappropriate if the overall price effect of the conspiracy was to decrease the price of the output. In such a case, it is theoretically possible that the cartel was a “naked” welfare decreasing cartel that decreased the price of the input so much that the cartel overall effect was to decrease the price of the output. However, if one used the two variable model of chapter 3 to conclude on the cartel welfare effect it would have been concluded that this cartel was a “complex” welfare increasing cartel. Recall that in this model a cartel that decreases the price of the output is always “complex” and welfare increasing. Therefore, if the overall effect of the cartel had been to decrease the price of the output, ignoring the input side of the conspiracy and using the two variable model to conclude on the direction of the welfare effect may have led to an incorrect conclusion.

or did not affect prosecution. In four cases the cartels decreased consumer surplus and prosecution increased it.

6.2.3. Results Allowing for Non-deterrence

Table 12 shows the results if it is assumed that, in all the cases in which prosecution did not affect price, prosecution did not deter cartel behaviour during the period analysed. In 15 cases it is not possible to conclude on the welfare effects. In the remaining two cases it is concluded that the cartels increased welfare and prosecution decreased welfare during the period analysed.

Table 12 also shows the consumer surplus effects of the cartels and their prosecution. In 11 cases it is not possible to conclude on the consumer surplus effects of the cartels. In two cases the cartels increased consumer surplus. In four cases the cartels decreased consumer surplus. In regards, to the consumer surplus effect of prosecution it is concluded that prosecution decreased consumer surplus in two cases, either decreased it or did not affect it in one case, increased it in four cases, either increased it or did not affect it in two cases, and did not affect it in four cases. In four cases it was not possible to conclude on the consumer surplus effect of prosecution.

6.2.4 Importance of Examining Quality

In order to assess the welfare effects of the cartels and prosecution it was necessary to extend this research towards the quality dimension. If cartel quality effects were important, an analysis of welfare effects (based on price effects) that abstracts from quality changes would produce misleading conclusions. For example, a “naked” cartel that decreases both price and quality would be misinterpreted as a “complex” welfare increasing cartel that created efficiency by allowing the firms to reduce costs via the use of a technology that was

superior to the one used under competition. In order to avoid this problem, chapter 5 was written and the welfare analysis of the cartels presented in the present chapter was made using information on both price and quality effects.

It is interesting to assess to what extent it really mattered to address the quality dimension before rushing to conclude on welfare effects. Tables 13 and 14 replicate this chapter's welfare analysis abstracting from any possible quality effects of the cartels. A summary of the welfare effects obtained when quality considerations are taken into account (tables 11 and 12) and when quality effects are ignored (tables 13 and 14) is presented in table 15. An analogous summary of the consumer surplus effects is presented in table 16. As can be seen from tables 15 and 16 the introduction of quality considerations significantly affected the conclusions on the welfare and consumer surplus effects. In other words, had quality considerations been ignored, the welfare and consumer surplus effects analysis would have led to misleading results. For example, the second and sixth columns in table 15 show the cartel welfare effects obtained under the approach that assumes that in those cases in which prosecution did not affect price cartel behaviour was deterred during the period analysed. The second column presents the results when quality considerations are ignored. The sixth column presents the results when quality considerations are allowed for. A comparison of both columns shows that by ignoring quality considerations it would have been mistakenly concluded in six cases that the cartels must have been "complex" welfare increasing cartels. These cases were Rubber, Roof, Boxes, Lamps, Sugar, Felts. As can be seen in table 13, in these six cases prosecution either increased price or did not affect price implying that the cartels either decreased price or had no effect on price. As table 13 shows in all these cases there was information suggesting that the cartels may have decreased quality. Clearly, in these six cases, it would

Table 13. Welfare Effects Ignoring Quality Considerations and Assuming that in Cases in which Prosecution Had No Effect on Price There Was Deterrence at the Alleged EOC Date

CASES ANALYSED USING TWO VARIABLE MODEL (ABSTRACTING FROM QUALITY)						
Case Label	Price effect of prosecution (From Table 5)	Inferred price effect of cartel	Effect of cartel		Effect of prosecution	
			Welfare (Based on Table 1)	CS	Welfare	CS
Fertilizer Tubing Sugar Felts	Rises	Falls	Rises	Rises	Falls	Falls
Coal Gases AQPP Culverts Rubber Roof Lamps Boxes	No effect	No effect	Rises	No effect	Falls	No effect
Gypsum Pork PANS Pipe	Falls	Rises	?	Falls	?	Rises
OTHER CASES (ABSTRACTING FROM QUALITY)						
Pulpwood	No effect	No effect	Rises	No effect*	Falls	No effect*

Note: "?" means "not possible to conclude".

*In the Pulpwood case this column refers to the welfare effect on the sellers of the pulpwood to the conspirators. Recall that Pulpwood was an input conspiracy.

Table 14. Welfare Effects Ignoring Quality Considerations and Assuming that in Cases in which Prosecution Had No Effect on Price It is Possible that There Was No Deterrence at the Alleged EOC Date

CASES ANALYSED USING TWO VARIABLE MODEL (ABSTRACTING FROM QUALITY)						
Case Label	Price effect of prosecution (From Table 5)	Inferred price effect of cartel	Effect of cartel		Effect of prosecution	
			Welfare (Based on Table 1)	CS	Welfare	CS
Fertilizer Tubing Sugar Felts	Rises	Falls	Rises	Rises	Falls	Falls
Coal Gases AQPP Culverts Rubber Roof Lamps Boxes	No effect	?	?	?	?	No effect
Gypsum Pork PANS Pipe	Falls	Rises	?	Falls	?	Rises
OTHER CASES (ABSTRACTING FROM QUALITY)						
Pulpwood	No effect	No effect	?	?	?	No effect*

Note: "?" means "not possible to conclude".

*In the Pulpwood case this column refers to the welfare effect on the sellers of the pulpwood to the conspirators. Recall that Pulpwood was an input conspiracy.

Table 15. Welfare Effects

Case Label	IGNORING QUALITY EFFECTS				QUALITY EFFECTS POSSIBLE IF ALLEGATIONS			
	Deterrence (Table 13)		No deterrence possible (Table 14)		Deterrence (Table 11)		No deterrence possible (Table 12)	
	Welfare Effect		Welfare Effect		Welfare Effect		Welfare Effect	
	Cartel	Prosecution	Cartel	Prosecution	Cartel	Prosecution	Cartel	Prosecution
Coal	Rises	Falls	?	?	Rises	Falls	?	?
Rubber	Rises	Falls	?	?	?	?	?	?
Roof	Rises	Falls	?	?	?	?	?	?
Pulpwood	Rises	Falls	?	?	Rises	Falls	?	?
Boxes	Rises	Falls	?	?	?	?	?	?
Culverts	Rises	Falls	?	?	Rises	Falls	?	?
Lamps	Rises	Falls	?	?	?	?	?	?
Tubing	Rises	Falls	Rises	Falls	Rises	Falls	Rises	Falls
Gypsum	?	?	?	?	?	?	?	?
Fertilizer	Rises	Falls	Rises	Falls	Rises	Falls	Rises	Falls
Sugar	Rises	Falls	Rises	Falls	?	?	?	?
Felts	Rises	Falls	Rises	Falls	?	?	?	?
Pork	?	?	?	?	?	?	?	?
Gases	Rises	Falls	?	?	Rises	Falls	?	?
PANS	?	?	?	?	?	?	?	?
AQPP	Rises	Falls	?	?	Rises	Falls	?	?
Pipe	?	?	?	?	?	?	?	?
Possible to conclude	13	13	4	4	7	7	2	2
Not possible to conclude	4	4	13	13	10	10	15	15

Note: "?" means "not possible to conclude".

Table 16. Consumer Surplus Effects

Case Label	IGNORING QUALITY EFFECTS				QUALITY EFFECTS POSSIBLE IF ALLEGATIONS			
	Deterrence (Table 13)		No deterrence possible (Table 14)		Deterrence (Table 11)		No deterrence possible (Table 12)	
	CS Effect		CS Effect		CS Effect		CS Effect	
	Cartel	Prosecution	Cartel	Prosecution	Cartel	Prosecution	Cartel	Prosecution
Coal	No effect	No effect	?	No effect	No effect	No effect	?	No effect
Rubber	No effect	No effect	?	No effect	Falls or no effect	Rises or no effect	?	Rises or no effect
Roof	No effect	No effect	?	No effect	Falls or no effect	Rises or no effect	?	Rises or no effect
Pulpwood*	No effect	No effect	?	No effect	No effect	No effect	?	No effect
Boxes	No effect	No effect	?	No effect	?	?	?	?
Culverts	No effect	No effect	?	No effect	Rises or no effect	Falls or no effect	?	Falls or no effect
Lamps	No effect	No effect	?	No effect	?	?	?	?
Tubing	Rises	Falls	Rises	Falls	Rises	Falls	Rises	Falls
Gypsum	Falls	Rises	Falls	Rises	Falls	Rises	Falls	Rises
Fertilizer	Rises	Falls	Rises	Falls	Rises	Falls	Rises	Falls
Sugar	Rises	Falls	Rises	Falls	?	?	?	?
Felts	Rises	Falls	Rises	Falls	?	?	?	?
Pork	Falls	Rises	Falls	Rises	Falls	Rises	Falls	Rises
Gases	No effect	No effect	?	No effect	No effect	No effect	?	No effect
PANS	Falls	Rises	Falls	Rises	Falls	Rises	Falls	Rises
AQPP	No effect	No effect	?	No effect	No effect	No effect	?	No effect
Pipe	Falls	Rises	Falls	Rises	Falls	Rises	Falls	Rises
Possible to conclude	17	17	8	17	13	13	6	13
Not possible to conclude	0	0	9	0	4	4	11	4

Note: "?" means "not possible to conclude".

*In Pulpwood the welfare effects presented in the table refer to the welfare effects on the sellers of pulpwood to the conspirators. Recall that Pulpwood was an input conspiracy.

have been misleading to abstract from quality effects and use the two variable framework of chapter 3 to conclude that all these cartels were “complex” welfare increasing cartels. This is because an alternative explanation to the observed price effects is that these cartels were “naked” welfare decreasing cartels that chose a level of quality that was so low that the monopoly price was below the competitive price.

Tables 15 and 16 (two last rows) also show that the number of cases in which it is possible to conclude on welfare and consumer surplus effects decreases dramatically once quality considerations are introduced. This result was to be expected from the theoretical analysis of chapter 3. In this regard, table 1 shows that when the cartel affects quality, it is harder to conclude on welfare effects than when one abstracts from quality. This is because the number of theoretically possible cartel types and welfare effects increases significantly in the three variable model framework that introduces quality versus the two variable model framework that abstracts from quality.

6.3. Interpretation

In the previous section of the chapter it is concluded that at least some of the cartels in the sample were welfare increasing cartels. The contention that some of these cartels were welfare increasing cartels would be stronger if there was any additional information explaining how some of these cartels may have created efficiency. In order to address this issue, the trial related documents and Competition Bureau publications and case files available on each conspiracy in the sample were reviewed to determine if there was any information of this sort. This section presents and discusses this type of information for those cases in which it was found.

The information used in this section is the same that was reviewed to obtain the results of chapter 5. It comes from two sources: the Competition Bureau (case file, annual reports, specific reports) and legal documents. As explained in that chapter, this information is biased towards containing negative welfare effects as opposed to positive welfare effects of cartels. This information bias has two important implications in the context of this chapter. First, not finding a particular positive welfare effect in the information available in some of the cases does not allow us to conclude absolutely that such an effect was not present. Second, finding a particular positive welfare effect in the information reviewed is especially relevant. For example, if the accused decided to introduce an efficiency creation argument during the trial even knowing that given the Canadian partial rule of reason approach to conspiracies it was going to be quickly dismissed by the judge, they must have had really good cause to expect their argument to influence the judge's view of the case.

The section turns now to the discussion of the information found. The information refers to five cases and it relates to the possibility that some of these cartels may have been, at least in part, cooperative attempts to solve market problems (e.g. free-rider, opportunism, informational problems) that affect cost and that have a suboptimal non-cooperative solution. The reader should keep in mind that the information presented below is far from providing a complete in-depth analysis of all the issues involved in each of these conspiracy cases. Such an endeavour is beyond the scope of this study.

6.3.1. The Lamps Case

The firms involved in this case were the three principal manufacturers of electric lamps in Canada. The case related to the adoption in 1959 by the three manufacturers of a Large

Lamp Plan prepared by Canadian General Electric and the subsequent adoption in 1961 by the three manufacturers of a revised Large Plan, also prepared by Canadian Electric (Director's annual report, 1971, p. 38, 40). According to the RTPC report on this case, a key purpose of the arrangements was the elimination of price competition at the distribution level. The arrangements were alleged to be aimed at allowing the manufacturers to regulate the prices at which their products would be supplied by the distributors of large lamps to commercial and industrial users (RTPC report, p. 19, 12-14).

In his address at a meeting with large lamp distributors, Mr. E. H. Lindsay, of Canadian General Electric described the market conditions that led to the challenged arrangement, and in particular to the design of the 1959 sales plan:

What have the lamp manufacturers and distributors been doing to offset these increasing costs and to assure the profitability that is essential to the health of any business? In my opinion the exact opposite of what we should be doing. All of us have been contributing to lamp marketing conditions that are chaotic in almost every respect; **where price cutting has largely replaced selling**; where the growth and the breadth of our individual markets are being limited by runaway discounts, and where none of us is making the legitimate profits to which we are entitled.

It is a condition that is hurting all of us. We as manufacturers, you as our agents, and also competitive lamp manufacturers and their distributors. Size is no protection against this disease of disappearing profits resulting from increasing costs and ridiculous price cutting. The larger you are and the wider your markets the more your profits may have been hit; or you may have simply lost the growth you should expect, by letting someone else take the business at unprofitable prices (RTPC report, p. 8) (Emphasis added by the author).

As explained in chapter 5, the challenged agreement was intended to remedy these "chaotic" market conditions. Mr. Lindsay's words suggest that these "chaotic" market conditions, characterized by intense price cutting, were a concern to the large lamp manufacturers not only because price cutting reduced profits but also because it undermined

the provision of sales related services. In fact, there was some evidence that the challenged agreement actually intended not only to increase profits but also to improve the provision of sales related services. In this regard, during the trial, the judge conceded that one of the objectives of the arrangement may have been to provide better service to the customers (29 C.P.R. (2d), p. 35). More interestingly, the price cutting - sales related services "connection" was explicitly referred to by the trial judge in his interpretation of the objectives of the arrangement (he was referring in particular to the objectives of the 1961 sales plan):

As suggested in the analysis document (ex. 56), the new plan attempted to stabilize further the market and to remove the emphasis from prices to sales and service (29 C.P.R. (2d), p. 26).

Unfortunately, it was not possible to find any information explicitly explaining how the arrangement may have had the effect of providing better services to the customers. A possible explanation is that by restricting price competition the large lamp manufacturers were able to solve free rider problems. Although no explicit reference to free rider problems was found in the information on this case, there were some references supporting the free rider story. First, the conspiracy activities related directly to the commercial and industrial (C & I) market and not to the household market (RTPC report, p. 15, 18, 19, Director's annual report, 1971, p. 40). Interestingly, sales related services may have been more important in the C & I market than in the household market because, as explained in the RTPC report, although the average home did not require many varieties of large lamps, many types of lamps were needed to meet the requirements of C & I users and the special needs of public authorities (RTPC report, p. 3). Second, large lamps were described as an homogeneous product. In this regard, it was explained in court that the users of large lamps would be faced with comparable lines from

each of the accused with the same physical characteristics and designed for the same use (29 C.P.R. (2d), p. 15). Third, according to the RTPC report, the testimony of witnesses in the inquiry was to the effect that the “chaotic” conditions in the distribution of electric large lamps had become particularly significant during the years 1956, 1957 and 1958. It was explained that electrical supply firms specializing in the sale of electric large lamps had traditionally been the principal channel through which lamp manufacturers distributed their products. However, in the post-war period corporate food chains, voluntary chains, department stores and other large scale retailers played increasingly larger roles in the distribution of many lines of goods, including electric large lamps. It was contended in the RTPC report that electrical wholesalers were disturbed by these events and decided to voice objections to the lamp manufacturers about the inroads being made into what they regarded as their traditional business. (RTPC report, p. 7) The evidence presented in the RTPC report showed that one of the objectives of the 1959 sales plan was to reduce the competition that traditional electrical distributors (in specific the manufacturers’ agents who sold on consignment) were facing from department stores and other non-electrical distributors (RTPC report, p. 15).

The three points mentioned above are consistent with the free rider hypothesis. The fact that electric large lamps were a homogeneous product implied that one distributor could free ride on the provision of sales related services of another distributor if prices were not fixed. Prior to the arrangement there was intense price cutting in the C & I market and thus, free rider problems may have led to a deterioration in the provision of sales related services. The arrival of a new type of distributor into the market may have made things worse. The new

distributors, as opposed to the traditional distributors who were specialized in the sale of large lamps, sold many different lines of products, and thus were less apt than the traditional distributors to offer high quality sales related services. Free riding between non-electrical distributors and electrical distributors may have accentuated the deterioration of sales related services even more.

6.3.2. The Culverts Case

In Culverts, documentary evidence and testimony relating to the accused companies and their employees revealed that the industry had been facing the following problems prior to the challenged agreement:

- **Overexpansion:**
From 1957-58, the industry had suffered from overexpansion. It was argued that several years before 1963, the industry was characterized by the entrance of new manufacturers facilitated by the fact that the required capital to get started in the business was relatively small. In 1957 there were 15 companies with 37 plants operating in Canada, whereas in 1962, 22 companies were fabricating corrugated metal pipe out of 49 plants (17 C.P.R. (2d), p. 218, 219).
- **Overcapacity:**
The industry was operating in 1962-1963 very much under capacity. In 1963, the industry was said to be running at 30 per cent of its productive capacity (17 C.P.R. (2d), p. 218, 219).
- **Keen competition from concrete pipe manufacturers:**
In the years 1962-63 competition was keen from the manufacturers of clay and concrete pipe (13 O.R. (2d), p. 37). It was argued that the inroads that the concrete pipe industry was making was in a substantial way responsible for the overcapacity problem (17 C..PR. (2d), p. 219).
- **Price cutting:**
It was explained that the entrance of new small manufacturers in the industry resulted in pressure on prices and a “profit squeeze” with smaller producers with lower overhead able to sell cheaper in their local area than the major companies (17 C.PR. (2d), p. 218, 219).

The trial judge explained that according to the testimonies and documentary evidence this pessimistic view of the industry seemed to be the most general perception in the industry and that it was only, but remarkably, contradicted by the view expressed by one newcomer, Fawcett (17 C.P.R. (2d), p. 226, 227, 267). The trial judge summarized the alleged industry situation prior to the challenged agreement in the following terms:

The producer members of the Institute...were, or would appear to have generally been, of the opinion that the metal culvert industry in Ontario and Quebec was on the decline due to 'cutthroat' competition with an active and on-going price war; that profits were dwindling or losses taking the place of profits; promotion of steel culvert consequently discouraged because it was, generally speaking, an unprofitable industry with concrete culvert making serious inroad on the culvert market (17 C.P.R. (2d), p. 265).

The Corrugated Metal Pipe Institute (CMPI, later named The Corrugated Steel Pipe Institute) was created in 1961. Membership in the CMPI consisted of active members who were metal culvert producers and associate members, such as steel and copper producers who were direct or indirect suppliers of the industry. (RTPC report, p. 10). The stated purposes of the Corrugated Metal Pipe Institute were:

- a) to promote the general use of corrugated metal pipe and drainage structures via product and market research, engineering promotion, advertising and good public relations;
- b) to provide the corrugated metal pipe industry and the public with authentic data regarding the comparative merits of corrugated metal pipe and drainage structures over other competitive products (RTPC report, p. 10).

The operations of CMPI were directed by a Board of Directors which met about once a month. An Engineer-Manager was in charge of the day-to-day operations of the CMPI and was also responsible for promoting the acceptance and use of corrugated metal pipe. There was evidence that the CMPI had actually been carrying out these type of promotion related

activities. For example, the CMPI had conducted an extensive market study, had prepared a technical manual, had studied a wide variety of technical problems and had conducted symposia (RTPC report, p. 10). It should be noted that the Crown did not challenge the cost reducing activities described here.

In 1963, R. R. Craig, executive vice-president, commercial of Dofasco and J.D. Allan, executive vice-president of Stelco, both of whom were directors of the CMPI, undertook on its behalf to conduct a "fact finding mission" among the producers of corrugated metal pipe with the goal of determining how the ills of this industry could be overcome including loss of market to concrete pipe and the tremendous overcapacity. As a result of this process, Mr. Allan and Mr. Craig prepared a report containing a detailed analysis of the industry problems and proposals for their solution. The two companies that these men represented had an interest in the success of the metal culverts industry because they were suppliers of the steel used to manufacture culverts (RTPC report, p. 235). The Craig-Allan report's main conclusion was that if the industry was to stay healthy and keep its capacity from being further inflated it had to achieve price stability at levels that would:

- provide adequate profits to shareholders
- provide adequate profits for product promotion and development
- provide adequate profits for industry work (CMPI)
- allow the corrugated metal pipe product to compete favourably with similar products made from other materials
- allow the present capacity of industry to be more fully occupied (RTPC report, p. 23, 24, 25).

The Craig-Allan report also argued that the best way to achieve price stability was for the industry to adopt an open price policy accompanied by a system of delivered prices (RTPC report, p. 25, 26) They said that an open price policy was the only legal way of

communication among members in the industry provided it was done without collusion (RTPC report, p. 23-25).⁴⁰ Such proposals (open price policy and delivered price system) were adopted by the industry and resulted in the agreement that was challenged by the Crown.

According to the RTPC report, Mr. Allan of Stelco explained in his testimony that the suggestion for himself and Mr. Craig to conduct an analysis of the problems of the metal culvert industry developed from **CMPI's difficulty in promoting the use of metal culverts and the question of the industry's ability to foster a long term promotional program.** Both Mr. Allan and Mr. Craig stated in their testimonies that such difficulty was **caused by the fact that the industry's products were being sold at unprofitable prices which made resources unavailable for long-term promotion of metal culvert** (RTPC report, p. 21, 22). The view that intense price cutting was undermining the promotion efforts is supported by a letter produced as exhibit 37 in the trial. In this letter, Mr. Campbell, president of CMPI and also president of Armco, explained that the pressure on prices and the "profit squeeze" that had resulted from the overexpansion of the industry left less margin and incentive for the "progressive ones" in the industry to do the necessary promotional and sales work to hold the industry position in comparison with the concrete pipe industry (17 C.P.R. (2d), p. 218).

The stated purposes of the CMPI suggest that its creation may have been mainly an industry response to the keen competition it was facing from the concrete pipe manufacturers. That is, in order to face the concrete pipe competition, the pipe manufacturers decided to join

⁴⁰The industry had been previously convicted under the conspiracy provisions (Director's annual report, 1971, p. 36).

efforts in key areas such as promotion, advertising and product and market research. The allegations by the accused that the CMPI was not being successful in achieving its objectives under competition and that they realized they required to restrict competition among themselves for the cost reducing cooperation (via CMPI) to successfully materialize are theoretically plausible as explained in chapter 3. In particular, these allegations are consistent with the Katz (1986) type of argument that the net incentive effect for cooperation largely depends on the strength of product-market competition. Additionally, the fact that the product was homogeneous implies that the joint promotion efforts may have been also undermined by possible free rider problems (besides price cutting among large and small manufacturers with different overhead costs) and thus that price fixing may have been, at least in part, a response to those free rider problems.

Finally, the information above not only provides support for the “complex” cartel hypothesis but it also casts serious doubts on the “naked” cartel hypothesis. In this regard, it is not obvious how a “naked” cartel could have been an industry response to deal with the industry problems. A “naked” cartel would have increased price and reduced output. How would a price increase have helped the industry to compete against the concrete pipe manufacturers? How would a reduction in output have helped the industry to solve the overcapacity problem? Also, the fact that the agreement was designed by officers of two firms that were suppliers of an input to the cartel firms is not consistent with the idea that this was a “naked cartel”. A “naked” cartel would have increased price and reduced output, and thus would have reduced demand for the input.

6.3.3. The Fertilizer Case

In Fertilizer, the information on the Competition Bureau case file revealed that the manufactures were involved in a **considerable amount** of cooperation through material and final product sales and exchange agreements. According to the Bureau file on this case, these agreements had a variety of rationales, namely: freight and other cost savings, the maintenance of markets and the maintenance of full product lines. First, with production plants spread across western Canada the companies, instead of supplying their own distributors, arranged that each would bag fertilizer for the other and would deliver it to the various franchise outlets. By having a co-manufacturer supply his trading partner's customers near his plant and vice versa, each manufacturer could derive significant freight savings. Second, some manufacturers swapped basic inputs in which they had a relative cost advantage so as to minimize their costs of production. Third, by virtue of the sale and swap agreements some manufacturers were maintaining a distribution structure in some markets which they could not maintain if they did not obtain fertilizer from the host manufacturer. Lastly, by virtue these agreements some manufacturers were able to acquire products they themselves did not manufacture and thus maintain full product lines (Bureau file: 3722-MC02).

The Bureau file information shows that the 'raison d'être' of these agreements was closely tied to the particular characteristics of the product. In this regard, it is explained that fertilizer grades contain large quantities of water and other 'fillers' which do not contribute to the value of the product. It is also explained that since fertilizer is a relatively low value/high volume product with transportation costs representing up to 30 per cent of the

final value of the product, product exchange agreements between the manufacturers were an important part of the distribution strategy of the manufacturers (Bureau file: 3722-MC02).

It is argued, in the Bureau file documents on this case, that cooperation amongst the manufacturers through these agreements for the above enunciated rationales had not resulted in any substantial benefit to the consumer but rather the reverse was true. It was contended that in the absence of these agreements, one could expect competition among the firms at a lower price level, and that this cooperation had resulted in a lessening of competition, and deprived the public of competition which in the absence of these agreements would undoubtedly had existed (Bureau file: 3722-MC02).

Finally, it is contended in the Bureau file on this case that the exchange agreements had major implications in the inquiry. It is argued that these exchanges provided a means of exchanges of production, technical and price information that would otherwise be confidential. It was further stated that this information flow helped police the agreement. It was also contended that the exchange agreements gave the firms significant transportation savings and that these savings were not passed on to the farmer (Bureau file: 3722-MC02).

The Crown challenged these agreements in court arguing that they had the effect of preventing or lessening competition unduly. However, the trial judge disagreed with the Crown. His words in this regard are presented below:

The Crown also submitted that agreements covering the exchange and purchase of fertilizer between the various accused had the effect of preventing or lessening competition unduly. There were many such agreements among the accused. By such agreements, the accused in some cases purchased and sold fertilizer among themselves. In other cases, the agreement provided for the exchange of fertilizer of one accused for that of the other. The purpose or reason for these agreements varied. Insofar as the party obtaining fertilizer was concerned, it was able to save freight costs on fertilizer which it

wished to sell in a market long distant from its plant. In other cases it enabled it to obtain a fertilizer formulation which it did not manufacture itself, thus giving it a complete line of fertilizer product. Insofar as the party disposing of fertilizer under these agreements was concerned, they made it possible for it to dispose of fertilizer which it had for sale.

It is my view that these purchases and exchanges did not affect competition, since the party obtaining fertilizer pursuant to such agreement could have obtained from another source, such as the United States. In addition, these agreements placed fertilizer for sale in the retail market in a far greater number of hands in a particular market area or zone and this would have the effect of increasing competition rather than preventing or lessening competition. Insofar as any savings obtained by a manufacturer was concerned, while such savings may have not been passed directly to the consumer, they would result in it having fertilizer for sale at a lower cost to itself, making it possible for it to sell such fertilizer at a more attractive price to its customer.

In the result, I do not agree with the submission made by the Crown that such agreements had the effect of preventing or lessening competition. Even if I did agree with the Crown in this regard, I am not satisfied that any such resultant preventing or lessening of competition would be undue since the fertilizer dealt with, pursuant to such agreements, represented only a very small percentage of the total dealings in fertilizer in Western Canada ([1980] 2 W.W.R., p. 717, 718).

6.3.4. *The PANS Case*

This case involved competing pharmacies in Nova Scotia and their corporate associations: the Nova Scotia Pharmaceutical Society and the Pharmacy Association of Nova Scotia (the Society/Association) (49 C.P.R. (3d), p. 289). According to the trial judge, the evidence established that individual pharmacies were of the opinion that they did not possess the necessary ability or expertise to assess the pros and cons in their contractual dealings and negotiations with third party insurers and, therefore, preferred to rely on the Society/Association for this matter (49 CPR (3d), p. 299, 302). It could be hypothesized that the negotiation costs of these contracts for each of the pharmacies may have been lower under the joint negotiation scheme (via the Society/Association) than under an individual negotiation scheme. Also, the Society/Association engaged in efforts to standardize the provisions of participating pharmacy agreements between individual pharmacies and third party insurers.

The accused negotiated a standard participating pharmacy agreement, and after receiving a negative opinion from Consumer and Corporate Affairs Canada in this respect, decided to use guidelines for third party insurers to follow (49 C.P.R (3d), p. 289). The economic expert hired by the accused contended that standard participating contracts offered administrative cost advantages to the pharmacists; and that these lower costs may be reflected in lower dispensing fees which in turn reduce premiums to subscribers (Expert economic evidence of Frank Mathewson, p. 8).

6.3.5. The Pulpwood Case

In Pulpwood, various pulp and paper companies in Eastern Canada were alleged to have been holding meetings in which they agreed upon the prices to be paid to farmers and other small producers of pulpwood (RTPC report, p. 2). An economist hired by the accused developed a theory in regards to the effects and purpose of the meetings among the accused. He was asked in an interview during the investigation that led to the RTPC report on this case what would have happened or might have happened if representatives of the pulp and paper companies had not engaged in meetings to discuss the supply and prices of pulpwood. He explained that pulp and paper companies derived important market information from these meetings, for example, in regards to the availability of wood as well as each other requirements of wood. He contended that in the absence of such meetings, a possible scenario was that no pulp and paper company would know what the other companies planned to purchase nor what the availability of wood would be. He argued that in the absence of such market information, the pulp and paper companies would be more reluctant to depend upon the purchase wood market and thus would have arranged to increase the percentage of wood

obtained from their own limits. That is, he explained that, under such circumstances there might definitely be an inclination on the part the pulp and paper companies "to plan for greater limit production of wood rather than gambling on being caught short on deliveries of purchase wood and have to go on short time at the mill" (quote from "Hearings" , p. 1223-5, presented in excerpt form in the RTPC report, p. 201). If the pulp and paper companies' requirements of purchase wood went down, he contended, then the price of purchase wood would also go down and the farmers would have "suffered". He rephrased his "theory" by saying that what he meant was that if it had not been for those meetings it was very well possible rationalize a greater amount of limit cut and lower purchase wood from the farmer, the broker and the dealer. Therefore, he concluded, prices to the farmers might have been lower without those meetings (RTPC report, p. 200-208).

During the trial there was considerable controversy as to what the real purpose of these meetings was. As explained by the trial judge, the defence urged that they were called with no sinister design but merely in the normal course of furthering the mutual interests of the participants in the legitimate exercise of their business, while the Crown argued that whatever other purposes they may have had, one of them was to agree upon the prevention or lessening of competition. The trial judge explained that in support of the defence contention it was pointed out that no single market existed in the case of pulpwood as it did for other commodities where a prospective buyer could ascertain the current price. It was argued that those responsible for the procurement of wood for their mills had to determine as far as they could what their costs would be in advance of each season. It was maintained that they could only do so by meeting together and verifying certain factors such as the procurement needs

of each mill, the quantities of pulpwood produced by a given area during the last season and the prospects for the period ahead. Furthermore, it was contended that even as far as price was concerned, they needed to discuss what the price would likely be for the coming season because the amount of wood cut would be affected by the price offered. According to the trial judge, the Crown could not deny that to some extent this contention of the defence was well-founded, but it pointed out that the accused went beyond the legitimate exchange of business information and actually agreed among themselves to prevent or lessen competition by fixing many schedules of maximum prices to be paid to farmers, settlers, brokers and dealers when purchasing pulpwood (36 C.P.R., p. 201).

There are some elements providing support for the defence theory. First, in his statement of evidence, the Director⁴¹ explains that many of the consuming mills could turn to their own limits as an alternative source of supply. However, he explained that this was only the case, if the consuming mills had ample warning. The reason for this, as explained by the Director, was that "no abrupt switch to limit wood could be made if the cutting season was well advanced when the scarcity of purchased wood became apparent or at a time when there were shortages of labor." (RTPC report, p. 3, excerpt of statement of evidence by the director). Second, the information in the RTPC Report on this case supports the defence argument in regards to the special characteristics of the pulpwood for sale industry. It is explained in the RTPC report, that the production of pulpwood for sale did not proceed along the lines of many other commercial crops for which a regular market existed. Instead, the cutting of pulpwood usually proceeded only after a contract had been arranged for the supply of a

⁴¹Now called the Commissioner of Competition.

definite quantity. It was argued in the RTPC Report, that in a real sense, therefore, pulpwood was produced to order and the letting of contracts and the price specified in them were the main determinants in the quantity of pulpwood produced for sale in any season (RTPC report, p. 210).

The defence contention that this was a special market in which the buyers were faced with a lot of uncertainty seems credible. However, in the information reviewed on this case, no convincing explanation of why price fixing among the buyers was necessary to deal with the uncertainty issue was found. For example, the uncertainty problem could have been solved individually by each buyer by signing long term contracts with its suppliers of pulpwood.

6.3.6. Summary

In five cases out of the 17 cases in this study there was information suggesting to some degree that these cartels may have had welfare increasing effects (and thus not only welfare decreasing effects). These cases are Lamps, Culverts, Fertilizer, PANS and Pulpwood. In Lamps, although the hypothesis that the cartel may have helped to solve free rider problems is plausible, no explicit evidence in this regard was found. In Pulpwood, the cartel may have helped to reduce uncertainty in the market but no convincing explanation supporting the hypothesis that price fixing may have been a necessary condition to achieve this goal was found. In PANS, and specially in Culverts and Fertilizer, there was evidence of joint cost reducing activities among the firms in the cartel.

6.4. Final Remarks

The main finding of this chapter is that some of the cartels in the sample were welfare increasing cost reducing cartels and that, thereby, prosecution of these cartels decreased

welfare. This finding holds for at least seven cases or at least two cases depending on the assumption made in regards to the deterrence effect of prosecution in those cases in which prosecution did not affect price during the period analysed. If it is assumed that, in all those cases in which prosecution did not affect price, cartel behaviour was deterred, the finding holds for Coal, Gases, AQPP, Pulpwood, Fertilizer, Tubing and Culverts. In the remaining 10 cases it is not possible to conclude on the welfare effects. If, instead, one allows for the possibility that in those cases in which prosecution did not affect price, cartel behaviour was not deterred, the finding holds for Fertilizer and Tubing. It is not possible to conclude on the welfare effect in the remaining 15 cases. It should be stressed that, under both approaches used in this section, in the set of cases in which it was not possible to obtain a conclusion, the cartels may have been all welfare decreasing cartels, all welfare increasing cartels or some combination of welfare increasing cartels and welfare decreasing cartels.

The first section's finding that at least some cartels in the sample were cost reducing welfare increasing cartels is reinforced by the analysis presented in the second section of the chapter. While the first section was concerned with inferring the welfare effects of the cartels from their price and quality effects, the second section was aimed at finding any possible information that could hint how some of the cartels in the sample may have created efficiency. This type of information was found and discussed for five cases. Interestingly, in three of these five cases, Culverts, Fertilizer and Pulpwood, it was concluded in the first section of this chapter, at least under one of the approaches used, that the cartels were welfare increasing cost reducing cartels. It is worth mentioning that in the case of Fertilizer, the support for the cost reducing welfare increasing cartel conclusion is especially strong. First, in this case,

prosecution led to a statistically significant increase in price, implying that the cartel was price decreasing (Also, recall that the price effect conclusion was robust to changes in the predictor and the data period used). Second, the analysis in chapter 5 concluded that the cartel at least did not decrease quality. This result indicated that the price decreasing effect of the cartel must have come through welfare increasing cost reducing effects and not from welfare decreasing quality decreasing effects of the cartel. This conclusion was reinforced by the finding in the second section of the present chapter that in this case the firms were engaged in extensive cost reducing cooperation through sales and swap agreements.⁴²

It is important to recall that the conclusions on the welfare effects of cartels and prosecution in the first section of this chapter have been made for the period corresponding to the 24 months following the alleged end of the conspiracy date. The reader should keep in mind that this effect is not necessarily the same as the overall effect of prosecution because in most cases in the sample prosecution was a long process that lasted for several years. Firms may have reacted to prosecution in different ways at different points in time during the prosecution period. For example, in some cases, the firms may have decided to continue with their alleged conspiracy activities until sentencing occurred. In this respect, it should be noted that in most cases sentencing occurred long after the 24 months following the alleged EOC date. In other cases, prosecution may have deterred cartel behaviour only temporarily either because fines were set too low to deter cartel behaviour or because the firms were acquitted.

⁴²Notice that these facts should not be interpreted as meaning that price fixing was a necessary condition for the joint cost reducing activities to materialize. Recall that in this case the Crown challenged the cost reducing cooperation activities themselves. Therefore, it is possible that the firms decided to stop all activities challenged by the Crown, including both price fixing and joint cost reducing cooperation.

In three of the 17 cases in the sample the firms were acquitted (See appendix F). These cases were: Fertilizer, Sugar and PANS. In these three cases statistically significant price effects were found suggesting that cartel behaviour was deterred during the 24 months following the alleged EOC date. Both approaches used in this chapter concluded that, in Fertilizer, prosecution decreased welfare during the 24 months following the alleged EOC date. In Sugar and PANS, it was not possible to conclude on the welfare effect of prosecution during this period. In these three cases the firms may have returned to their alleged cartel behaviour after the acquittal and therefore prosecution may have affected welfare only temporarily.

7. OVERALL CONCLUDING REMARKS

This research was motivated by two important debates. First, several authors who stress the capacity of different organizational forms to reduce the costs of coordinating resources have argued that some cartels may be cost reducing and, thereby, potentially welfare increasing (Bork (1978), Butz (1993), Demsetz (1992), Dick (1992), Kennish and Ross (1997), Ross (1991), Sproul (1990, 1993)). This proposition differs from the traditional view that cartels always decrease welfare and serve the only purpose of restricting output and gaining monopoly profit. Second, several academics have raised the concern that Canadian cartel law, by ignoring efficiency considerations, may be leading to the discouragement of welfare increasing cartels together with welfare decreasing cartels (Ross (1991), Kennish and Ross (1997), Trebilcock and Warner (1993)).

This study examines the price, quality and welfare effects of 17 industries indicted under the Canadian conspiracy provisions. The results support the idea that cartels can create efficiency through cost reduction and, hence, validate the concern about the welfare effects of current Canadian cartel law. It concludes that at least seven cartels or at least two cartels, depending on the approach used, were cost reducing and welfare increasing and that prosecution of these cartels thus decreased welfare. In the remaining cases, under both approaches, the results are such that it is not possible to conclude on the direction of the welfare effects.

The result that prosecution did not decrease price in 13 cases, including four cases in which it increased price, is at least consistent with the idea that these cartels created efficiency

through cost reduction. However, this finding may come about not because of lost efficiencies but because the cartels had been choosing a sub-optimal level of quality. Also, in those cases in which prosecution did not affect price, an additional possibility is that cartel behaviour was not deterred at all. If a conservative approach is used so that the finding that prosecution did not decrease price is taken as an indication of efficiencies only if there were no allegations that the cartel decreased quality, there is still support for the efficient cartel hypothesis in seven cases. If the approach is made even stricter so that an indication of efficiencies requires that prosecution increased price and that there were no alleged cartel quality decreasing effects, there is still support for the efficient cartel hypothesis in two cases. It should be stressed that both approaches assume polar cases. The fact that there were alleged quality decreasing effects in some cases does not necessarily mean that in all these cases the cartels actually had these effects. The fact that prosecution did not affect price does not necessarily mean that the cartels were not deterred.

The conclusion that at least some of the cartels in the sample were welfare increasing and cost reducing is supported by additional information from the trial related documents and Competition Bureau reports and case files which provided hints regarding how some of the cartels in the sample may have created efficiency. This type of information was especially relevant in one case, Fertilizer, in which information that the firms were engaged in extensive joint cost reducing cooperation was obtained.

The finding that prosecution increased price or did not affect price in some cases serve to corroborate the findings of Sproul (1993) for the United States. However, it is worth mentioning three important differences between both studies. First, this thesis examines the

price effects of prosecution on a case-by-case basis while Sproul focuses on the aggregate (across cases) price effect of prosecution. Second, the result of this thesis that prosecution increases prices (in four cases) may be even stronger than in Sproul (1993) because this study uses a statistical test to assess the significance of the price effects and Sproul does not. Lastly, Sproul (1993) did not account for the possible quality effects of the cartels. This weakens the usefulness of his finding that prosecution increased price as an indication that the cartels created efficiency through cost reduction.

The contention, supported by this study, that some cartels can create efficiency casts serious doubt about the appropriateness of the Canadian partial rule of reason approach to conspiracies. In Canada, cartel law does not permit a full consideration of the welfare effects of cartels in establishing their illegality and possible counterbalancing efficiency gains are no defence. Such an approach risks penalizing and/or discouraging welfare increasing cartels together with welfare decreasing cartels. The proposals for changes to the Canadian cartel law addressing this concern should be given serious consideration.

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APPENDIX A

SECTION 45 OF THE COMPETITION ACT

(Source: Competition Act, R.S., 1985, c. C-34, s. 1; R.S., 1985, c. 19 (2nd Supp.), s. 19.)

45. (1) Every one who conspires, combines, agrees or arranges with another person

- (a) to limit unduly the facilities for transporting, producing, manufacturing, supplying, storing or dealing in any product,**
- (b) to prevent, limit or lessen, unduly, the manufacture or production of a product or to enhance unreasonably the price thereof,**
- (c) to prevent or lessen, unduly, competition in the production, manufacture, purchase, barter, sale, storage, rental, transportation or supply of a product, or in the price of insurance on persons or property, or**
- (d) to otherwise restrain or injure competition unduly,**

is guilty of an indictable offence and liable to imprisonment for a term not exceeding five years or to a fine not exceeding ten million dollars or to both.

(2) For greater certainty, in establishing that a conspiracy, combination, agreement or arrangement is in contravention of subsection (1), it shall not be necessary to prove that the conspiracy, combination, agreement or arrangement, if carried into effect, would or would be likely to eliminate, completely or virtually, competition in the market to which it relates or that it was the object of any or all of the parties thereto to eliminate, completely or virtually, competition in that market.

(2.1) In a prosecution under subsection (1), the court may infer the existence of a conspiracy, combination, agreement or arrangement from circumstantial evidence, with or without direct evidence of communication between or among the alleged parties thereto, but, for greater certainty, the conspiracy, combination, agreement or arrangement must be proved beyond a reasonable doubt.

(2.2) For greater certainty, in establishing that a conspiracy, combination, agreement or arrangement is in contravention of subsection (1), it is necessary to prove that the parties thereto intended to and did enter into the conspiracy, combination, agreement or arrangement, but it is not necessary to prove that the parties intended that the conspiracy, combination, agreement or arrangement have an effect set out in subsection (1).

(3) Subject to subsection (4), in a prosecution under subsection (1), the court shall not convict the accused if the conspiracy, combination, agreement or arrangement relates only to one or more of the following:

- (a) the exchange of statistics;**
- (b) the defining of product standards;**
- (c) the exchange of credit information;**
- (d) the definition of terminology used in a trade, industry or profession;**
- (e) cooperation in research and development;**
- (f) the restriction of advertising or promotion, other than a discriminatory restriction directed against a member of the mass media;**
- (g) the sizes or shapes of the containers in which an article is packaged;**
- (h) the adoption of the metric system of weights and measures; or**

(i) measures to protect the environment.

(4) Subsection (3) does not apply if the conspiracy, combination, agreement or arrangement has lessened or is likely to lessen competition unduly in respect of one of the following:

(a) prices.

(b) quantity or quality of production.

(c) markets or customers. or

(d) channels or methods of distribution, or if the conspiracy, combination, agreement or arrangement has restricted or is likely to restrict any person from entering into or expanding a business in a trade, industry or profession.

(5) Subject to subsection (6), in a prosecution under subsection (1) the court shall not convict the accused if the conspiracy, combination, agreement or arrangement relates only to the export of products from Canada.

(6) Subsection (5) does not apply if the conspiracy, combination, agreement or arrangement

(a) has resulted in or is likely to result in a reduction or limitation of the real value of exports of a product;

(b) has restricted or is likely to restrict any person from entering into or expanding the business of exporting products from Canada; or

(c) has prevented or lessened or is likely to prevent or lessen competition unduly in the supply of services facilitating the export of products from Canada.

(d) [Repealed, RS, 1985, c. 19 (2nd Supp.), s. 30]

(7) In a prosecution under subsection (1), the court shall not convict the accused if it finds that the conspiracy, combination, agreement or arrangement relates only to a service and to standards of competence and integrity that are reasonably necessary for the protection of the public

(a) in the practice of a trade or profession relating to the service; or

(b) in the collection and dissemination of information relating to the service.

(7.1) Subsection (1) does not apply in respect of an agreement or arrangement between federal financial institutions that is described in subsection 49(1).

(8) Subsection (1) does not apply in respect of a conspiracy, combination, agreement or arrangement that is entered into only by companies each of which is, in respect of every one of the others, an affiliate. RS, 1985, c. C-34, s. 45; RS, 1985, c. 19 (2nd Supp.), s. 30; 1991, c. 45, s. 547, c. 46, s. 590, c. 47, s. 714.

45.1 No proceedings may be commenced under subsection 45(1) against a person against whom an order is sought under section 79 or 92 on the basis of the same or substantially the same facts as would be alleged in proceedings under that subsection. RS, 1985, c. 19 (2nd Supp.), s. 31.

APPENDIX B

SOME CHARACTERISTICS OF SCHEDULES $W_p = 0$ and $W_q = 0$

Assumptions

Assume that for any (p, q) :

$$W_{pp}(p, q) < 0.$$

$$W_{qq}(p, q) < 0.$$

$$W_{pp}(p, q)W_{qq}(p, q) - W_{pq}(p, q)W_{pq}(p, q) > 0 \Rightarrow \left| \frac{W_{pp}(p, q)}{W_{pq}(p, q)} \right| > \left| \frac{W_{pq}(p, q)}{W_{qq}(p, q)} \right|$$

$$C(X(p, q), q) = c(q)X(p, q) \quad (\text{This was the cost function assumed by Spence (1975)}).$$

$$c'(q) > 0$$

$$X_p(p, q) < 0$$

Notice that the first three assumptions above are sufficient for the welfare function to be strictly concave and, thus, for it to have a unique absolute maximum (See, for example, Chiang (1984), p. 322, 338, 339, 347).

Schedule $W_p = 0$

$$W_p = 0 \Leftrightarrow X_p(p, q)[p - c(q)] = 0 \quad (B1)$$

Let $(\hat{p}, \hat{q})$ satisfy equation (B1). Apply the Implicit Function Theorem to obtain:

$$\frac{dq}{dp}(\hat{p}, \hat{q}) = -\frac{W_{pp}(\hat{p}, \hat{q})}{W_{pq}(\hat{p}, \hat{q})} \Rightarrow \left| \frac{dq}{dp}(\hat{p}, \hat{q}) \right| = \left| \frac{W_{pp}(\hat{p}, \hat{q})}{W_{pq}(\hat{p}, \hat{q})} \right| \quad (B2)$$

$$\frac{dq}{dp}(\hat{p}, \hat{q}) = -\frac{X_{pp}(\hat{p}, \hat{q})[\hat{p} - c(\hat{q})] + X_p(\hat{p}, \hat{q})}{X_{pq}(\hat{p}, \hat{q})[\hat{p} - c(\hat{q})] - c'(\hat{q})X_p(\hat{p}, \hat{q})} \quad (B3)$$

Given the assumption that $X_p(p, q) < 0$ for any (p, q) , equation (B1) implies that:

$$[\hat{p} - c(\hat{q})] = 0 \text{ for any } (\hat{p}, \hat{q}) \quad (B4)$$

Equations (B3) and (B4) imply that:

$$\frac{dq}{dp}(\bar{p}, \bar{q}) = \frac{1}{c'(\bar{q})} > 0 \text{ at any } (\bar{p}, \bar{q}) \quad (B5)$$

Schedule $W_q = 0$

$$W_q = 0 \Leftrightarrow \int_{\bar{p}}^{\infty} X_q(v, q)dv - c'(q)X(p, q) + X_q(p, q)[p - c(q)] = 0 \quad (B6)$$

Let $(\bar{p}, \bar{q})$ satisfy equation (B6). Apply the Implicit Function Theorem to obtain:

$$\frac{dq}{dp}(\bar{p}, \bar{q}) = - \frac{W_{pq}(\bar{p}, \bar{q})}{W_{qq}(\bar{p}, \bar{q})} \Rightarrow \left| \frac{dq}{dp}(\bar{p}, \bar{q}) \right| = \left| \frac{W_{pq}(\bar{p}, \bar{q})}{W_{qq}(\bar{p}, \bar{q})} \right| \quad (B7)$$

$$\frac{dq}{dp}(\bar{p}, \bar{q}) = - \frac{-X_q(\bar{p}, \bar{q}) - c'(\bar{q})X_p(\bar{p}, \bar{q}) + X_{qp}(\bar{p}, \bar{q})[\bar{p} - c(\bar{q})] + X_q(\bar{p}, \bar{q})}{\int_{\bar{p}}^{\infty} X_{qq}(v, \bar{q})dv - c''(\bar{q})X(\bar{p}, \bar{q}) - X_q(\bar{p}, \bar{q})c'(\bar{q}) + X_{qq}(\bar{p}, \bar{q})[\bar{p} - c(\bar{q})] - c'(\bar{q})X_q(\bar{p}, \bar{q})}$$

$$\frac{dq}{dp}(\bar{p}, \bar{q}) = - \frac{X_{qp}(\bar{p}, \bar{q})[\bar{p} - c(\bar{q})] - c'(\bar{q})X_p(\bar{p}, \bar{q})}{\int_{\bar{p}}^{\infty} X_{qq}(v, \bar{q})dv - c''(\bar{q})X(\bar{p}, \bar{q}) - 2X_q(\bar{p}, \bar{q})c'(\bar{q}) + X_{qq}(\bar{p}, \bar{q})[\bar{p} - c(\bar{q})]} \quad (B8)$$

Let $(\bar{p}, \bar{q})$ be the intersection point of schedules $W_p = 0$ and $W_q = 0$.

Because $(\bar{p}, \bar{q})$ lies in schedule $W_p = 0$ it must satisfy equation (B4).

Equations (B4) and (B8) imply that the slope of schedule $W_q = 0$ at the intersection point $(\bar{p}, \bar{q})$ is equal to:

$$\frac{dq}{dp}(\bar{p}, \bar{q}) = \frac{c'(\bar{q})X_p(\bar{p}, \bar{q})}{W_{qq}(\bar{p}, \bar{q})} > 0 \quad (B9)$$

Comparison of the Slopes

The absolute values of the slopes of schedules $W_p = 0$ and $W_q = 0$ at the intersection point $(\bar{p}, \bar{q})$ can be found by evaluating this point at equations (B2) and (B7) respectively. Given the assumptions made (see third assumption), it is clear that at the intersection point the absolute value of the slope of schedule $W_p = 0$ is greater than the absolute value of the slope of schedule $W_q = 0$.

Conclusions

Given the previous assumptions, the following has been proved:

- Schedule $w_p = 0$ has a positive slope,
- At the intersection point $(\hat{p}, \hat{q})$, schedule $w_q = 0$ has a positive slope and it is flatter than schedule $w_p = 0$.

It should also be noticed that because the welfare function is assumed to be strictly concave, schedules $w_p = 0$ and $w_q = 0$ intersect only once.

APPENDIX C

RESULTS OBTAINED IN CHAPTER 3 VERSUS RESULTS BY SPENCE (1975)

In the three variable model presented in chapter 3 the firm has three decision variables: price, quantity and quality. Two of these variables are independent, and the third is determined by the demand function. In the part of his analysis dealing with monopoly performance and welfare, Spence (1975) assumed the decision variables to be quantity and quality. In contrast, the model presented in chapter 3 takes the decision variables to be price and quality. Any reader willing to compare the results presented here with Spence's should take this into account. For example, the model presented here shows that **at any given level of price** a "naked" cartel always chooses a lower quality level than a competitive regime. To the reader familiar with Spence (1975)'s piece this result might appear to be a contradiction because Spence argued that it was possible for a monopoly to either under-supply or over-supply quality relative to the optimum. Nevertheless, there is no contradiction because by under-supply (over-supply) of quality Spence meant that **at any given level of quantity** a monopoly sets quality too low (high) relative to the optimum.

When the decision variables are taken to be price and quality (as in the model presented in chapter 3), at a given price, a cartel or monopoly will choose quality so that $\pi_q(p, q) = 0$. Also, at a given price, a planner that maximizes welfare will choose quality so that $\pi_q(p, q) = -S_q(p, q)$ (where "S" denotes net consumer surplus). Notice that because

$S_q(p, q)$ is always positive it can be concluded that at a given price, a cartel or monopoly always sets quality too low relative to the optimum.

When the decision variables are taken to be quantity and quality (as in Spence's model), at a given quantity, a cartel or monopoly will choose quality so that $\pi_q(x, q) = 0$. Also, at a given quantity, a planner that maximizes welfare will choose quality so that

$\pi_q(x, q) = -S_q(x, q)$. Notice that $S_q(x, q) = \int_0^x P_q(v, q) dv - xP_q(x, q)$ can take either a

positive or a negative value. When $S_q(x, q)$ is positive (negative) the cartel or monopoly sets quality too low (high) relative to the optimum. (Notice that $S_q(x, q)$ will take a positive (negative) value when $P_{qx}(x, q)$ is negative (positive)).

APPENDIX D

CASE SUMMARIES AND INFORMATION SOURCES

COAL

Case Summary:

Following an investigation under the Combines Investigation Act, an indictment against six accused was laid in September 1933. The indictment contained 10 counts relating to a violation of the Combines Investigation Act and s. 498 of the Criminal Code. The counts related to an undue restriction of trade and lessening of competition, the augmentation or fixation of prices, and the purchase or acquisition of control over an interest in the coal and coke trade. The challenged activities occurred during the period 1929-1933 (Information inferred from the discussion in the legal documents). On December 12, 1933, the trial judge acquitted one of the accused under all counts and convicted the remaining five accused under counts 1, 4 and 7, but acquitted them under all other counts. On the same date, he fined the convicted five accused and ordered them to pay the taxable costs and expenses in the case. The convicted accused appealed this decision. On October 5, 1934 the Quebec Court of King's Bench, Appeal Side, upheld the conviction and dismissed the appeal. The accused made a petition for special leave to appeal to the Privy Council. On June 6, 1935, the Judicial Committee of the Privy Council refused the petition for special leave to appeal. Five companies involved in the arrangements were tried in a different trial. This separate prosecution process ended at the court of appeal level with conviction and fines on June, 1936.

Sources of Information:

- *Rex v. Canadian Import Co. et al.* (1933), 61 CCC 114
- *Rex v. Canadian Import Co. et al.* (1934), 62 CCC 342
- *Rex v. Canadian Import Co. et al.* (1935), 64 CCC 145
- Competition Bureau database on conspiracy cases

RUBBER

Case Summary:

In June 1952, the Minister of Justice released a report on an investigation into alleged combines in the rubber industry. The report covered six inquiries into six branches of the rubber industry. As a result of this report, three charges were laid in the Province of Ontario and three legal cases were started. All charges related to offences contrary to section 498(1)(d) of the Criminal Code for unduly preventing or lessening competition. One such charge related to mechanical rubber goods which include conveyor and transmission belting, industrial, fire and garden hose, and miscellaneous industrial products; one charge related to tires and tubes and automobile accessories; and one charge related to rubber footwear. The offences were alleged to have occurred from 1936 to October 31, 1952, in the mechanical rubber case; from January 1, 1937 to October 31, 1952 in the tires and tubes case; and from July 12, 1944 to October 31, 1952, in the rubber footwear case.

The five companies charged in the mechanical rubber case pleaded guilty in April 1953. On September 25, 1953 these companies were each fined a maximum of \$10,000 and costs; and the Court granted an Order of Prohibition restraining the continuation or repetition of the offence. The companies appealed against the granting of the Order of Prohibition, both on the ground that the section authorizing it was beyond the power

of Parliament to enact, because it related to a field of provincial jurisdiction, and upon the ground that even if the section was within the power of Parliament, the Court should not, in the circumstances, have granted the order. The Ontario Court of Appeal confirmed the Order with a slight modification. The parties then obtained leave to appeal to the Supreme Court of Canada on the first ground above mentioned. The Supreme Court of Canada gave judgement on February 10, 1956 holding the section, in so far as it authorized the order in question, to be validly enacted Federal legislation in respect to criminal law.

In the other two cases, the parties also pleaded guilty and, in November 1953, were all fined the maximum fines and ordered to pay the costs of the prosecution. Orders of Prohibition were applied for in these cases, also, but the Judge deferred consideration of such application until the result of the appeal in the mechanical rubber goods case was known. Following the decision of the Supreme Court of Canada in regards to this appeal, the Orders of Prohibition were granted.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1954, 1955 and 1956
- Report of Commissioner, *Rubber products, Investigation into Alleged Combines in the Manufacture, Distribution and Sale of Mechanical Rubber Goods, Tires and Tubes, Accessories and Repair Materials, Rubber Footwear, Heels and Soles, Vulcanized Rubber Clothing*, Ottawa, 1952.
- *Regina v. Goodyear Tire & Rubber Co. of Canada Ltd. et al.* (1953), 107 CCC 88
- *Regina v. Goodyear Tire & Rubber Co. of Canada Ltd. et al.* (1954), 108 CCC 321
- *Goodyear Tire & Rubber Co. of Canada Ltd. et al. v. The Queen* (1956), 114 CCC 380
- *Regina v. Firestone Tire & Rubber Co. of Canada Ltd. et al.* (1953), 107 CCC 286
- *Regina v. Dominion Rubber Company et al.* (1953), [1953] 17 C.R. 409
- Competition Bureau database on conspiracy cases

ROOF

Case Summary:

The inquiry on this case was begun by the Commissioner of the Combines Investigation Act on June 14, 1952 (Note: Prior to November 1, 1952, reports were made by the "Commissioner of the Combines Investigation Act". As of that date the Act was amended to provide for the "Director" responsible for conducting investigations and the "Restrictive Trades Practices Commission", responsible for making the reports). After November 1, 1952, following a re-organization of the Combines Branch, the inquiry was continued by the Director of Investigation and Research. The evidence gathered by the Director and his allegations against the parties were place before the Restrictive Trade Practices Commission (RTPC) which heard arguments on behalf of the parties and the Director from November 8 to 16, 1954. The RTPC found that the evidence disclosed arrangements among the principal manufacturers of asphalt and tar roofing and related products in Canada which were designed to have and did have the effect of maintaining uniform prices and uniform terms and conditions of sale for these products for many years.

A report on this case was submitted to the Minister of Justice by the RTPC on August 29, 1955 and made public by him on September 21, 1955. As a result of this report, the companies concerned were charged at Toronto, under section 498 (later section 411) of the Criminal Code with conspiring to prevent or lessen competition unduly in the asphalt and tar roofings and related products trade. The grand jury brought a True Bill on January 11, 1957. Eleven companies were convicted at Toronto upon pleas of guilty for an offence under section 498(1)(d) (later 411 (1)(d)) of the Criminal Code. On January 7, 1958 these companies were fined \$10,000 each. On May 22, 1958 the Court issued a restraining order prohibiting the continuation or repetition of the offence.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1956, 1957, 1958, 1959
- Restrictive Trade Practices Commission, *Report Concerning an Alleged Combine in the Manufacture, Distribution and Sale of Asphalt and Tar Roofings and Related Products in Canada*, Ottawa, 1955.
- Competition Bureau database on conspiracy cases

PULPWOOD**Case Summary:**

This inquiry was commenced by the Director of Investigation and Research following complaints made in the House of Commons to the effect that various pulp and paper companies in Eastern Canada were agreeing upon the prices to be paid to farmers and other small producers of pulpwood. After extensive investigations throughout Eastern Canada, the Director, on February 28, 1957, submitted a Statement of Evidence to the Restrictive Trade Practices Commission (RTPC) and to a large number of pulp and paper companies and other purchasers of pulpwood in Eastern Canada, alleging that such parties had entered into arrangements which had the effect of depressing the prices paid for pulpwood to farmers and other small producers. During November and December 1957, the RTPC heard representations on behalf of the Director and on behalf of the parties against whom allegations were made. A report was submitted to the Minister of Justice by the RTPC on March 31, 1958 and made public by him on April 29, 1958. In October, 1958, 17 companies were charged at Montreal that, between April 3, 1947 and December 31, 1954, they conspired to prevent or lessen unduly competition in the pulpwood trade in the provinces of Ontario, Quebec and New Brunswick, contrary to section 411 (1)(d) of the Criminal Code. On May 20, 1959 the accused were committed for trial which commenced on October 13, 1959. The companies were convicted on June 15, 1960 and the Court imposed fines totalling \$240,000.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1958, 1960 and 1961
- Restrictive Trade Practices Commission, *Report Concerning the Purchase of Pulpwood in Certain Districts in Eastern Canada*, Ottawa, 1958.
- *Regina v. Abitibi Power & Paper Co. Ltd. et al.* (1960), 36 C.P.R. 188
- Competition Bureau database on conspiracy cases

BOXES**Case Summary:**

The inquiry on this case was commenced in 1953 as part of a broad inquiry into the paperboard and paperboard container industries. The paperboard industry includes both boxboard and container grades of paperboard. The paperboard container industry includes both corrugated shipping containers and set-up and folding boxes. The inquiry revealed clear-cut restrictive agreements relating to boxboard grades of paperboard and this aspect of the inquiry was first proceeded with. The containerboard/corrugated box aspect of the inquiry turned out to be much more complicated than the boxboard aspect and, while the Restrictive Trade

Practices Commission (RTPC) officials were able to do a considerable amount of work upon it while the boxboard inquiry was current, most of the work had to be taken up upon the conclusion of that case. When the hearing of oral evidence was resumed in 1957, the RTPC officials decided to proceed with the shipping containers inquiry after discovering that the boxboard inquiry and report had not resulted in the abandonment of restrictive arrangements in respect of shipping containers. On August 30, 1962 the Minister of Justice made public three reports by the RTPC relating to the shipping containers industry. One of the reports dealt with an alleged price-fixing combine and with twelve consolidations of formerly independent shipping container companies with large manufacturers of containerboard. The other two reports dealt with two separate acquisitions of the same kind. The record in this case with respect to the alleged price-fixing combine was referred to counsel for an opinion as to whether prosecution or other proceedings were warranted. Proceedings by way of indictment were instituted in Toronto against 20 companies. The accused were charged with the offence of conspiracy under section 498(1)(d) of the Criminal Code of preventing or lessening unduly competition in the production or sale of container grades of paperboard and corrugated shipping containers made therefrom. Although the conspiracy period as stated in the indictment was 1947-1954 (both inclusive), according to the RTPC report on the case, the challenged agreement was still in effect in 1959. A True Bill was returned by the Grand Jury on September 9, 1963. The trial was expected to begin in Toronto in September 1964 but was postponed until March 1965. On March 1, 1965, 17 of the companies pleaded guilty and the trial of the remaining three began. On March 19 the trial was adjourned to May 17. Sentencing of the companies pleading guilty was deferred until the trial of those pleading not guilty was completed. The trial was completed on May 27, 1965 with judgement and sentence reserved until the fall of 1965. On November 24, 1966 the three companies which had pleaded not guilty were convicted. On December 16, 1966 the 20 companies were fined a total of \$391,500. The Court also granted an order of prohibition. Three of the companies filed appeals against their convictions. The Crown also filed applications for leave to appeal against the sentence of all but one of the companies, asking for larger fines and a more detailed form of prohibition order that granted by the trial judge. On March 26, 1969 the Court of Appeal for Ontario unanimously dismissed the appeals of the three appellants against conviction and the Crown's appeal against the fines. A new Order of Prohibition was issued, not in the detail requested by the Crown but in more detail than that granted by the trial court.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1963, 1964, 1965, 1967, 1968, 1969
- Restrictive Trade Practices Commission, *Report Concerning the Manufacture, Distribution and Sale of Paperboard Shipping Containers and Related Products*, Ottawa, 1962
- *Regina v. St. Lawrence Corp. Ltd. (and nineteen other corporations)* (1966), 51 C.P.R. 170
- *Regina v. St. Lawrence Corp. Ltd. et al.* (1969), 59 C.P.R. 97
- Competition Bureau database on conspiracy cases

CULVERTS

Case Summary:

The Director of Investigation and Research began an inquiry into the corrugated metal pipe industry in 1966 after he had received complaints from a number of public authorities, including the Province of Quebec, concerning identical tenders that had been submitted to them. On July 30, 1970, the Restrictive Trade Practices Commission made public a report on this matter. The evidence was referred to the Attorney General of Canada and prosecution proceedings were instituted in Toronto. It was alleged that 12 companies and several individuals had conspired to prevent or lessen unduly competition in the corrugated metal culvert industry in the provinces of Ontario and Quebec, contrary to section 32(1)(c) of the Combines Investigation

Act. According to the original indictment the offence related to the period November 1, 1962 - August 31, 1967 (In an amendment indictment, quoted in the court of appeal, the conspiracy period was stated as December 31, 1965 - August 31, 1967). A True Bill was returned by the Grand Jury on September 8, 1972. The trial commenced February 4, 1974, and was completed March 2. On September 25, 1974, all the accused corporations were convicted and, on January 16, 1975, fines were imposed. The Court also granted an Order of prohibition. All the accused filed notices appealing both convictions and monetary sentences, except two companies that appealed conviction only. The appeal was heard in the Court of Appeal, Supreme Court of Ontario, on December 1-5, 1975. The Court allowed the appeals in part. The convictions of three companies were quashed and the fine imposed on one company was reduced, however all other appeals both as to conviction and sentence were dismissed. Total fines amounted to \$447,000. Four companies sought leave to appeal to the Supreme Court of Canada. On April 5, 1976, this application was dismissed.

Sources of Information:

- Director of Investigation and Research, annual reports for the years: 1971, 1973, 1974, 1975, 1976, 1977
- Restrictive Trade Practices Commission, *The Metal Culver Industry, Ontario and Quebec. Report in the Matter of an Inquiry Relating to the Production, Manufacture, Sale and Supply of Corrugated Metal Pipe and Related Products*, Ottawa, 1970.
- *Regina v. Armco Canada Ltd. and 9 other Corporations* (1974), 17 C.P.R. (2d) 211
- *Regina v. Armco Canada Ltd. and 9 other Corporations* (1975), 19 C.P.R. (2d) 273
- *Regina v. Armco Canada Ltd. and 9 other Corporations* (1976), 13 O.R. (2d) 32
- Competition Bureau database on conspiracy cases

LAMPS

Case Summary:

A report on this case was submitted to the Minister of Justice by the Restrictive Trade Practices Commission on January 14, 1971, and made public by him on February 11, 1971. Prosecution proceedings were initiated in Toronto and a True Bill was returned by the Grand Jury on May 17, 1972. The accused, three large lamp manufacturers, were charged with one count of conspiracy pursuant to s. 32(1)(c) of the Act, that between January 1, 1959 and August 25, 1967, they conspired to lessen unduly competition in the large lamp market. The accused were also charged with two counts of monopoly under s. 33 of the Act corresponding to the same period. The trial commenced March 4, 1974, and was completed on July 8, 1974. On September 2, 1976 the accused were convicted on one count under paragraph 32(1) (c) of the Act and acquitted on two counts under section 33. On April 13, 1977, fines totalling \$550,000 were imposed. The Court also granted an Order of prohibition.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1971, 1973, 1976, 1977
- Restrictive Trade Practices Commission, *Electric Large Lamps. Report in the Matter of an Inquiry Relating to the Production, Manufacture, Sale and Supply of Electric Lamps and Related Products*, Ottawa, 1971
- *Regina v. Canadian General Electric Co. Ltd., Westinghouse Canada Ltd. and GTE Sylvania Canada Ltd. (No.1)* (1974), 16 C.P.R. (2d) 175
- *Regina v. Canadian General Electric Co. Ltd., Westinghouse Canada Ltd. and GTE Sylvania Canada Ltd. (No.2)* (1974), 16 C.P.R. (2d) 186
- *Regina v. Canadian General Electric Co. Ltd. et al.* (1976), 29 C.P.R. (2d) 1

- *The Queen v. Canadian General Electric Co. Ltd. et al.* (1977), 35 C.P.R. (2d) 210
- Competition Bureau database on conspiracy cases

TUBING

Case Summary:

This inquiry was commenced in June 1973. The inquiry was initiated by the Director following the receipt of a complaint alleging that certain manufacturers of electric-welded mechanical steel tubing, having agreed not to compete on the basis of price, were submitting identical quotations to the users of steel tubing. The evidence obtained during this inquiry was referred to the Attorney General of Canada. On June 23, 1976 an Information was laid against eight accused. On November 18, 1977, at the termination of the preliminary hearing, two accused were discharged and the remaining accused were ordered to stand trial. On November 24, 1977, an indictment was laid. It was alleged that, between January 1, 1968 and December 31, 1972, the accused conspired to lessen unduly competition contrary to s. 32(1)(c) of the Combines Investigation Act. On October 10, 1978 guilty pleas were entered on behalf of all the accused companies, and fines were imposed by the court. In addition, the court granted an Order of Prohibition.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1977, 1978, 1979
- Bureau File: 5612-IS01
- Competition Bureau database on conspiracy cases

GYPSUM

Case Summary:

This case arose from an inquiry by the Director into the manufacture and sale of gypsum wallboard in Canada. The evidence obtained in the inquiry was referred to the Attorney General of Canada. An Information containing one count under paragraph 32(1)(c) of the Act was laid at Toronto on September 30, 1976 against four companies in connection with the unduly lessening of competition in the manufacture and sale of gypsum wallboard in Manitoba, Saskatchewan, Alberta and British Columbia. The charge against one of the accused was subsequently dropped when the original information was withdrawn and a new Information was laid on August 29, 1977. The preliminary hearing was held in Toronto on August 29, 1977. All three accused were ordered to stand trial. The trial was held on May 3, 1978, all the accused corporations pleaded guilty and fines were imposed. The court also granted an Order of Prohibition.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1977, 1978, 1979
- Competition Bureau database on conspiracy cases

FERTILIZER

Case Summary:

This inquiry was commenced in February 1973 after numerous complaints were received by the Director concerning the conduct of firms in the western Canadian fertilizer industry. In December 1975, the evidence in this inquiry was referred to the Attorney General of Canada. On January 16, 1976, an Information containing one count under paragraph 32(1)(c) was laid at Calgary, Alberta against six companies. In addition, several firms were named as unindicted co-conspirators. The preliminary hearing commenced August 3, 1976. Crown argument was made in January of 1977 with defence argument and Crown rebuttal heard for 14 days commencing May 24, 1977. The provincial judge gave his decision in this matter on August 16, 1977 and ordered all the accused to stand trial. On August 31, 1977 the charges were relaid. The accused, manufacturers of fertilizer in western Canada, were charged with the offence of conspiracy under s. 32(1)(c) of the Combines Investigation Act of preventing or lessening competition unduly in the fertilizer trade. It was alleged in the indictment that the offence took place between January 1, 1965 and January 16, 1976 and that it affected the provinces of British Columbia, Alberta, Saskatchewan, Manitoba and part of Ontario. The trial commenced on November 13, 1978 and lasted 149 court days. On January 14, 1980 the court acquitted all the accused.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1976, 1977, 1978, 1979, 1980
- Bureau file: 3722-MC02
- *Regina v. Cominco Ltd. et al.* (1978), 40 C.P.R. (2d) 121
- *R v. Cominco Ltd.-Cominco Ltee et al* (1979), [1980] 2 W.W.R. 693
- Competition Bureau database on conspiracy cases

SUGAR

Case Summary:

After an initial investigation, this case was referred to the Attorney General of Canada. On May 31, 1973, an Information was laid at Montreal against 4 accused. The accused were the most important eastern Canadian sugar refiners. The preliminary hearing in this case took place between November 1973 and January 1974 and on April 3, 1974, the accused were ordered to stand trial. The accused were charged with two offences. The one offence was that they had conspired to prevent or lessen competition unduly contrary to section 32(1)(c) of the Combines Investigation Act. The other offence was that they had entered into a conspiracy to enhance unreasonably the price of raw and refined sugar contrary to section 32(1)(b) of the Combines Investigation Act. The trial began in October 1974 and was concluded in June 1975. Judgement acquitting the accused corporations was handed down on December 19, 1975. On January 5, 1976, the Crown filed and appeal before the Québec Court of Appeal. The appeal was heard during the last week of October 1977 and, on March 14, 1978, the Court allowed the appeal on the count under paragraph 32(1)(c) and registered a conviction. The case was sent back to the Trial Court for sentencing. The appeal on the count under paragraph 32(1)(b) was dismissed. Submissions on sentence were heard in September 1978. On October 6, 1978, the Trial Court handed down the sentence fining each of the three main accused corporations \$750,000. These were the largest fines ever handed down by a court on charges under the Combines Investigation Act until that date. The accused appealed the conviction to the Supreme Court of Canada and the sentence to the Québec Court of Appeal. The Supreme Court of Canada heard the appeal in December 1979 and on July 18, 1980, rendered judgment allowing the appeals and restoring the acquittals.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1974, 1975, 1976, 1977, 1978, 1979, 1980 and 1981.
- Bureau file: 10820-1 (several volumes, from Archives), 10820-1-7, vol 1 and vol 2 (from Archives)
- *The Queen v. Atlantic Sugar Refineries Co. Ltd., Redpath Industries Ltd., St. Lawrence Sugar Ltd. and S.L.S.R. Holdings Ltd.* (1975), 26 C.P.R. (2d) 14
- *Attorney-General of Canada v. Atlantic Sugar Refineries Co. Ltd. et al.* (1978), 41 C.P.R. (2d) 5
- *Atlantic Sugar Refineries Co. Ltd. et al. V. Attorney-General of Canada* (1980), 53 C.P.R. (2d) 1
- Competition Bureau database on conspiracy cases

FELTS**Case Summary:**

This case arose out of an inquiry by the Director into an alleged conspiracy to unduly prevent or lessen competition in the papermaker's felts trade and related products in Canada. In July, 1976, the evidence obtained in this inquiry was referred to the Attorney General of Canada. On October 28, 1976, and Information containing one count under paragraph 32(1)(c) of the Combines Investigation Act was laid at Montreal against 11 companies. In addition, several firms in Canada and Europe were named as unindicted co-conspirators. The original Information was withdrawn and a new information substituted at the start of the preliminary hearing in Montreal on December 5, 1977. In the new Information seven companies were charged. The balance of the companies charged in the original Information were named as unindicted co-conspirators. The Crown presented its written argument on February 6, 1978. The preliminary hearing was completed on June 15, 1978 and in a written decision handed down on July 13, 1978, the accused companies were ordered to stand trial before the Superior Court of the Province of Quebec. The accused companies were producers of papermaker's wet felts and some of them were also engaged in the manufacture of dryer felts. They were charged that, between April 1, 1952 and July 31, 1974, they conspired to lessen unduly competition in the papermaker's wet felts trade in Canada, contrary to s. 32(1)(c) of the Act. The trial commenced on May 7, 1979 and was completed on July 23, 1979. All of the defendants were convicted on January 7, 1980. On February 29, 1980 the six accused were sentenced to pay fines. The court also granted an Order of Prohibition. The convicted companies applied for and received leave to appeal. On December 2, 1982 the Québec Court of Appeal rejected all 12 grounds for appeal. Leave to appeal the conviction to the Supreme Court of Canada was sought that month. This latter application was denied in February 1983 and costs of the application were awarded to the Crown.

Sources of Information:

- Director of Investigation and Research, annual reports for the years: 1977, 1978, 1979, 1980, 1981, 1982, 1983
- *Regina v. Albany Felt Co. of Canada Ltd. et al.* (1979), 50 C.P.R. (2d) 282
- *Regina v. Albany Felt Co. of Canada Ltd. et al. (No. 1)* (1980), 52 C.P.R. (2d) 189
- *Regina v. Albany Felt Co. of Canada Ltd. et al. (No. 2)* (1980), 52 C.P.R. (2d) 204
- *Regina v. Albany Felt Co. of Canada Ltd. et al.* (1982), 143 D.L.R. (3d) 691
- Competition Bureau database on conspiracy cases

PORK

Case Summary:

This inquiry was commenced in February 1980 following the receipt of information alleging that the major meat packers operating in the Province of Alberta had agreed to share slaughter hogs offered for sale by the Alberta Pork Producers Marketing Board on a predetermined percentage basis; to purchase slaughter hogs at an agreed price or within a given price range; and agreed on wholesale prices for pork or pork products. Searches of the premises of the Alberta Pork Producers Marketing Board took place in February 1980. Hearings before the Restrictive Trade Practices Commission were held during 1980 and 1981 in Calgary, Edmonton, Ottawa and Toronto. The evidence obtained in the inquiry was referred to the Attorney General of Canada on December 21, 1981. On February 19, 1982, an Information containing two counts under paragraph 32(1)(c) of the Act was laid at Calgary against five meat packer companies. A revised Information adding another meat packer, changing the name of one of the accused and deleting a third, was laid on June 24, 1982. The preliminary hearing commenced on January 31, 1983. On March 14, 1983, submissions were made concerning the retroactive application of the Canadian Charter of Rights and Freedoms following a decision of the Alberta Court of Appeal declaring section 10 of the Act unconstitutional. On September 19, 1983, the presiding judge ruled on the motion in favour of the applicants and declared certain documentary evidence to be inadmissible.

On December 9, 1983, in the Provincial Court of Alberta at Calgary, three of the five accused waived the preliminary hearing. On the same day, charges were laid in the Alberta Court of Queen's Bench at Edmonton against these three companies alleging a conspiracy to prevent or lessen unduly competition in the purchase of slaughter hogs in the Province of Alberta for the period from December 9, 1969, to December 31, 1974. These three accused companies pleaded guilty and were each fined \$125,000.

The two other accused companies, Canada Packers Inc. and Intercontinental Packers Limited, continued with the preliminary hearing which ended on February 23, 1984. The presiding judge gave his ruling on May 24, 1984. The judge ordered the two accused to stand trial in respect of a conspiracy to prevent or lessen competition unduly in relation to the prices of pork and pork products sold to the distributive market, contrary to paragraph 32(1)(c) of the Act, for the period January 1, 1965, to June 30, 1976, instead of January 1, 1965, to December 31, 1978, originally alleged by the Crown. In addition he ruled that the evidence was not sufficient to allow a charge relating to the marketing of slaughter hogs.

The Crown, as a result of the ruling not to include the marketing of slaughter hogs in an indictment, decided to proceed by way of preferred indictment. The Attorney General of Canada, on July 18, 1984, laid charges in the Court of Queen's Bench of Alberta alleging that the two accused meat packer companies conspired to prevent or lessen unduly competition in the marketing of slaughter hogs and pork cuts or products therefrom, contrary to paragraph 32(1)(c) of the Act. In July 1985, Canada Packers Inc. filed a statement of claim against the Attorney General of Canada requesting (1) that portions of the indictment relating to the purchase of slaughter hogs through the Alberta Pork Producers Marketing Board be declared invalid and of no force or effect; (2) that provisions of the Criminal Code allowing the Attorney General of Canada to prefer an indictment after an accused has been discharged following a preliminary inquiry are inconsistent with the Charter of Rights and Freedoms; and, (3) an injunction restraining the Attorney General of Canada from prosecuting Canada Packers on parts of the indictment relating to the purchasing of slaughter hogs through the Alberta Pork Producers Marketing Board. In September 1985 the Court rejected Canada Packers' statement of claim. An appeal of this decision by Canada Packers was dismissed. The trial in this matter commenced on January 6, 1986, in the Court of Queen's Bench in Calgary. On June 26, 1986, Intercontinental Packers Limited entered a guilty plea to a charge of conspiracy to prevent or lessen competition unduly in the purchase of slaughter hogs in the Province of Alberta for the period from January 1, 1969 to December 31, 1974. The Attorney General of Canada entered a stay of proceedings against Intercontinental in relation to the parts of the charges dealing with the marketing of pork cuts or pork products therefrom. On January 15, 1988, Canada Packers was acquitted on all charges. The Crown appealed

this decision. On February 23, 1988 Intercontinental was sentenced to a fine of \$100,000. The Crown's appeal of the acquittal of Canada Packers was subsequently abandoned.

Sources of Information:

- Director of Investigation and Research, annual reports for the years: 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989
- *Alberta Pork Producers' Marketing Board et al. v. Swift Canadian Co. Ltd. et al.* (1981), 129 D.L.R. (3d) 411
- *R. v. Burns Foods Limited, Burns Meat Ltd., Canada Packers Inc., Eschem Canada Inc., Gainers Limited, and Intercontinental Packers Limited* (1983), 42 A.R. 70
- *Swift Canadian Co. Ltd. et al. v. Alberta Pork Producers' Marketing Board et al.* (1984), 9 D.L.R. (4th) 71
- *Attorney-General of Canada v. Canada Packers Inc.* (1985), 8 C.P.R. (3d) 199
- *Attorney-General of Canada v. Canada Packers Inc.* (1985), 26 C.R.R. 15
- *R. v. Canada Packers Inc. et al.* (1988), 19 C.P.R. (3d) 133
- Bureau file: 5011-LM02-6
- Competition Bureau database on conspiracy cases

GASES

Case Summary:

On May 10, 1990, the Director initiated an inquiry into the conspiracy and bid-rigging activities of the five major suppliers of compressed gas in Canada. Searches of these five firms were conducted during the months of May and June 1990. The companies and individuals involved in this case were charged (in several indictments) that, between June 1, 1989 and May 31, 1990, they prevented or lessened unduly competition in the sale or supply in Canada of compressed oxygen, nitrogen, argon, carbon dioxide and hydrogen sold or supplied in liquid form, contrary to subsection 45 (1) (c) of the Competition Act.

On September 6, 1991, two firms pleaded guilty and were fined \$1.7 million and \$700,000 respectively. On September 13, 1991, two other firms pleaded guilty and were fined \$1.7 million each. On October 18, 1991, two individuals pleaded guilty and were each fined \$75,000. On October 25, 1991, the remaining firm pleaded guilty and was fined \$200,000, ending the prosecution of the companies involved in this conspiracy. The prosecution of individuals continued. These individuals were corporate officials at the accused companies. On July 2, 1992, two individuals were charged with one count each under section 45(1)(c) of the Act for their involvement in this conspiracy. Both individuals pleaded guilty. On July 2, 1992, one of these individuals was fined \$75,000, and, the next day, the other individual was fined \$50,000. In August 1993, two other individuals pleaded guilty to one count under section 45(1)(c). Both individuals were fined \$75,000. In December, 1994, other individual was committed to stand trial on one count under section 45(1)(c). On October 9, 1996, this individual was convicted and fined \$35,000. This individual appealed his conviction. On October 22, 1997, this individual's appeal was dismissed. On November 4, 1997, written reasons for the dismissal of the appeal were provided. This ended the prosecution process in the Gases case.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1992, 1993, 1994, 1996, 1997
- Bureau file: 3711-iC01
- Competition Bureau, *Enforcement: Current Activities, Compressed Gas, CompAct Issue #7*, October-December 1997, Publication Date: 1998-07-10 (<http://strategis.ic.gc.ca>)

- Competition Bureau, *Enforcement: Current Activities, Compressed Gas Conspiracy Case Concluded*, CompAct Issue #3, July-September 1996, Publication Date 1997-03-12 (<http://strategis.ic.gc.ca>)
- Competition Bureau database on conspiracy cases

PANS

Case Summary:

This inquiry commenced in December 1982 following receipt of information that the Pharmacy Association of Nova Scotia had agreed to implement a boycott of the third-party drug prepayment plans administered by Maritime Medical Care Inc., a major non-profit insurer. The insurer had resisted the Association's demands for an increase in the level of reimbursement paid pharmacies participating in its plans. As a result of the alleged boycott threat, the insurer was compelled to agree to the demands of the Association. During the inquiry the records of the Association were examined.

On February 15, 1985, the evidence in the inquiry was referred to the Attorney General of Canada. An Information containing two counts under paragraph 32(1)(c) (now section 45(1)(c)) was laid at Halifax on February 24, 1987 against two associations, several companies and individuals. The associations were Nova Scotia Pharmaceutical Society and Pharmacy Association of Nova Scotia. On April 26, 1988, warrants were issued by the Supreme Court of Nova Scotia, pursuant to section 15(1), for the re-seizure of documents originally seized in December 1982, pursuant to section 10 of the former Combines Investigation Act. Earlier in the day the court had ruled that the original seizure was illegal under the Charter and the documents were ordered returned. The preliminary inquiry commenced on January 23, 1989. On March 22, 1990, the Nova Scotia Provincial Court committed the associations, companies and individuals to stand trial on both charges under section 45 of the Act. On May 31, 1990, these parties were indicted with two counts of conspiracy to lessen competition unduly in the supply of prescription drugs and pharmacist's dispensing services to customers paying cash or covered under a private prescription drug insurance plan in Nova Scotia between 1974 and 1986. On September 5, 1990 the Trial Division of the Nova Scotia Provincial Court quashed the indictment against the accused on the ground that section 45 of the Act was unconstitutional and violated the Charter of Rights and Freedoms because the word "unduly" was too vague and uncertain and it allowed for the conviction and imprisonment of an accused without sufficient finding of criminal intent. The Crown appealed of this decision was heard on February 11 and 12, 1991. The Court of Appeal reversed the lower Court's ruling that the conspiracy provision was unconstitutional. The case was appealed to the Supreme Court of Canada. On July 9, 1992, the Supreme Court released its decision upholding the validity of the conspiracy provision of the Act.

On November 2, 1992 the trial against Nova Scotia Pharmaceutical Society and the Pharmacy Association of Nova (the 2 associations) alone was commenced in the Supreme Court of Nova Scotia. On February 26, 1993, the accused were acquitted. On March 30, 1993, a stay of proceedings was entered against the remaining accused (pharmacies and individual pharmacists).

Sources of Information:

- Director of Investigation and Research, annual reports for the years: 1987, 1988, 1989, 1990, 1991, 1992, 1993
- *Nova Scotia Pharmaceutical Society et al. v. The Queen* (1988), 21 C.P.R. (3d) 488
- *Regina v. Nova Scotia Pharmaceutical Society et al.* (1990), 58 CCC (3d) 161
- *Regina v. Nova Scotia Pharmaceutical Society et al.* (1990), 59 CCC (3d) 30
- *Regina v. Nova Scotia Pharmaceutical Society et al.* (1991), 64 CCC (3d) 129
- *Regina v. Nova Scotia Pharmaceutical Society et al.; Attorney-General of Ontario et al., interveners* (1992), 43 C.P.R. (3d) 1

- *Her Majesty the Queen in right of Canada v. Nova Scotia Pharmaceutical Society et al.* (1993), 49 C.P.R. (3d) 289
- *The Queen in right of Canada v. Nova Scotia Pharmaceutical Society et al.* (1994), 55 C.P.R. (3d) 356
- Mathewson, Frank, *Expert economic evidence of Frank Mathewson in the matter of Queen v. Nova Scotia Pharmaceutical Society et al. under section 32 of the Combines Investigation Act*, November 16, 1992 (Obtained from the Competition Bureau)
- Competition Bureau database on conspiracy cases

AQPP

Case Summary:

In September 1988, Competition Bureau officials executed search warrants in the premises of the Association Québécoise des Pharmaciens Propriétaires (AQPP) and five companies. The members of the AQPP were licensed pharmacists who owned approximately 90% of the pharmacies in the province of Québec. On April 19, 1990, 7 individuals, 15 companies and the AQPP were charged in Montréal that they conspired to fix the prices and the dispensing fees of oral contraceptive pills and prescription narcotics sold to the cash market in the Province of Québec, contrary to s. 45(1)(c) of the Competition Act. The charge related to the period between December 1, 1987 and September 30, 1988. The accused challenged the constitutionality of s. 45 and, on December 6, 1990, the Québec Superior Court declared the section to be contrary to the Charter. The Crown appealed the Québec Superior Court's decision. The case was remanded pending the constitutional challenge to the conspiracy provision which lasted until 1993. On December 16, 1993 the accused were ordered to stand trial and an indictment was laid against seven individuals, 15 companies and the AQPP. On August 30, 1994 the Attorney-General replaced the December 16 indictment with two new indictments: one indictment against seven individuals, and one indictment against six companies and the AQPP. The trial for the six companies and the AQPP was commenced on September 7, 1994. The indictment was quashed on September 22, 1994. On November 30, 1994, the Attorney-General laid a new indictment against the six companies and the AQPP. On May 12, 1995, the six companies and the AQPP pleaded guilty. The Crown decided to withdraw the indictment regarding the seven individuals and the Court imposed an Order of Prohibition on them. On May 19, 1995, the Court imposed fines on the six companies and the AQPP.

Sources of Information:

- Director of Investigation and Research, annual reports for the years 1991, 1993 and 1996
- Bureau file: 6031-PA01
- Cadsby, Charles B. and Tapon, Francis, *Opinion on the Market Structure and State of Competition in the Retail Pharmaceutical Market in Quebec, 1987-1988, Report Prepared by Francis Tapon and Charles Bram Cadsby*, Department of Economics, University of Guelph, Ontario, Revised December 1994 (Obtained from Competition Bureau case file)
- *R. c. Association Québécoise des Pharmaciens Propriétaires (A.Q.P.P.)*, [1995] R.J.Q. 1498
- *Association Québécoise des Pharmaciens Propriétaires c. Canada (Procureur Général)*, [1991] R.J.Q., 205
- Competition Bureau database on conspiracy cases

PIPE

Case Summary:

On July 12, 1994, the Director commenced an Inquiry into the activities of Canada Pipe Company Limited, United States Pipe and Foundry Company and McWane Inc. The inquiry was conducted jointly with representatives of the United States Department of Justice, Anti-Trust Division. On September 21, 1995, Canada Pipe was charged (via preferred indictment) that between January, 1990 and September 30, 1990, it did unlawfully conspire with United States Pipe and Foundry Company to prevent or lessen unduly competition in the supply and sale of ductile iron pipe in the mid-size range in Canada, contrary to section 45(1)(c) of the Competition Act. On September 27, 1995, in the Federal Court in Toronto, Canada Pipe pleaded guilty and was convicted and fined \$2.5 million. An Order of prohibition was also imposed.

Sources of Information:

- Director of Investigation and Research, annual report for the year 1996
- Industry Canada, *Enforcement: The Canada Pipe Case*, CompAct Issue #1, January-March 1996, Publication Date: 1996-05-22 (<http://strategis.ic.gc.ca>)
- *Regina v. Canada Pipe Co. Ltd.* (1995), 64 C.P.R. (3d) 182
- Bureau file: 2941-IC03 (several volumes)
- Competition Bureau database on conspiracy cases

APPENDIX E

APPLYING THE METHODOLOGY OF SPROUL (1993) TO CANADIAN DATA

Summary of Sproul (1993)'s Methodology

The methodology summarized below was used by Sproul (1993) in the section of his paper that assessed the price effect of prosecution.

For each case:

- (1) Find price data on the good produced by the cartel and on related goods.
- (2) Select the predictor to be used based on the following requirements:
 - Similar conditions of supply and demand,
 - Not significantly affected by prosecution,
 - Predictor with highest correlation prior to the indictment date (which is equivalent to choosing the predictor with the highest R^2 because Sproul estimated two variable linear regression models)
- (3) Use all data prior to the indictment date to estimate a linear regression of the price of the cartel good against a constant and the price of the predictor.
- (4) Extend the sample to include 48 months after the indictment date.
- (5) Use the estimated regression for the period prior to the indictment date to predict price over the extended sample.
- (6) Generate a time series by dividing the actual price over the predicted price.

Repeat steps 1 to 6 for all cases.

- (7) Aggregate the industry time series containing the ratio of actual price over predicted price by calculating an unweighted average across all cases. Plot the aggregated time series for the period from the beginning of data up to 48 months after the indictment. Conclude on the aggregate effect of prosecution.
- (8) Check the robustness of the results to a change in the prosecution event.

Note: Sproul (1993) did not conduct a complete case by case analysis. He limited himself to presenting plots of actual and predicted prices for all cases and to commenting on the price effects for some, not all, cases based on such plots.

Aggregate Price Effect of Prosecution

Notes:

Fertilizer excluded.

Pipe and Pork series end in months 123 and 124 respectively.

Sugar has two missing observations: Months 143 and 144.

Not all cases had data available for 99 months prior to the indictment date.

Predictors, correlation coefficients and R-squares

Case name	Predictor with highest correlation prior to indictment	R	R²
Coal	Non-metallic minerals and their products (Canada) Wholesale price index Source: DBS publications (Code: n/a)	0.785843	0.617549
Rubber	Tires, tubes, tread, & repair materials (U.S.) PPI Source: LABSTAT (PPI code: WPU0712)	0.982049	0.964421
Roof	Residential building materials (Canada) Wholesale price index Source: DBS publications (Code: n/a)	0.869409	0.755873
Pulpwood	Woodpulp, groundwood short ton (U.S.) PPI Source: LABSTAT (PPI Code: WPU09110131)	0.869231	0.755563
Boxes	Total manufacturing industries (Canada) ISPI Source: CANSIM (Code: D500000)	0.706192	0.498707
Culverts	Pressure tubing, carbon 100 ft (U.S.) PPI Source: LABSTAT (PPI Code: WPU10130275)	0.65053	0.423189
Lamps	Electrical machinery and equipment (U.S.) PPI Source: LABSTAT (PPI Code: WPU117)	0.951219	0.904817
Tubing	Iron castings (Canada) IPPI Source: CANSIM (Code: D691748)	0.983079	0.966444
Gypsum	Miscellaneous non-metallic mineral products industries (Canada) ISPI Source: CANSIM (Code: D542301)	0.998014	0.996033

Table Continued on Next Page

Predictors, correlation coefficients and R-squares (Continued)

Case name	Predictor with highest correlation prior to indictment	R	R²
Fertilizer	Agricultural chemicals and chemical products (U.S.) PPI Source: LABSTAT (PPI Code: WPU065)	0.937048	0.878059
Sugar	Raw cane sugar PPI Source: LABSTAT (PPI Code: WPU02520101)	0.79202	0.627296
Felts	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.965369	0.931938
Pork	Pork (U.S.) PPI Source: LABSTAT (PPI Code: WPU022104)	0.959452	0.920548
Gases	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.95793	0.91763
PANS	Medicinal and pharmaceutical products (Alberta) CPI Source: CANSIM (Code: P109087)	0.99808	0.996164
AQPP	Prescribed medicines (Canada) CPI Source: CANSIM (Code: P100203)	0.996534	0.99308
Pipe	All commodities (Canada) IPPI Source: CANSIM (Code: D693420)	0.98629	0.972769

Robustness of the Results to a Change in the Event

Notes:
Fertilizer and PANS excluded.
Pipe, Pork and Pulpwood series end in months 130, 131 and 137 respectively.
Sugar has two missing observations: Months 96 and 97.
Not all cases had data available for 106 months prior to the fines date.

Notes:
Fertilizer excluded.
Not all cases had data available for the 78 months prior to the alleged EOC date.

Individual Charts

Individual Charts (Continued)

Individual Charts (Continued)

APPENDIX F

JUDICIAL DECISIONS BY CASE

CASE LABEL	COURT LEVEL	RESULT
Coal	Appeal	Convicted
Rubber	Trial	Convicted
Roof	Trial	Convicted
Pulpwood	Trial	Convicted
Boxes	Appeal	Convicted
Culverts	Appeal	Convicted
Lamps	Trial	Convicted
Tubing	Trial	Convicted
Gypsum	Trial	Convicted
Fertilizer	Trial	Acquitted
Sugar	Supreme Court	Acquitted
Felts	Appeal	Convicted
Pork	Trial	Convicted
Gases	Trial	Convicted
PANS	Trial	Acquitted
AQPP	Trial	Convicted
Pipe	Trial	Convicted

Source: Competition Bureau database on conspiracy cases