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MONEY IN ECONOMIC DEVELOPMENT:
THE ECUADORIAN CASE

by

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ABSTRACT

The dissertation analyses the domestic financial market of Ecuador and the way in which that market is governed by the banking system. The latter consists of a number of competing commercial banks, the National Development Bank, and the Central Bank.

The main role of commercial banks is to provide a mechanism for mobilizing savings and channeling them into productive uses. The National Development Bank is a publicly owned institution specializing in long-term agricultural credit. It depends on direct contributions from the central government, on credits from the Central Bank, and on government-managed foreign credits. The Central Bank regulates the supply of money and credit by means of traditional and non-orthodox instruments of control. The latter include quantitative determination of the commercial banks' portfolio growth, selective credit controls, international reserves management and manipulation of government accounts in the Central Bank.

The capital market is defined as the market for financial assets other than money, where stocks and bonds can be bought and sold using the services of brokers and dealers. Since such an organized market does not exist in Ecuador, it is emphasized that commercial banks are the only channels through

which domestic funds flow from private savers to investors. The hypothesis is, then, that there exists a complementary effect between the accumulation of monetary assets held as bank deposits and physical capital formation.

The relationship between the real return on liabilities of banks, the holdings of those liabilities, and capital accumulation is explored using Ecuadorian statistical data. The empirical findings suggest that an increase of the real interest rate on monetary assets has a positive impact on the ratio of bank deposits to Gross Domestic Product, and that this ratio, in its turn, is positively correlated with the share of Gross Private Domestic Fixed Investment in Gross Domestic Product.

The imposition of interest rate ceilings by the central government tends to result in a depressed financial system, a lower investment rate, and an increased rate spread between investments' marginal product and the real deposit rates paid to money-holders. An appropriate monetary policy, then, is defined as the release of real rates of interest to disclose the scarcity of capital, to stimulate savings, and to bring to an end the credit rationing process. With regard to complementary policies, the government should encourage the establishment of a broad and active financial market on which government as well as private securities become more attractive to hold.

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INTRODUCTION

Ecuador is a small Latin American country geographically situated on the equator, and in many ways its features are representative of those which exist in one or another part of Latin America.

Hence studying its particular economic characteristics can provide a richness of insight which bears meaning elsewhere in the continent.

Ecuador's climates and soils are varied and its surface ranges from coastal flood plains and dense Amazonian jungle to snow-capped Andean mountain peaks. The Amazonian region, with an important agricultural potential that has been largely unexplored, has attained economic pre-eminence with the recently discovered deposits of oil.

Although Ecuador became in its time the largest world exporter of cacao and today is the second exporter of petroleum in Latin America, it still remains an underdeveloped country.

The principal objective of this dissertation is to examine, within the institutional and structural economic framework of Ecuador, the role of money in its economic development.

Money, which may or may not be costless to produce, is a liability of either the government or a privately owned banking system.

Money functions as a store of value as well as a medium of exchan-

ge in the various economic activities of a specific country.

In considering the role of money in economic development, two main questions arise. What strategies may be taken to sustain economic growth and to stimulate economic development, and to what extent can the financial policies and institutional arrangements affect such strategies?

Traditional monetary growth theories have focused on these questions by using different mathematical models to express different assumptions about the role of money on economic growth. In short, we can distinguish three basic functions of money: it provides society with a common measure of value or unit of account, it offers an acceptable medium of exchange; and it provides a liquid store of value which can facilitate the separation of exchange over time.

Our concern is that traditional monetary theories, whether they be neo-classical or neo-Keynesian, are designed only for developed economies as long as they assume perfect capital and financial markets. Therefore, an alternative approach that reverses this crucial assumption is necessary to explain the role of money in the economic structures of underdeveloped countries.

The analysis begins, in Chapter I, with a review of the neo-classical and neo-Keynesian "wealth views" of money and how they ap-

ply to the economic structure of developed economies. In the same chapter such theories are related to an alternative view based on two recent works by E. Shaw and R. McKinnon which focus on the economic structure of developing economies. In fact, it is the Shaw-McKinnon approach which provides the theoretical framework for the analysis of the role of money in the Ecuadorean economy.

In Chapter II, we examine the testable implications of the Latin American monetarist-structuralist controversy. An analysis of both hypotheses, using Ecuadorean data, is important because they give rise to quite different interpretations of the relationship between inflation and economic development. As it is explained later, the monetary policy recommendations emerging from the hypothesis developed in this dissertation are weakened if the "structuralist" view of inflation proves to be feasible for Ecuador.

In Chapter III, we examine the financial structure of Ecuador. This is a necessary element to the understanding of the influence of domestic finance on the private inclination to save and invest.

In Chapter IV, on the basis of the discussion of the preceding chapters, the main hypothesis is developed explicitly.

Two fundamental assertions underlie the hypothesis: First, the absence of domestic capital markets in the Ecuadorean economy determines a positive correlation between real interest rates and

the demand for monetary assets. Therefore, policies that generate higher interest rates are bound to increase the real size of the financial sector. Second, the substitution effect between money and physical capital accepted by traditional monetary theories is inapplicable. Rather, it is postulated that a complementary effect exists between money and physical capital in the portfolios of wealth-holders.

In Chapter V, the hypothesis is tested empirically. The main findings are summarized and some policy recommendations are included in Chapter VI.

1 THEORETICAL FRAMEWORK

The analysis of the effectiveness of monetary policy in inducing economic growth in underdeveloped economies has often been neglected on the grounds that in such economies the monetary sector tends to be small and the capital market imperfect, thus, their governments have relied heavily on fiscal measures as the only open alternative for inducing economic growth.

Such a behaviour is understandable in as much as it is the logical consequence of an almost mechanical application of the policy prescriptions that are -or that have been in one time or another- relevant only in the context of developed economies.

The last assertion becomes clear if we analyze the assumptions on which traditional monetary growth theories are based.

Traditional Monetary Growth Theories

Traditional monetary growth models have been polarized into two major groups: Neoclassical models and Keynes-Wicksell models.

Both types of models, thus far developed, assume economies with perfect capital and financial markets, and homogeneous inputs and outputs.

The Neoclassical Viewpoint

The Neoclassical models have been developed by such authors as Harry Johnson(43), Milton Friedman(23), Don Patinkin and David Levhari(48), Duncan Foley and Miguel Sidrauski(22), James Tobin(82),

and others, and all of them share in common the assumption that money is a competing asset with physical capital. The applicability of this approach to developing economies has been criticized by E. Shaw and R. McKinnon.¹ They present the basic neoclassical framework as a combination of the Golden Rule and the Full-Liquidity Rule. The aggregate production function may be written

$$(1) \quad Y = g(K, L, M/P)$$

where Y is real output, K is the stock of Capital of uniform productivity, L is a homogeneous labor-time input, and M/P is the real stock of money. The real stock of money is treated like the stock of capital in the production process due to the money's function as a productive factor. Such function is the source of the transactions demand for money and its stock can be regarded as part of social disposable income, Y', thus

$$(2) \quad Y' = Y + d(M/P)/dt = Y + (\dot{M} - \dot{P})M/P$$

where $\dot{M}$ is the rate of growth of nominal money, $\dot{P}$ is the rate of inflation, and t is an index of time.

Neoclassical theory defines the savings function as a given fraction $0 < s < 1$ of social disposable income, which is allocated between physical capital and real money balances, so that the last two are substitutes. The savings function becomes

¹ The following exposition of the Neoclassical model has been extracted from E.S. Shaw(66), especially chapters 2 and 3. And R.I. McKinnon(51), especially chapters 4 and 5.

$$(3) \quad sY' = dK/dt + (\dot{M} - \dot{P})M/P = I + (\dot{M} - \dot{P})M/P$$

substitute from equation (2) for Y' to get the investment function

$$(4) \quad I = sY - (1 - s)(\dot{M} - \dot{P})M/P$$

Where I is the aggregate annual flow of investment in physical capital. Since the coefficient of M/P is positive $((1 - s)(\dot{M} - \dot{P}) \geq 0)$, the characteristic of this investment function is that an increase in the real stock of money reduces investment. In other words, real money balances and physical capital are regarded as "competing assets".

Furthermore, since money is costless to create, the government should induce private holders of real balances to expand their demand for M/P until the marginal productivity of money declines to zero. This policy implies, according to the full-liquidity rule of M. Friedman, that the rate of monetary growth $(\dot{M})$ should be manipulated until the rate of deflation equals the marginal physical product of capital, r , at which point the nominal interest rate on deposits is zero, and since full satiation of money is reached, the marginal productivity of money disappears.

$$(5) \quad -\dot{P} = r$$

the substitution effect between money and physical capital is reinforced by the use of a demand for money function with a negative elasticity with respect to the marginal product of capital

$$(6) \quad (M/P)' = L(Y, r, i - \dot{P}^e)$$

where $(M/P)'$ is the demand for real money balances, r is the marginal productivity of both physical capital and all non-monetary financial assets, i is the nominal rate on deposits, $\dot{P}^e$ is the expected rate of inflation. Thus, $(r - i + \dot{P}^e)$ is the opportunity cost of holding money.

The elasticities with respect to Y and $(i - \dot{P}^e)$ are assumed to be positive, but the elasticity with respect to r is assumed to be negative. It is the negative sign of the latter elasticity which generates the "substitution effect" characteristic of the neoclassical monetary theory. In view of this result McKinnon points out¹

"Within this neoclassical model, authorities who want to encourage private investment may well be chary of policies that raise M/P ."

The Keynesian Viewpoint

The Keynesian viewpoint of the role of money in the economy has been summarized in the Keynes-Wicksell model, and characterizes the work of such authors as Hahn(35), Tsiang(83), Stein(71), Rose(63), and others. This model, like its neoclassical counterpart, also uses a theoretical framework of reference that is only applicable to a developed economy. The basic assumptions of this model can be characterized as follows:

- (i) The level of investment and savings in the economy are

¹McKinnon(51), pp. 46

independent functions of the desired investment and savings per unit of capital ratios;

- (ii) Prices change only if there exists excess demand for or excess supply of goods. (i.e. if the commodity markets are in disequilibrium).

According to the first assumption it is postulated that the desired rate of investment -which can differ from the desired rate of savings- depends on the firms' desired capital to labor ratio. The latter grows as long as the difference between the marginal product of capital and the real rate of interest is positive ($r - i + \dot{P}^2 > 0$). When this difference becomes zero ($r = i - \dot{P}^2$), the desired rate of investment per unit of capital is equal to the rate of growth of effective labor (n), such relationship can be expressed as

$$(1) \quad I/K = n + r - i + \dot{P}^2$$

the desired rate of savings, on the other hand, depends on the savings per unit of capital ratio, which is negatively related to the labor to capital ratio, and to the real money balances per unit of capital ratio, such relationship can be expressed as

$$(2) \quad S/K = f(L/K, M/PK)$$

According to the second assumption it is postulated that the rate of price change is positively related to the difference between the desired investment and savings per unit of capital ratios

$$(3) \quad \dot{P} = b(I/K - S/K)$$

where b represents the "speed of market adjustment". Substituting equation (1) and (2) into (3) the price change equation can be rewritten

$$(4) \quad \dot{P}/b = n + r + \dot{P}^2 - i - f(L/K, M/PK)$$

The dynamic system of this model is represented by the two differential equations derived for the growth paths of (L/K) and of (M/PK) respectively

$$(5) \quad \log (L/K) = n - \dot{K}$$

$$(6) \quad \log (M/PK) = \dot{M} - \dot{P} - \dot{K}$$

This dynamic system is solved with the use of two additional assumptions.

The first is Walras' Law: the excess demand for commodities is equal to the excess supply of real balances

$$(7) \quad I - S = (M/P) - (M/P)'$$

where (M/P) is the supply of real balances, and $(M/P)'$ is its demand. Rewriting equation (7) in per unit of capital terms

$$(8) \quad I/K - S/K = (M/PK) - (M/PK)'$$

where the demand for real balances per unit of capital $(M/PK)'$ is positively related to the real net financial wealth and to the level of transactions, but negatively related to the opportunity cost of holding money

$$(9) \quad (M/PK)' = d(Y(L/K) + \dot{P}/b, M/PK, r + \dot{P}^2 - i)$$

where $(\dot{P}/b)$ represents the excess demand of investment per unit of capital $(I/K - S/K)$, thus, $(Y(L/K) + \dot{P}/b)$ is the transactions demand, (M/PK) represents the real net financial wealth, and $(r + \dot{P}^2 - i)$ is the opportunity cost of holding money.

Substitute equation (9) into equation (8) to get

$$(10) \quad \dot{P}/b - e(d(Y(L/K) + \dot{P}/b, M/PK, r + \dot{P}^2 - i) - (M/PK)) = 0$$

The second additional assumption is that the rate of capital formation $(\dot{K})$ is a linear combination of desired investment per unit of capital (I/K) and desired savings per unit of capital (S/K)

$$(11) \quad \dot{K} = a(I/K) + (1 - a)(S/K)$$

where $0 < a < 1$ when there is excess aggregate demand. Substituting the prices change equation (3) into equation (11)

$$(12) \quad \dot{K} = a(\dot{P}/b) + S/K$$

Substituting equation (12) into equations (5) and (6)

$$(13) \quad \log(L/K) = n - a(\dot{P}/b) - S/K$$

$$(14) \quad \log(M/PK) = \dot{M} - \dot{P} - a(\dot{P}/b) - S/K$$

Substituting equation (2) into equations (13) and (14)

$$(15) \quad \log(L/K) = n - a(\dot{P}/b) - f(L/K, M/PK)$$

$$(16) \quad \log(M/PK) = \dot{M} - \dot{P} - a(\dot{P}/b) - f(L/K, M/PK)$$

In order to close the system, the relation between $\dot{P}$ and the va-

riables (L/K) and (M/PK) can be derived if an hypothesis concerning the price expectations formation is imposed. This hypothesis can be written as

$$(17) \quad \dot{P} = P((L/K), (M/PK); n, \dot{M})$$

Substituting (17) into equations (15) and (16), the Keynes-Wicksell model in its dynamic form becomes

$$(18) \quad \log (L/K) = n - (a/b) P(L/K, M/PK; n, \dot{M}) - f(L/K, M/PK)$$

$$(19) \quad \log (M/PK) = \dot{M} - (1 + a/b) P(L/K, M/PK; n, \dot{M}) - f(L/K, M/PK)$$

From these differential equations two basic results can be derived, first, the effect of an increase in the rate of monetary expansion on the steady-state value of capital intensity is ambiguous and depends on the speed of market adjustment (b) and on the difference between ex-ante desired investment and savings; second, in order to sustain long-run economic growth, the optimal policy is an inflationary increase in money supply.

The speed of market adjustment, unlike in the neoclassical model, becomes crucial in the Keynes-Wicksell model. If $\dot{M}$ raises faster than $\dot{P}$, we have two countervailing effects on capital intensity: $(\dot{M} > \dot{P})$ decreases desired savings, thus, lowers the capital intensity, but, at the same time, the increase in real balances tends to rise the capital intensity. The net effect on the capital intensity, then, depends on the effect that is dominant in the process.

On the other hand, a high speed of market adjustment ($\dot{M} = \dot{P}$) will decrease real balances, and, hence, increase desired savings.

This increase in capital intensity will be pushed further by the raise in desired investment due to prices increase. In the latter case, then, an increase in the rate of monetary expansion unambiguously results in an increased capital intensity.

Therefore, in order to justify the optimal monetary policy of the Keynes-Wicksell model we need one of two alternative conditions:

- (i) A high speed of market adjustment of prices when there exists excess demand in the commodity market; or
- (ii) A desired investment effect dominant over the counter-vailing desired savings effect, when there exists a slow speed of market adjustments.

A Comparison of the Traditional Views

The fact that Neoclassical and Keynesian approaches end up with different conclusions about the role of money in economic growth -although both refer to the same theoretical framework of a developed economy- is due to the differences of the assumptions underlying the markets on which the transactions take place.

Both approaches share in common the belief that transactors tend to distribute their wealth between the available assets in the economy, including money. If the proportion of real balances held in the portfolios is disturbed, a process of substitution between

assets takes place so as to restore the equality of marginal advantages of each asset. It is this common belief that makes traditional monetary growth theories -whether they be monetarist or Keynesian- irrelevant for the analysis of money on the structural framework of an underdeveloped economy.

In the theoretical framework of a developed economy, the distinction between the monetarist and Keynesian approaches, as expressed in the neoclassical and Keynes-Wicksell models, lies in the different assumptions regarding the markets on which the process of asset-substitution takes place.

In this context, the two basic differences on these assumptions are:

- (i) The monetarist approach assumes identical investment and savings functions, whereas in the Keynesian approach the investment and savings functions are independent;
- (ii) The monetarist approach assumes market equilibrium, whereas the Keynesian approach assumes market disequilibrium.

As stated above, the differences in these fundamental assumptions result in different conclusions regarding the effect of a change in the rate of monetary growth on the rate of capital intensity, and regarding the optimal rate of monetary growth. However, this study is not concerned with the different assumptions of the monetarist and Keynesian approaches nor with the differences in the

conclusions of these two approaches.¹ Our concern is that these traditional portfolio approaches -whether they are expressed as equilibrium or disequilibrium models- are designed only for developed economies with perfect capital and financial markets, and homogeneous inputs and outputs.

The characteristics of a developed economy are in fact the necessary theoretical background in order to treat money and physical capital as substitutes of wealth-holding. This substitution effect, in its turn, becomes crucial to justify the assumptions common to both approaches with regard to the demand for money function and the savings propensity. Indeed, both approaches treat the level of desired real money balances as negatively related to the marginal product of capital, and the average propensity to save as a constant not directly affected by the interest rates. These assumptions are not applicable to a developing economy, where the economic structure and financial characteristics make the substitution effect questionable.

AN ALTERNATIVE APPROACH

In light of the different economic structures of underdeveloped economies, Shaw and McKinnon have suggested that the "substitution effect" of traditional monetary theory may have no relevance for such economies.

¹For an extensive description of these differences, see Stein('70), Fisher(20), Hadjimichalakis(34).

Shaw repudiates the substitution effect by denying the validity of the neoclassical view in which real money balances are regarded as wealth due to their productive character. He regards money as a debt of the monetary system instead of wealth to society. The monetary system and non-monetary financial institutions form an intermediary sector which becomes the recipient of a surplus sector -i.e. a sector where savings exceed investment in physical capital- by issue of its own debt including money. According to this debt intermediation view, the monetary system plays an important role as an intermediary between savers and investors. In a developing economy, then, where capital markets are not well developed, repression of financial markets is bound to retard economic development.

McKinnon, on the other hand, argues that the substitution effect is not valid over the entire range of returns on holding money and real rate of returns on physical capital, because money balances and physical capital may be complementary over the range on which self-financed, lumpy investment expenditures require high money balance holdings. In this range, money balances are viewed as a "conduit" through which capital accumulation takes place, therefore, investment will be negatively related to the cost of holding money and positively related to the nominal interest rate on money deposits. The conduit effect defines the real return on money balances, r' , as positively related to investment up to a certain point

where the real return of money and investment are equalized. Beyond that point the substitution effect becomes dominant.

In this manner, McKinnon emphasizes the possibility of a complementary effect instead of a substitution effect, by the same token that Shaw emphasizes the debt-intermediation view instead of the wealth-view. Both analyses are complementary as far as the role of money in an underdeveloped economy is concerned. However, the terminology used is different. Shaw refers to a "lagging economy" to emphasize the belief that the economic policies of underdeveloped countries tend to keep aggregate levels of income and wealth at a low level; while McKinnon uses the term "fragmented economy" to emphasize the fact that different sectors and economic units are isolated from each other and, thus, that they face different effective prices, marginal products and a different term structure of interest rates. In what follows we avoid the use of different terminology consolidating both terms under the term "underdeveloped economy".

The basic theoretical point of the consolidated Shaw-McKinnon view against the traditional view is that the complementarity between real money balances and physical capital cannot be explained within the theoretical framework used by the monetarist and Keynesian theories as long as they assume perfect capital and financial markets, whereas in underdeveloped economies such markets are almost non-

existent, and, therefore, physical investment must be mostly self-financed.¹ Furthermore, those traditional theories assume perfectly divisible capital with homogeneous rates of return, whereas in underdeveloped economies the real rates of return have a much wider scope.

In fact, the complementarity between money and physical capital is the crucial theoretical basis for the construction of an alternative demand function which, in its turn, constitutes the initial function for the construction of a model to interpret the Shaw-McKinnon view.

The Shaw-McKinnon Model

The Shaw-McKinnon hypothesis on the function of money in underdeveloped economies can be clearly contrasted with the traditional hypothesis by considering the traditional per capita demand for money function

$$(1) \quad (M/Pn)' = f(r)$$

where $(M/Pn)'$ is the demand for real balances on per capita terms, and r is the marginal product of capital. As stated above, the traditional substitution hypothesis assumes an interest rate elasticity of negative sign, while the complementary hypothesis assumes a positive elasticity up to certain range. In fact, the possibility of a positive sign in the first derivative of the function constitutes the heart of the Shaw-McKinnon approach.

¹An economy completely dependent on self-finance (i.e. where each saver manages his savings directly) can be compared with a developed economy in which savers hold claims on a depository intermediary.

More specifically, Shaw and McKinnon emphasize the case for underdeveloped economies in which almost all economic units are confined to self-finance indivisible investments, thereby in the demand for money function

$$(2) \quad (M/P)' = L(Y, I/Y, i - \dot{P}^2)$$

all the partial derivatives are assumed of positive sign. According with the view of complementarity between real money balances and physical capital, the investment to income ratio (I/Y) is positively correlated to the average return on capital. Furthermore, the average return to capital, $\bar{r}$, which increases with technical improvement -or "green revolution"- is related to a rise in the desired investment to income ratio, and, thus, to a rise in desired real money balances

$$(3) \quad (M/P)' = L(Y, \bar{r}, i - \dot{P}^2)$$

where, again, all the partial derivatives are of positive sign in the range where the complementary effect is dominant. In other words, in the range where the marginal rate of return on capital is not an opportunity cost to the desired holdings of real money balances. Therefore, since an increase in ($\bar{r}$) leads to an increase in desired investments, an increase in the marginal product of capital leads to an increase in desired real balances, so that money and physical capital are complements.

Furthermore, this complementary effect also means that the tradi-

tional conclusion that the average propensity to save is a constant not directly affected by the interest rates, is not relevant in underdeveloped economies. The traditional conclusion, indeed, is only applicable to a developed economy where all economic units have access to sources of finance at homogeneous rates of interest, and where perfect markets continuously equalize desired demand to supply of financial assets, so that the propensity to save is not affected directly by the interest rates on money holdings. However, in an underdeveloped economy, where capital and financial markets are at best not well-developed, the accumulation of real money balances becomes the only source of self-finance.

In other words, real balances are basically the only available financial asset to wealth-holders, and, therefore, the propensity to save is directly and positively correlated to the return on money balances. In terms of the traditional investment function

$$(4) \quad I = sY - (1 - s) (\dot{M} - \dot{P})M/P$$

the annual flow of investment in physical capital (I) could not be necessarily reduced by an increase in M/P if the last is due to an increase in the return on money balances, which, in its turn, increases the propensity to save. Although the coefficient of M/P is still positive ($(1 - s)(\dot{M} - \dot{P}) > 0$), it has a smaller absolute value, so that the net effect could be positive. In short, the "competing asset" effect is questionable if the propensity to save is affected by the real return on money holdings.

The Shaw-McKinnon hypothesis, then, rests on the positive influence of the return on money balances on desired savings to income ratios. The return on money balances, r' , depends on three factors: on the nominal interest rate on deposits, i ; on the services of money as a transactions instrument and as a store of value, i' ; and on the expected rate of inflation, $\dot{P}^e$.

$$(5) \quad r' = i + i' - \dot{P}^e$$

An additional departure of this approach from the traditional monetary growth theory is the definition of optimal monetary growth.¹

In the monetarist approach the optimal rate of monetary growth is given at that level where the marginal productivity of money disappears, that is, where the full-liquidity rule is met. In the Keynesian approach the optimal rate of monetary growth is inflationary, provided there exists a high speed of market adjustment; or a desired investment effect dominant over the countervailing desired savings effect, in the case where the speed of market adjustment were slow.

In the Shaw-McKinnon approach the rate of monetary growth is optimal where the earnings of the monetary system, after provision of all cost, is exhausted. The exhaustion of earnings of the monetary system does not imply full-liquidity; because the cost of producing money is taken into consideration. It does not imply inflationary growth either, because the increase of the supply of money

¹For an extensive explanation of the different growth strategies within the traditional monetary theories, see: Johnson(43), Marty(49), Sidrausky(67), Stein(72), Diamond(12), Nagatani(55).

is absorbed by an increase of desired real money balances. In fact, the explanation for the causes of inflation in the Shaw-McKinnon approach is basically monetarist, in the sense that the rate of inflation is fundamentally a consequence of the supply of nominal money rising faster than the quantity of real balances that would have been demanded had the price level remained constant. The solution for ending inflation is, then, a reduction in the rate of expansion of nominal money. However, this measure for reducing or eliminating the inflation rate is not considered optimal in the Shaw-McKinnon approach, since it would provoke a fall, at least temporarily, in real output. The explanation for this fall in real output is based on the assumption that in underdeveloped economies, due to the lack of financial markets, the only source of financing investments, besides self-finance, is the commercial banking system, in which the only sources to promote credit are available nominal deposits. To quote McKinnon:¹

"Deflation of aggregate demand will be self-defeating if it creates bottlenecks in the aggregate supply of goods and services. After all, the price level will fall (or stop rising) only if the aggregate demand for goods and services is reduced relative to their aggregate supply. Hence any measure that accentuates "financial repression," by reducing the already limited efficiency of

¹McKinnon(51), pp. 87. This explanation can be contrasted with the traditional explanation of a short-run fall in the level of real output based on the "Phillips Curve".

the bank-oriented capital markets, will be inordinately expensive. It may cause the aggregate supply of goods and services to fall faster than the fall in aggregate demand and thus frustrate attempts to stabilize the price level."

Nevertheless, deflating is a priority in the Shaw-McKinnon approach. However, their recommendation is directed to deflating by increasing the demand for money through an increase in the real rate of return on money balances, rather than by reducing the supply of money. They show that the growth rate is maximised when the real return to holding money is raised to its highest feasible value. This occurs when the real loan rate is correspondingly raised to equality with the real profit rate. The optimal rate of inflation is likely to be low, given the reluctance of authorities to compensate for inflation by appropriate adjustment in the nominal deposit and loan rates.

This low optimal rate of inflation can be also contrasted with the higher optimal rate of inflation resulting from the Keynesian policy recommendations that deal with an increase in the rate of monetary growth as the correct measure to stimulate the employment of unused factor endowments.

In the Shaw-McKinnon approach the demand for money is increased only by increasing the difference between nominal rates and the rate of

inflation, therefore, a high rate of inflation would require an even higher rate of growth of nominal interest rates, which is not likely to be potically feasible due to the resulting higher increases in the loan rates of interest.

More formally, the rate of output growth, within the Shaw-McKinnon model, can be expressed as a function of the rate of return on money balances. The use of a modified version of the Harrod-Domar model of equilibrium growth becomes appropriate. Such model introduces a simple production function

$$(6) \quad Y = kK$$

where Y is the aggregated real output, k is a constant that represents the output to capital ratio, and K is the stock of physical capital.

McKinnon points out that:¹

"Within our financial approach to economic development, the output/capital ratio could actually rise when new investment is accompanied by suitable monetary expansion; or investment could be subject to diminishing returns in the classical sense. For analytical simplicity, however, ... (the output/capital ratio) ... is assumed to be constant."

Differentiating equation (6) with respect to time

$$(7) \quad dY/dt = k(dK/dt) = k I$$

¹McKinnon(51), pp. 125

dividing by Y to get the rate of output growth

$$(8) \quad (dY/dt)/Y = \dot{Y} = k I/Y$$

the investment propensity in the unmodified Harrod-Domar model is a fixed proportion of income

$$(9) \quad I = dK/dt = sY$$

However, in the Shaw-McKinnon approach the propensity to save is a function of the rate of output growth, the average returns on capital, and the rate of returns on money balances

$$(10) \quad s = s(\dot{Y}, \bar{r}, i - \dot{P}^2)$$

where the first derivatives with respect to $\dot{Y}$ and with respect to $\bar{r}$ are positives, but the first derivative with respect to $(i - \dot{P}^2)$ is positive only where the substitution effect is not dominant.

Substituting equation (10) into (9) and dividing both terms of the resulting equation by Y

$$(11) \quad I/Y = s(\dot{Y}, \bar{r}, i - \dot{P}^2)$$

then, from equation (8) we obtain

$$(12) \quad \dot{Y} = k.s(\dot{Y}, \bar{r}, i - \dot{P}^2)$$

as the rate of output growth.

A Comparison with the Traditional Approach

The fundamental differences between the traditional and the Shaw-McKinnon approaches are two fold: First, a completely different

economic framework of reference; Second, -a consequence of the first- a different hypothesis about the function of money in the economy. The traditional approach refers to a developed economy with perfect capital and financial markets and homogeneous inputs and outputs. Such economic framework justifies the assumption of a constant propensity to save, and the development of a model where money is a "competing asset" on the portfolios of wealth-holders, so that the demand for money is inversely correlated to the marginal product of capital.

The Shaw-McKinnon approach, on the contrary, refers to an underdeveloped economy whose capital and financial markets are also underdeveloped, and, therefore, most of the lumpy investment expenditures must be self-financed.¹

In this environment, then, demand for real balances is positively related to the marginal product of capital, and money becomes a complement of physical capital.

The differences in the hypotheses about the role of money in the economy are also easily contrasted. In the traditional approach, money is used mainly because it is a medium of exchange; while in the Shaw-McKinnon approach, money is used mainly because of its store-of-value property. The theoretical justification for the latter hypothesis is given by the fact that the process of accumulating capital in underdeveloped economies is possible only through the higher monetization of the system.

¹In what follows, we use the term "self-finance" also to refer to the use of "informal" capital markets. For example, money lenders, Cooperativas de Ahorro, rich relatives, and so forth.

2 CAUSES OF INFLATION

In Latin America there are two theories that try to explain the impact of inflation on economic development. Namely, the "monetarist" and "structuralist" theories that give rise to quite different explanations of the causes of inflation, and to alternative economic policy recommendations. The "monetarist" position explains inflation in terms of an excessive growth of the money supply as a consequence of fiscal deficits and easy credit. Its economic policy recommendations are directed to obtaining price stability as a necessary step to achieve economic development.

The "structuralist" position explains monetary expansion not as a cause but as a consequence of changes in the real sector of the economy, and, therefore, its policy recommendations are not directed against inflation as such, but against those structural factors that deny a balanced development in the monetary and real sectors of the economy.

In this section we analyze this question in more detail, since we are interested to know if any of those factors could help us interpret the present economic conditions of Ecuador. A presentation of the viewpoint of any school of thought, however, is a task that always remains incomplete, if not in absolutes, at least in relatives, this is especially true when there exists an alternative school of thought.

The case in point, the monetarist-structuralist controversy, is no exception to the rule. Their viewpoints are overlapping on certain issues, while pointing in opposite directions on others. One could boil down the matter to a simple question: is inflation in Ecuador incompatible with economic growth? Only that in this case each theory would answer the question by using two completely different frameworks of economic analysis, as Dudley Seers has pointed out:¹

"At the heart of the controversy between "monetarists" and "structuralists" are two different ways of looking at economic development, in fact two completely different attitudes toward the nature of social change, two different sets of value judgments about the purposes of economic activity and the ends of economic policy, and two incompatible views of what is politically possible."

Nevertheless, in the context of this study such a dichotomy is avoided since we are interested only in those propositions that are empirically testable. With this in mind, our purpose here is to emphasize the quantitative aspects of the "monetarist" and "structuralist" theories that are applicable in the Ecuadorean context.

¹D. Seers(64) pp. 89

The Monetarist Viewpoint

The monetarist viewpoint of inflation is more orthodox. This theory explains inflation as the consequence of the supply of nominal money growing at a faster rate than the growth of real output. This process can lead to distortions in market-prices in the short-run and, thus, to misallocation of resources in the long-run.¹

In the context of the Ecuadorean economy a monetarist would agree that since in Ecuador -and for that matter, in any underdeveloped economy- there is no market for primary securities,² the only way that the individual saver can protect his nominal assets against inflation is by investing in unproductive investments like housing, gold, consumption of durables, and accumulation of inventories.³ Since this form of savings allocation does not increase the productive capacity of the economy, the conclusion is obvious: there exists a substitution effect between the original cause of inflation -namely, the increase in the rate of growth of the nominal money supply- and the amounts of savings that otherwise had gone into productive investment.

The monetarist policy recommendations emphasize the curtailment of government expenditures and the elimination of subsidized credit, as the basic approach to reduce the level of inflation and distortions in market prices. The monetarists ad-

¹For an extensive summary of the monetarist viewpoint see Roberto Campos(8) pp. 69-73

²i.e., there is not an organized domestic financial market that provides liquid assets at attractive real yields.

³i.e., through the acquisition of inflation-hedges.

mit that such a policy would have a short-run demand-stagnation effect, but this is considered a short-run sacrifice since wiping out price distortions will generate room for a more healthy economic growth in the long-run.

The Structuralist Viewpoint

The structuralist theory was developed in the early 50's by a group of economists working for the CEPAL (Comisión Económica para América Latina), and, today, it is strongly identified with such authors as Raúl Prebisch, Osvaldo Sunkel, David Felix, Dudley Seers, and Celso Furtado, among others.

Their basic argument is that changes in the rate of monetary expansion are just a consequence of the real forces inherent to the process of economic development. As Dudley Seers argues:¹

"Changes in the supply of money are, generally speaking, the expression of real forces acting in the economy."

The "real force" acting as the source of rising prices are es-

¹Dudley Seers(65) pp. 25

pecially identified with the agriculture, foreign trade, and government sectors. The agricultural sector is regarded as "supply inelastic" due to the slow growth of productivity, the foreign trade sector is regarded as "demand inelastic" so that the main cause of depreciation is due to the deficient foreign demand for primary product exports, and the government sector is regarded as "permanent deficitary" as a result of an income inelastic taxation system.¹ In short, because of the inelasticities and structural bottlenecks inherent to an underdeveloped economy, budgetary deficits and credit expansion are inevitable and correlated to the process of development.

Under the structuralist argument there is little room for monetary policy. In fact, from the structuralist point of view, monetary policy should not play an independent role, but it should be completely subordinated to policies of the fiscal type. The latter should include, prices, interest rates and imports controls, subsidies to import substitution industries, reforms on the income taxation system and on land distribution, incentives to foreign capital inflows, transfers and tariff protection for infant industries, subsidized credit and tax concessions for "development" industries, allocating foreign exchange in favor of capital goods and raw materials for facilitating domestic investment, tax reforms and other measures to raise the level of savings, and so forth.

¹In Ecuador, during 1973-75, the Government had a surplus due to increases of petroleum revenues. See Table B-4.

The structuralist argument fails to provide a formal model to justify its basic premise: that inflation is inherent to the process of development.¹ However, in the next section we review the main structuralist hypotheses that, using Ecuadorian statistical data, can be subject to empirical testing.

¹It should be pointed out that the above exposition is a highly abbreviated synthesis of structuralist views. For a more detailed exposition see, for example, D. Seers (65).

The Empirical Testing:

The Monetarist Hypothesis.

In the Latin American monetarist framework, inflation is generated by both money financed government deficits as well as expansion of the Central Bank's loans to both private and public sectors. Government investment financed by monetary expansion is regarded as inflationary because in the short term the investment adds more to the demand for goods than it does to the level of real output of the economy.¹ However, an increase in the rate of monetary expansion in excess of the growth of output does not necessarily involve inflation if the demand for money as a proportion of income is also increasing. This should be evident from the analysis of the equation of exchange:

$$1) MV = Py$$

where M is the nominal money supply, V is the income velocity of money, P is the general price level of final output, and y is the final real output. Defining $D(= 1/V)$ as the demand to hold money per unit of income, we can re-write equation (1) as:

$$1') M = DPy$$

taking rates of growth of the variables in equation (1') we obtain:

$$2) \dot{M} = \dot{D} + \dot{P} + \dot{y}$$

we can then see that if the demand for money per unit of income is increasing ($\dot{D} > 0$), the rate of monetary expansion may be bigger than the growth of output ($\dot{M} > \dot{y}$) without the price level rising.

¹Raymond Mikesell (52) pp. 152.

This possibility has been examined by Arnold Harberger¹ in "El Problema de la Inflación en América Latina." Harberger² also tested the monetarist approach assuming an exogenously determined money supply, and assuming that the demand for money is a function of the price level, the level of real income, and the cost of holding cash. Given the level of real income and the cost of holding cash, the price level will adjust to equate the demand for money to an existing supply.

Since the analysis refers to determination of the inflation rate rather than the price level, the percentage change in the price level, $\dot{P}$, is expressed as a function of the percentage change in real income, $\dot{y}$, the percentage change in the quantity of money³ during the current period, $\dot{M}_t$, and in the past period, $\dot{M}_{t-1}$.

$$3) \quad \dot{P}_t = a - by_t + c\dot{M}_t + d\dot{M}_{t-1}$$

where the effects of increases in the money supply on the price level are assumed to occur over time and, thus, money supply enters the equation in the form of a distributed lag.

A second equation considers the percentage change in the price level during the current period minus the percentage change du-

¹Arnold Harberger (38)

²Ibid (39)

³Money is defined in the narrow sense (i.e. currency plus demand deposits).

ring the last period, and a variable representing the expected change in the cost of holding cash, A_t (i.e., the expected change in the price level).

$$4) \dot{P}_t = a' - b'y_t + c'\dot{M}_t + d'\dot{M}_{t-1} + eA_t$$

Lastly, in a third equation he includes as independent variable, W , which is the percentage change in the Sueldo Vital (Minimum Wages).¹

$$5) \dot{P}_t = a'' - b''y_t + c''\dot{M}_t + d''\dot{M}_{t-1} + e'A_t + fW_t$$

Other studies have used the Harberger model with results generally confirming the findings of Harberger's original work. For example, Robert Vogel² estimates Harberger's basic equation using statistical data for sixteen Latin American countries for 1950-1969. The results were as follows:

$$6) \dot{P}_t = .031 - .298y_t + .586\dot{M}_t - .407\dot{M}_{t-1} + .014A_t \quad R^2 = .82$$

(3.1) (17.0) (11.1) (0.4) D.W.=1.55

where "t" values appear in parentheses.

Those results, in general, support Harberger's hypothesis of a strong correlation between the rate of inflation, the rate of real income change and the rate of money supply change, therefore, support the monetarist view of inflation. Those regressions were

¹Using annual data for Chile, Harberger obtains the following statistical results:

$$3) \dot{P} = -1.05 - 1.05y + .8\dot{M} + .34\dot{M}_{-1} \quad R^2 = .84$$

$$4) \dot{P} = -.32 - .91y + .74\dot{M} + .34\dot{M}_{-1} + .20A \quad R^2 = .87$$

$$5) \dot{P} = -1.15 - .89y + .70\dot{M} + .29\dot{M}_{-1} + .16A + .13W \quad R^2 = .87$$

²R. Vogel (84)

estimated using statistical data for Ecuador for 1948-1976:¹

$$\begin{aligned}
 7) \quad \dot{P}_t &= .030 - .255\dot{y}_t + .209\dot{M}_t + .300\dot{M}_{t-1} & R^2 &= .85 \\
 & (.008) (.115) \quad (.041) \quad (.037) & D.W. &= 2.13 \\
 8) \quad \dot{P}_t &= .027 - .179\dot{y}_t + .217\dot{M}_t + .295\dot{M}_{t-1} + .161A_t & R^2 &= .86 \\
 & (.009) (.136) \quad (.042) \quad (.037) \quad (.153) & D.W. &= 1.95
 \end{aligned}$$

where all the coefficients of equation 7 are statistically significant (standard errors appear in parentheses). In equation 8 the percentage change in real income's coefficient is significant at the 10 percent level, while variable A's coefficient (which "t" statistic is 1.05) is significant at the 15 percent level.

These results, in general, confirm the monetarist hypothesis that an increase in the rate of monetary expansion, or a decline in the rate of output growth, results in an increase in the inflation rate. Nevertheless, using Ecuadorian data, the constant term is significantly different from zero, therefore, if real income and the money stock remain constant, the price level would not remain constant. This result would suggest that the inflation rate is not totally dependent on monetary factors.

One other particular that should be pointed out, is the fact that the results show little relationship between the actual rate of inflation and the proxy for expected changes in the price level (first difference of the logs of lagged price-levels changes).

¹The Sueldo Vital variable was omitted because, in Ecuador, minimum wages legislation has been operative only in three occasions, and, in each case, the period has been smaller than two years.

Anibal Felix¹ has suggested that, in the Latin American context, the expected changes in a unit of purchasing power, the reciprocal of the price level (i.e., $E(1/P)$), is more relevant to express the cost of holding cash, than expected changes in the price level itself. This method was employed to re-estimate equation 8 with the following results²

$$8)' \quad \dot{P}_t = .035 - .181\dot{y}_t + .206\dot{M}_t + .214\dot{M}_{t-1} - .092A'_t \quad R^2 = .85$$

(.0075)(.105) (.082) (.079) (.084) D.W. = 1.91

where the coefficient of A' is, again, not statistically significant. The coefficients of the other variables, on the other hand, were statistically significant at the 5 percent level (standard errors appear in parentheses).

Several comments can be made about the use of these equations to test the basic sources of inflationary pressures, where the latter are defined as the change in the level of real income, the change in the rate of monetary expansion, and the costs of holding cash.

First, in the context of the Monetarist-Structuralist controversy we are interested to test for inflationary pressures arising from both monetarist and structuralist sources. Therefore, the structuralist variables must also be included. Second, a number

¹Anibal Felix(19)

²Other methods were also embodied on equation 8, but they did not improve the explanatory power.

of empirical studies (to be discussed below) suggest that the definition of money in the broad sense (M_2) is more relevant for the Ecuadorean economy.

Third, the inclusion of broad money determines that the cost-of-holding-money variable should consider the real rate of return (i.e., the expected rate of inflation as well as the interest rate).

Fourth, the empirical findings that link prices to money supply is also consistent with the structuralist view that money supply is responding to prior inflation. Thus, a more rigorous analysis must test also the direction of causality.

In short, these empirical results suggest a strong relationship between output, money, and inflation. However, they do not test for a structural source of inflation, nor do they test direction of causality. In this study, we will attempt to overcome these shortcomings. In the next section we isolate the structuralist views that are susceptible of empirical testing.

The Structuralist Hypothesis

The structuralist viewpoint that a reduction in the rate of monetary expansion induces a fall -at least temporary- in real output, can be also explained with the use of the quantity theory equation expressed as the percentage rate of change over time

of the variables¹

$$\dot{M} + \dot{V} = \dot{P} + \dot{y}$$

In this relationship, if the monetary authorities determine a decrease in the rate of monetary expansion, (to a lower but still positive number) the demand for money as a proportion of income is expected to increase. As a result, $\dot{V}$ becomes negative. If the rate of change of income velocity of money becomes sufficiently strongly negative, the right hand side of the equation also turns negative.² The structuralists, then, argue that prices, at least in the short-run, are downward sticky, thus, the adjustment must be borne by a decrease in the rate of real output growth.

In sum, because aggregate demand in nominal terms declines with the decline in the rate of monetary expansion, and, because structural and institutional factors determine downward inflexibility of prices: a decrease in government expenditure, or a decrease in Central Bank loans to the public and private sectors, which result in a decrease in the rate of monetary expansion, is borne by a decrease in production. This result, so goes the argument, is not politically feasible in Latin American countries, even in the short-run. The conclusion seems plausible in the Ecuadorean context, if indeed the right hand side of the equation turns negative during the process; and, if indeed prices are downward

¹The notation has been already defined, so, there is no need to repeat it again.

²For a detailed explanation of this process see M. Darby(11). Especially Chapter 7.

inflexible even when facing excess supply.

Although the assumption that prices are downward inflexible is important for the debate, the structuralists do not justify it theoretically. In general, downward inflexibility of prices is ascribed to the pervasiveness of imperfect competition and to the existence of structural bottlenecks in the economy. The definition of the sectors with imperfect competition, and structural bottlenecks, presumably depends on the specific country.

It should be pointed out that, for structuralists, the process of adjustment of relative prices affects the absolute price level:¹

"Any movement of relative prices determined by a change in the conditions of supply will similarly produce, if money prices are rigid downwards, an increase of the general price-level."

In the context of the Ecuadorean economy, the existence of structural bottlenecks must be identified with the agricultural sector.²

Therefore, to test the structuralist hypothesis, relative prices should be defined in terms of prices in the agricultural sector to prices in the non-agricultural sector.

This definition, which allows the empirical test of the structuralist hypothesis, represents a simplification of the structuralist hypothesis.

¹J. Olivera (59) pp. 326

²The agricultural sector constitutes the most important sector in the economy. See Table B-1 .

lists viewpoint, since they assume that structural bottlenecks exist also in the foreign trade and manufacturing sectors. In the case of Ecuador, however, the relatively backward sector is the agricultural sector. Furthermore, for some structuralists, the main causes of underdevelopment are identified with the agricultural sector.

To quote a prominent structuralist:¹

"The lag in agricultural production and productivity ..(in Latin America).. has a decisive influence on the rate of growth of GDP, both because agriculture still represents a large proportion of GDP and because rural stagnation tends to limit industrial expansion; it is a basic cause of inflationary pressure and balance of payments difficulties; it obstructs the improvement of urban income distribution because of the tendency of relative agricultural prices to increase and because concentration of property in agriculture tends to maintain a high concentration of income in this activity."

The selection of the agricultural sector as the relatively backward sector in the Ecuadorean economy permits the construction of a model for the empirical test of the structuralist argument that relative prices influence the absolute price level.

¹0. Sunkel(73) pp. 75

To test the structuralist position we introduce into equation 7, as independent variable, the price ratio of agricultural to non-agricultural goods, (P'/P) .

$$9) \dot{P}_t = a + b\dot{y}_t + c\dot{M}_t + d\dot{M}_{t-1} + e(P'/P)^2_t$$

where $(P'/P)^2_t$ is the percentage change of the (P'/P) ratio over time.¹

Equation 9 embodies the rate of change of the relative price of agricultural goods into Harberger's equation. Regression analysis can be used to test the structuralist view that upward pressure in the agricultural sector produces a rise in the price of agricultural goods relative to the price of non-agricultural goods. An increase in the (P'/P) ratio will dictate a higher inflation rate. Or, as the structuralists claim: "Agricultural bottlenecks are a basic cause of inflationary pressure." The structuralist view will be consistent with a finding of a positive and significant coefficient of the $(P'/P)^2$ variable.

Since the agricultural sector is the most important sector of the Ecuadorian economy² (it could exist intercorrelation between the percentage change in real income, $\dot{y}$, and the price ratio of agricultural to non-agricultural goods, (P'/P)) an equation that excludes the first variable was also tested,

$$10) \dot{P}_t = a' + c'\dot{M}_t + d'\dot{M}_{t-1} + e'(P'/P)^2_t$$

¹i.e., $(P'/P)^2_t = (P'/P)_t - (P'/P)_{t-1} / (P'/P)_{t-1}$

Note: The other variables have already been defined (see pp.34).

²See Table B-1.

The statistical values used to represent the variable P'_t were data on price indexes for seventy two agricultural commodities (13 of which are considered as major crops and 59 as minor crops)¹

The variable P_t was represented by statistical data on price indexes for non-agricultural goods.²

The statistical results were as follows:³

$$9)' \dot{P}_t = .036 - .176\dot{y}_t + .211\dot{M}_t + .202\dot{M}_{t-1} + .121(P'/P)^2_t$$

(.0065) (.106) (.047) (.041) (.224)

$$R^2 = .86$$

$$D.W. = 1.75$$

$$10)' \dot{P}_t = .019 + .238\dot{M}_t - .301\dot{M}_{t-1} + .232(P'/P)^2_t$$

(.001) (.006) (.038) (.225)

$$R^2 = .58$$

$$D.W. = 1.86$$

where standard errors appear in parentheses.

¹See Table B-6.

²More specifically, the data refers to manufacturing, mining, electric energy, transportation, services and unclassified goods.

³The inclusion of the $(P'/P)^2$ variable also implies that the economy is not always at full employment, an assumption consistent with the case of Ecuador. An economy that is continuously at full employment requires an instantaneous price adjustment, but if prices adjust instantaneously throughout the economy, there would be no observable differences between changes of the price level in the agricultural sector and changes of the price level in the non-agricultural sector.

The results show a positive coefficient for the $(P'/P)^2$ variable in both equations. However, it is not significantly different from zero.¹

From these results, it seems that only excess aggregate demand is able to influence the price level, as the monetarists claim. The statistical results, then, do not support the structuralist argument that relative prices affect the absolute level of prices. Nevertheless, we are not able to reject the structuralist theory, since the assumption of relative prices effects on the absolute price level is a sufficient, but not a necessary condition to a structuralist theory of inflation.

As stated above, an alternative formulation of the structuralist approach is given by an endogenous money supply, passively responding to variables of the fiscal type. More specifically, since the government must print money to support its fiscal expenditures as the only avenue to increase tax collection, any attempt to maintain the real level of its deficits when the price level is rising, causes an increase in the money supply. In short, causality runs from past inflation to increases in the actual money supply.

The precise mechanism through which the money supply responds to the price level is not defined in the structuralist literature,

¹The coefficients of the other variables were statistically significant at the 5 percent level.

however, a test of causality is performed in the next section to analyse the possibility of a feedback from the price level to the money supply.

A method to test causality is given by the Post Hoc Ergo Propter Hoc principle. It should be pointed out, that this principle may also be valid to test the monetarist assumption that money supply is exogenous since in the monetarist framework the government is viewed as setting the money supply to finance government expenditure and, thus, determining the level of aggregate demand. Accordingly, an exogenous money supply variable can be entered directly into the inflation equation.

This method was used by C. Sims¹ to analyse the causal feedback between nominal GNP and the money supply for the United States in the postwar period. His results permitted him to reject the assumption of a feedback from the price level to nominal output, and supported the neoclassical assertion that money supply is an exogenous variable. To quote Sims:²

"No evidence appears to contradict the common assumption that money can be treated as exogenous in a regression of GNP on current and past money."

On the other hand, J. Tobin³ rejects the Post Hoc Ergo Propter Hoc principle to analyse the assertion attributed to Milton Friedman⁴

¹See C. Sims(69)

²C. Sims(69) pp. 550

³J. Tobin(80)

⁴See, for example, M. Friedman(24), M. Friedman(25), M. Friedman and A. Schwartz(27)

that money or its rate of change tends to "lead" income. To quote J. Tobin:¹

"Milton Friedman asserts that changes in the supply of money M (defined to include time deposits) are the principal cause of changes in money income Y."

Tobin, however, suggests that changes in the money supply may be a passive response to income changes generated by autonomous investment and changes in money income.

In the next section a test of causality between money and prices in the context of the monetarist-structuralist controversy is performed for the Ecuadorian case.

A Test of Causality

An empirical test of causality between money and prices may have three alternative outcomes. First, the test may not permit us to rule out feedback from the money supply to the price level nor from the price level to the money supply. Second, the test may indicate potential causality from prices to money supply only. Third, the test may indicate an impact of money supply on prices only.

The first possible outcome does not permit a rejection of either of the two hypotheses of feedback between prices and money. This finding is consistent with an inflation that arises from moneta-

J. Tobin(80) pp. 301

rits as well as structuralist sources. In this case, a passive money supply occurs if monetary authorities validate shifts in the expected rate of inflation due to political, or other non-quantitative, developments. In short, this outcome suggests that structuralist factors also affect money supply and hence inflation.

The second possible outcome supports the structuralist hypothesis since it reflects the existence of a mechanism determining the inflation rate that depends on non-monetarist factors. However, it should be pointed out, structuralists agree with monetarists that the supply of money and the price level have a positive correlation. The difference is that structuralists believe that the money stock is responding to inflation rather than initiating it. The third possible outcome supports the monetarist position that there is no feedback from prices to the supply of money. That is, in the short and long-run the rate of inflation is determined only by exogenous monetary variables. Thus, money supply is active, which opens the possibility for a successful decline of the inflation rate through a restrictive monetary policy.

An empirical procedure to test for the direction of causality between two economic variables, where the possibility of feedback in either direction exists, may lead to very complicated mo-

dels. As Sims asserts:¹

"The method of identifying causal direction employed here does rest on a sophisticated version of the Post Hoc Ergo Propter Hoc principle."

In the context of the monetarist-structuralist controversy, however, the relevant variables are only money and prices. The monetarist position explains inflation as the result of exogenous and expansive monetary and fiscal policy. That is, money supply increases lead to inflation. The structuralists, on the other hand, do not deny that the price level rises along with the supply of money. However, they argue that the exogenous factors that determine the price level are of the structural type and that the supply of money responds to such factors.

The procedure is to take a regression of the endogenous variable prices on past, current and future values of the exogenous variable money. The future values of money, as a group, will have no-significantly different from zero coefficients, if and only if causality runs one way from money to prices. Similarly, in a regression of money (taken as dependent variable) on past, current, and future values of the prices variable, the future values of prices, as a group, will have zero coefficients only when causality runs one way from prices to money.²

¹C. Sims(69) pp. 543

²For a detailed explanation of this procedure see C. Sims(69). Especially section III. Structural factors are identified with institutional rigidities that exist outside the monetary sector.

In short, if causality runs from money supply to prices only, the coefficients of future money supply in a regression of prices on money will be zero. If causality runs from prices to money supply only, the coefficients of future values of prices in a regression of money on prices will be zero.

Therefore, the two basic equations to be tested are:¹

$$1) P_0 = a + b_1 M_{-4} + b_2 M_{-3} + b_3 M_{-2} + b_4 M_{-1} + b_5 M_0 + b_6 M_1 + b_7 M_2 + b_8 M_3 + b_9 M_4$$

$$2) M_0 = c + d_1 P_{-4} + d_2 P_{-3} + d_3 P_{-2} + d_4 P_{-1} + d_5 P_0 + d_6 P_1 + d_7 P_2 + d_8 P_3 + d_9 P_4$$

where P and M are the lags of Price and Money variables respectively.

There are two null hypotheses to be tested. The first null hypothesis, is that future values of money supply as a group ($M_1 \dots M_4$) have coefficients not-significantly different from zero in a regression of equation 1. A monetarist model would be supported if this hypothesis cannot be rejected.

The second null hypothesis, is that future values of prices ($P_1 \dots P_4$) have coefficients not-significantly different from zero in a regression of equation 2. A structuralist model would be supported if this hypothesis cannot be rejected.

The data used were quarterly observations for prices (consumer price indexes) and money (currency, demand deposits and time and

¹The time subscript (t) has been omitted. The subscript o denotes the present period.

savings deposits) over the period 1957.1-1977.4. Money was measured both as narrow money (currency plus demand deposits) and as broad money (M_1 plus savings and time deposits). To avoid serial correlation in the residuals, all variables were prefiltered using the filter suggested by C. Sims.¹ The importance of using this prefilter is due to the fact that the regression residuals would be very nearly white noise.²

Table # 1 shows the resulting coefficients of the regressions of prices on narrow (M_1) and broad money (QM) respectively, both as past and future independent variables; and the resulting coefficients of the regressions of M_1 and QM on past and future price variables.

Table # 2 shows the associated F-tests on the four future values of money in the regressions of prices on both definitions of money; and the associated F-tests on the four future values of prices in the regressions of both definitions of money on prices. F-tests are for the null hypothesis that all four future independent variables have zero coefficients.

Table # 1 shows that, in a regression of prices on the two alternatives definitions of money (M and QM), the four future values of M were not significant in explaining the dependent variable prices, thus, we are not able to reject the monetarist hypothesis. Further, since in the regression of money on pri-

¹i.e. Each variable in its log form, X_t , was replaced by $X_t - 1.5X_{t-1} - .5625X_{t-2}$

²For example, see J. Durbin(14)

TABLE # 1

REGRESSIONS BETWEEN MONEY SUPPLY AND PRICES, FOR THE PERIOD 1957.1-77.4
(Quarterly)

<u>Coefficients</u> <u>on Lag of</u>	<u>P on M</u>	<u>P on QM</u>	<u>M on P</u>	<u>QM on P</u>
constant	-.201 (.119)	-.121 (.075)	.437 (.036)	.394 (.102)
-4	-.331 (.177)	.432 (.198)	.250 (.110)	-.207 (.198)
-3	.147 (.179)	-.217 (.234)	.032 (.130)	-.075 (.210)
-2	.338 (.158)	.019 (.003)	-.100 (.097)	.127 (.078)
-1	.220 (.113)	.321 (.124)	.141 (.108)	.131 (.099)
0	.168 (.087)	.192 (.098)	.059 (.041)	.093 (.025)
1	.118 (.076)	.107 (.098)	.339 (.109)	.272 (.175)
2	-.068 (.087)	.017 (.012)	-.022 (.099)	.172 (.193)
3	.139 (.093)	-.065 (.056)	.041 (.051)	-.057 (.042)
4	.119 (.118)	.108 (.099)	-.183 (.154)	.155 (.121)
R ²	.8607	.8427	.8591	.8692
D.W.	2.12	2.05	2.50	2.21

TABLE # 2

F-TESTS ON FOUR FUTURE QUARTERS' COEFFICIENTS

Regression Equation	F	Degrees of Freedom
P on M	1.31	(4,92)
P on QM	1.42	(4,92)
M on P	2.87"	(4,92)
QM on P	2.01'	(4,92)

Note: Standard errors of the coefficients in Table # 1 appear in parentheses. The F" values are significant at .05 level. The F' values are significant at .10 level.

ces, the four future values of P were significant in explaining the money dependent variable (at the .05 level in the case of M_1 and at the .10 level in the case of QM), we are able to reject the structuralist hypothesis.

Therefore, it seems plausible to conclude that, in the case of Ecuador, causality goes from money to prices, but not from prices to money. This result supports the monetarist hypothesis.

Nevertheless, a limitation of this test must be especially pointed out. Although the largest individual coefficients in both, P on M and P on QM , regressions occur on past lags, these findings do not provide direct evidence on the structure of money supply determination. The fact that money is not passively related to prices merely implies that prices are not the main influence in the supply of money. However, it may be the case that the quantity of money depends on other variables as well (for instance, government expenditure, real output and interest rates), and these may swamp the influence of price movements. To quote C. Sims:¹

"Such evidence proves that in the sample the price-quantity relation traces the demand curve, but it does not in itself prove anything about the supply curve."

¹C. Sims(69) pp. 543

Summary

The empirical results of this chapter suggest that in Ecuador the monetarist hypothesis is applicable. First, the findings of significant coefficients in the Harberger equations are consistent with the argument that expansion of the supply of money in excess of real output is responsible for inflation.

Second, the structuralist argument that an increase in the price level is not only explained by increases in excess aggregate demand but also by increases in agricultural prices relatively to non-agricultural prices, were not supported by the available statistical data.

Third, in the test for causality between money and prices we were able to reject the structuralist view of one way causality from prices to money, but we were not able to reject the monetarist view of one way causality from money to prices.

3 THE STRUCTURE OF ECUADOR'S BANKING SYSTEM

The Ecuadorean banking system consist of a number of competing commercial banks, The National Development Bank, and The Central Bank.

Commercial Banks

Commercial banks are the most important financial institutions for the private sector, especially in connection with short-term lending for the finance of trade and working capital. They are often criticized on the basis that, in the absence of more appropriate financial intermediaries, they should be prepared to fill the void by lending also on a long-term basis for industrial and agricultural development. In fact, the availability of commercial credit has been heavily biased towards medium and large borrowers who want short-term working capital loans and own part of the particular commercial bank stocks, or have economic links with the bank stock-holders.

In 1977, 44 percent of total credits through Ecuadorian financial institutions were advanced to the commercial sector.¹

The agricultural sector, on the other hand, received less than 20 percent of total credits, although this sector accounted for 42 percent of total national production and employed 55 percent

¹See Table B-3b.

of the active population until 1975.¹

Commercial banks also provide credit for the public sector by buying interest-bearing government securities. Although government bonds have long maturities (twenty years) and low interest rates (8 percent) in a context of increasing prices, they constitute by law, part of the commercial banks' statutory reserves. The minimum requirement has varied between 10 and 20 percent of total reserves. Of the long-term operations of commercial banks, the absorption of government bonds under compulsory schemes, is the most important one.²

The reason for the commercial banks reluctance to provide medium and longer-term credit³ to the private sector is due mainly to the governmental imposition of ceilings on the interest rates on loans, and because uncertainties associated with monetary policy stability. Indeed, monetary and credit policies in Ecuador have had no consistent direction for the last 20 years.⁴ Uncontrolled government expenditures and expanding deficits increasingly have led to recurrent budgetary crisis and inflationary financing from the Central Bank. Nevertheless, short-term financing becomes in many cases medium -or even long-term financing- because of the very common practice of automatic renewal at maturity.

¹See Table E-1.

²See INE(41).

³We are defining medium and long-term credits as those which principals are paid in periods bigger than one and five years, respectively.

⁴Since 1960, no overall quantitative money supply targets have been set or announced by the Governments. See Economía(16).

There are basically three forms of short-term bank credit: cash credit, overdrafts and demand loans. Regulated interest rates are charged in cash credit and demand loans, but interest can be charged on overdrafts only if they exceed a certain amount.¹ The principal sources of finance for private credit requirements constitute demand deposits, although commercial banks are permitted to accept also time and savings deposits. As a matter of fact, savings and time deposits with commercial banks constitute the only open alternative for the collection and distribution of individuals' monetary savings. However, the volume of savings and time deposits has been traditionally fairly small.

Since the main role of the commercial banks is to provide a mechanism for mobilizing savings and channeling them into productive uses, the economic function of the commercial banker is given by his ability to act as an intermediary between owners of surplus funds and would-be borrowers. In a country like Ecuador, where the role of the stock market is nil, commercial banks serve as the only available financial market for both depositors and borrowers.³ In such environment, loans are dependent upon the volume of deposits, and the latter are dependent upon the volume of savings. Granting that commercial banks should serve both depositors and borrowers, the imposition of interest rate

¹See INE(41).

²See Table A-2

³Outside the banking system the main sources of credit are local money-lenders, pawn brokers, and savings cooperatives (i.e., "informal" financial markets).

ceilings on loans depresses the expansion of the banks' financial role and gives rise to a credit rationing process.

The argument in favor of interest ceilings given by the monetary authorities is that high interest rate levels will reduce the level of investment and, thus, the productive capacity of the economy, and for the need to compensate "risky" investors. However, this argument is highly debatable if we consider that controls on the level of interest rates and the rationing of credit process, arise because of the disequilibrium resulting from the implicit transfer from depositors to borrowers. If this transfer were eliminated the amount of savings deposits would increase and, therefore, the disequilibrium between the supply of real savings and demand for real credit would be reduced. Higher interest rates, on the other hand, will force the commercial banker, in self-protection, to make his loans to the best borrowers who are those who offer the best rates of interest compatible with good security, and who are therefore persons or firms in a position to utilize borrowed funds most profitably and effectively. In short, the release of interest rate ceilings is likely to expand the role of the banks as financial intermediaries and, on the other hand, long-term financing is likely to provide an incentive for investors to borrow at a higher interest rate. Additionally, the role of commercial banks in capturing savings deposits is important, not only because of the accumulation of capital associated with long-term credit, but because the ex-

¹ See El Comercio(17)

pansion of short-time credit is crucial in an economy like Ecuador which is based heavily in agricultural production. Variations in crops, temperatures, and length of seasons make for changing and uncertain seasonal capital requirements which, in the absence of short-term loans, must be met with the accumulation of finished products which may have a negative real rate of return (for example, crops deteriorating in storage) but provide the only alternative to cope with unpredictable capital requirements.

In Ecuador, one clear example of the unpredictable variations of agricultural production happened in 1971. The Ecuadorean sierra region provides most of the country's domestic food consumption because its wide variety of climates and soils allows a great diversity of production. Potatoes are second only to grains as a food crop in the highlands, and its production increased from 221,000 tons in 1970 to 400,000 tons in 1971.¹ Most of the potatoes growers are small tenant farmers who harvest and trade their products themselves. Since the Ecuadorean agricultural sector is mostly insulated from short-term loan facilities, the farmers, processors, and dealers of potatoes were confronted with the task of harvesting, selling, and utilizing the extra production of potatoes with only the cash capital which they estimated as sufficient for an ordinary and smaller production.

¹See IERAC(40)

The result was a disastrous waste of potatoes that became rot before they could be harvested with the limited amount of capital resources. Farmers were not able to increase their cash capital to meet the emergency by borrowing in the long-term capital market either, although some government officials were willing to lend them some government bonds, these did not have any demand. To avoid further losses, the farmers started selling potatoes at very low prices to individuals that were willing to harvest the potatoes themselves. Because of the subsequent depression of the market price of potatoes in 1971, the following year many farmers did not plant potatoes but other types of crops (which land-efficiency of production was lower), the result was again a shortage of supply.

If commercial banks had enough deposits to advance real funds to the farmers, or were the rate of interest allowed to rise to generate disposable funds, the net social cost of the variation of agricultural production would have been much smaller. Short-term loans are essential to an easy, smooth adjustment to meet the large unpredictable element of agricultural production.

Unfortunately, most of the scarce real disposable funds for short-term loans are captured by the "more safe" urban sector. Here, too, the short-term loan market permits one industry to relinquish part of its capital and another to gain it with a minimum of disturbance.

In Ecuador, then, commercial banks are the most important financial institutions. Although their limited real size of disposable funds, which most important source is demand deposits from individuals, are channeled mostly to financing the short-term capital needs of the commercial sector.

In the mid-sixties the Ecuadorean government, through the Central Bank, interfered effectively in the banking system to encourage the establishment of bank branches around the country. Bank offices were created even in small underpopulated areas, and many rural inhabitants started to use bank services to keep their money savings instead of keeping them at their homes, as a result the fraction of money held as savings and time deposits in commercial banks gradually rose until 1971. Since then this fraction has been declining, one might suspect, as a consequence of the increase in the rate of inflation of the last seven years.

The savings and time deposits to narrow money ratio, even at its peak in 1971 (.369)¹, has been traditionally low if we compare it with the same ratio in developed countries where it is by far bigger than one.

The fact that short-term loans constitute the major part of loan activity of commercial banks reflects the conservative policy of commercial bankers toward long-term loans as a result of the lack

¹See INE(41), Table # 17.

of suitable assets which could serve as customer's collateral,¹ and the lack of an efficient rediscounting mechanism for such loans in the Central Bank. Furthermore, among those short-term loans, there is a clear dominance of loans for sectors such as general commerce, as opposed to industry or agriculture.²

Savings Institutions

In Ecuador no savings banks have been organized, although such institutions could be important collectors of savings. A saving bank presumably would gather in the thrift accounts of the poor and middle classes, promise to return the money deposited on due notice, and invest the funds in conservative securities, mortgage loans, and other earnings assets. The depositor would benefit by receiving interest on his funds, by the security derived from the expert diversification of investments provided by the bank, and by the protection arising from the bank's capital, surplus and undivided profits. In short, a savings bank would furnish the small saver with a service which is not available to him through commercial banks. Their absence in Ecuador is perhaps a consequence of the lack of a strong middle class. In recent years, however, savings and loan association (Mutuales de Vivienda y Asociaciones de Ahorro) have been established in the more important cities of the country.

¹Interest rate ceilings, on the other hand, do not allow to cover "risky" loans.

²See Table B-3b.

The main objective of the Mutualistas de Vivienda is to collect savings from the poor and middle classes for the financing of low-cost housing. Unfortunately such institutions have been unable to develop an important role and most of them have undergone periods of financial instability due to their lack of ability in attracting new savings from the public.

The Asociaciones de Ahorro, on the other hand, are organized in the form of corporations who are supposed to act as financial intermediaries by buying and selling securities among individuals that belong to the specific Asociación. However, the main objective and source of funds for these institutions, is the sale of their own shares to the public. The collected resources are funneled into the market by means of investment in industrial or financial enterprises. The Asociaciones de Ahorro have two different systems of operation: closed-end, and open-end. Closed-end associations have a fixed capital since the shares are not redeemable. Open-end associations have shares which may be redeemable and, thus, the shareholders and the capital are variable.

A third kind of associations constitute certain types of institutions which collect savings from the public by means of contracts where the individual acquires a share, for a given amount and a specific time of maturity, for which he pays by making periodic compulsory deposits that bear interest. Generally, the use of

the share have a lottery feature: a share may be redeemed before maturity if its number is drawn. These institutions use their funds to enable the shareholders to take out a loan after a given time or upon maturity. Although, as noted previously, these kind of institutions are still new, it seems probable that they will continue expanding.

Similar contracts of long-term savings are carried by the Compañías de Seguro. These are insurance companies that, besides using mechanisms of forced contractual savings, as general policy maintain a specific premium in real terms. Obviously, the services provided by these companies have been limited to the upper non-fixed income classes and, unlike their counterparts in developed countries, they have a very limited scope of activities.

Two other types of financial institutions deserve to be mentioned. The Banco Ecuatoriano de la Vivienda (BEV) and the Instituto Ecuatoriano de Seguridad Social (IESS). Both are public institutions.

We may define the BEV as the Ecuadorian Housing Bank. Its main objective is to finance private housing construction, and it depends for its operations on governments's budgetary transfers, which have never been too significant. Therefore, it has had to rely extensively on foreign lending and bond issues which private banks are, by law, required to purchase. The BEV also promotes

housing investment through voluntary savings of potencial borrowers. Although the BEV has acquired considerable importance in the last twelve years, it is estimated that its present range of operations cover only a 20 percent of the housing requirements. The IESS is what we may call the Ecuadorian Social Security Institute. It obtains its resources from contributions from employees, employers, and the Government. The IESS is an autonomous institution which uses its accumulated savings mainly to provide mortgage loans and direct medical services, and other social benefits, to insured individuals. In a number of occasions, budgetary problems have made it very difficult for the government to meet its contributions, and therefore the IESS has been confronted with a critical financial situation.

On balance, then, the institutions, or "financial banks", that have tried to fulfill the lack of long-term credit by the commercial banks, have not been very successful. Because of the nature of these institutions, it is essential that the value of savings be reasonably maintained in the long-run. Their weak role, then, must be attributed largely to the lack of a stable demand for monetary assets.

In short, under those conditions, traditional fixed-income securities lose appeal because they fail to provide an adequate hedge against unpredictable fluctuations in monetary and credit policies. However, taking into consideration the actual finan-

cial structure of the Ecuadorean economy, the role of the previously described financial institutions becomes crucial for the mobilization of internal resources.

Ecuador's Development Banks

The lack of adequate medium and long-term credit mechanisms within the private banking system have resulted in the formation of two financial institutions: the Banco Nacional de Fomento (BNF) and the Corporación Financiera Nacional (CFN).

Both are publicly owned institutions specializing in financing medium and long-term investment, although they also provide a wide range of professional and technical services to the private sector. Their sources of credit come directly from the government, or from government-managed foreign credit. Indeed, foreign creditors prefer to lend to the government rather than to individual enterprises. Thus, the proportion of long-term investment financed by foreign loans reflects, in general, the government support of these debts, rather than the soundness of the private firms, or enterprises, that become the final recipients of such credits.

The credit lines, in general, are directed towards the economic sectors, or lines of production, that the government considers important for the overall economic development of Ecuador.¹

Since both, the BNF and CFN, are non-profit organizations they dispense their financial resources without applying the tradi-

¹See Table B-2.

tional rules of profit motivated investment banks and the loans, which in some cases become grants, are provided at very low nominal interest rates. In fact, the credits provided by both organizations are considered as subsidies that form part of the overall development plan of the government.

The Corporación Financiera Nacional (CFN)

The CFN -The National Finance Corporation- has its origins in 1957 when the Government of Ecuador, under the Industrial Development Law, created a government's financial agency (La Comisión de Valores). This agency became later, in 1963, the CFN and was granted the status of an autonomous full development agency which its main task is the collection and distribution of funds for capital development of industry. However, the CFN provides also managerial guidance, feasibility studies of investment projects, assistance with costing and accounting procedures, and advice of marketing.

Although, as stated above, its main role is to provide medium and long-term industrial financing, it also makes short-term loans to its long-term borrowers. Its resources are derived basically from the central government. However, the CFN plays also an important role in directly contracting foreign loans, and in the qualification of the industries or, in some cases, the firms that become final recipients of such a credit. Especially, in the 70's,

it has been notably successful in mobilizing external resources which, in 1977, constituted the 25 percent of its capital stock.¹ The importance of the CFN in promoting industrialization development through medium and long-term credit has been growing steadily since its formation in 1963, and it is expected that in the near future it will become the issuer of its own fixed-income securities.

The Banco Nacional de Fomento (BNF)

The BNF -The National Development Bank- depends on direct contributions from the central government, on credits from the Central Bank, and on government-managed foreign credits. The BNF was established in 1954 to provide agricultural credit, and "small industrial credit" to artisans and small industries. The bulk of its loans (92.5%), however, are provided to the agricultural sector.²

Two types of credit have been extended, regular credit and supervised credit. The latter involves supervision and technical assistance and special treatment regarding interest, terms and guarantees. The activities of the BNF have expanded to include rural housing, insurance of agricultural loans, irrigation projects, supervision and inspection of agricultural loans granted by commercial banks, and to trade agricultural tools, machinery, insect-

¹INE(41) pp. 18

²BNF(4) pp. 34

ticides, and fertilizers. Nevertheless, since the BNF's administrators prefer to direct the loans to larger and commercialized individual farms, hardly any credit is available for small-scale farming. Small farmers can get credit only if they are organized into agricultural cooperatives which is considered the only way to mechanize and modernize their methods of production. In fact, small and unorganized farms are faced with indivisibilities in machinery and equipment as well as with a lack of technological know-how.

The situation is worsened by the fact that, as noted above, commercial banks have a heavy demand from commercial firms and higher income groups for their available lending capital, and small farmers do not borrow in sufficiently large amounts to make it profitable for the private banks to grant the loans. Therefore, for all practical purposes, credit is not available for the vast majority in the agricultural sector.¹ Any capital investment for the small individual farmer, then, is possible only through the accumulation of foodstuffs. Furthermore, since most of the small-farm surplus (i.e., the amount that is not self-consumed) is traded directly for certain inputs -in kind- whose quantities are determined in the specific geographical area, most of the production is not marketed and does not generate the monetary returns that are requisite to commercial financing. This fact explains

¹See Tables B-7 and B-8.

the regression away from a monetary economy to a barter one observed in the Ecuadorean agricultural sector.

An additional fact that explains the lack of intergration of most of the rural population to the monetary sector is the conditions under which land is held and the income distribution patterns in the agricultural sector. Minifundistas and landless farm workers constitute nearly nine-tenths of the farm population in Ecuador.¹ A Minifundia is an unit of land too small to provide more than the basic needs of the Minifundista²

The Central Bank

The Ecuadorean Central Bank was established in 1927 as a direct result of the recommendations of an american mission under the leadership of Edwin W. Kemmerer³, which had urged the Ecuadorean Government to reorganize the financial situation of the country and to adopt a monetary framework susceptible of operating under the Gold Standard.

The creation of the Central Bank meant to introduce a non-political view in the formulation of the monetary policy to complement the decisions taken by the government and relating either to the overall acceleration of economic development or to the allocation of credit to suit the needs of the private sector,

¹See Table B-8.

²See Sunkel(73) pp. 98.

³Galbraith(23) pp. 242.

and to enhance the confidence of the public in the soundness of the national currency and of monetary conditions in general.¹

The Central Bank is the lender of last resort to the commercial banks and to the Central Government. It also regulates the supply of money and credit by means of frequently changing reserve requirements, regulating the quantity and quality of primary credit, altering the prior deposit for import requirements, trading in international reserves, and making selective changes in interest and discount rates.

However, the monetary-policy techniques associated with its function of last resort lending, i.e., open-market operations and discount-rate policy, have been very limited. In fact, both the volume of securities and the number of private transactors have been restricted to compulsory schemes. Although from 1973, onwards, the Central Bank has begun to carry out open market operations with the non-banking private sector, the results have been very modest and still most of the government bonds are held by commercial banks as part of their statutory reserves, and by official and semiofficial institutions which are required by law to invest in such securities.

On the other hand, discount policy has been relatively ineffective. This is due to the influence that discount rates exert on lending attitudes due to the existence of a great variety and

¹El Comercio(17) 10 de Agosto, 1977.

range of financial assets and institutions, the effect of which is to make the capital market extremely sensitive. The impact is intensified since in Ecuador, for all practical purposes, markets for corporate stocks and bonds do not exist and the number of financial intermediaries is very limited.

In these conditions, changes in required reserve-ratios seem, at first sight, to be the best device for affecting the degree of commercial-bank dependence on Central Bank lending. Nevertheless, the most popular instruments used by the Central Bank have been interest rates and selective credit-controls.

The interest rate policy has traditionally consisted on fixing, at relatively low levels, the rates of interest offered and charged by commercial banks. This policy has resulted on a cronic excess demand for credit, on the reduction of the relative attractiveness of savings accounts, and perhaps also on flows to foreign countries of domestic capital.

Selective credit-controls, on the other hand, have been used in order to control the volume of commercial banks lending. However, selective credit-controls have worked, in general, only in one direction: to restrain the extension of credit to stipulated sectors, or industries; they have not been too effective in leading commercial banks credit towards the less commercialized economic areas, because banks, at controlled rate of interest, cannot be persuaded

to make loans which they expect to be highly unprofitable and risky. In view of this problem, the general policy of the monetary authorities has been to set aside funds for special development applications. Most of these funds are channeled, through the BNF and CFM, in the form of direct grants and subsidized loans for the agricultural, or industrial areas, considered as of high priority for economic development.¹

¹See Table B-9.

The Monetary Sector

On the basis of the financial structure of Ecuador, the monetary sector is defined to include only commercial banks (c.b.) and the Central Bank (C.B.). The liabilities of c.b. are demand deposits (DD) and savings and time deposits (SD) from the public and debt to the Central Bank (BB); the liabilities of the C.B. are currency in circulation (CR) and commercial banks reserve deposits (RB).

The assets of c.b. are short-term loans to the public (LP) and RB; the assets of the C.B. are foreign exchange reserves (FR), advances to the government (GB) and BB.

More formally, those items can be classified in the balance sheets of c.b. and of the C.B., as follows:

TABLE # 3

BALANCE SHEET OF COMMERCIAL BANKS (CONSOLIDATED)

<u>ASSETS</u>		<u>LIABILITIES</u>	
Cash	CRb	Borrowings from the C.B.	BB
Reserves	RB	Deposit Liabilities	
		Demand Deposits	DD
Claims on Private Sector	LP	Savings Deposits	SD
Assets=Liabilities			

BALANCE SHEET OF THE CENTRAL BANK

<u>ASSETS</u>		<u>LIABILITIES</u>	
Foreign Assets	FR	Commercial Banks' Deposits	RB
Claims on Government	GB	Currency in Circulation	CR
		Held by c.b. (CRb)	
Claims on c.b.	BB	Held by the Public (CRp)	
		Government Deposits	GD
Assets=Liabilities			

From this table we can construct an assets and liabilities statement for the whole monetary system. It should be pointed out that FR includes foreign assets of the C.B. only since foreign assets of c.b. are negligible in Ecuador; additionally, claims on government by c.b. are not stated explicitly since they are included implicitly on RB (i.e., government securities are part of statutory reserves held in the C.B.).

In the process of combining the balance sheets of commercial banks and Central Bank, certain assets and liabilities that are internal to the monetary system are netted out. Thus, RB are netted out, being assets of c.b. but liabilities of the C.B.; the same is true for CRb, and for BB.

After this process, only one-sided assets or liabilities need to be included. The fundamental identity is that the total as-

sets of the monetary sector must equal liabilities plus capital accounts,

Total Assets = Liabilities plus Capital Accounts.

Explaining liabilities as the sum of monetary plus non-monetary liabilities, and rearranging the above identity to obtain an expression for money supply,

Monetary Liabilities = Total Assets minus Non-Monetary Liabilities minus Capital Accounts.

Defining monetary liabilities as CR_p plus DD (i.e., currency held by the public plus demand deposits in commercial banks), the last identity is found to be the underlying principle in the definition of money supply. In other words, the supply of money varies directly with changes in assets, and inversely with changes in non-monetary liabilities and capital accounts.

In this simple framework, it may prove useful to obtain a formula for the money multiplier with the use of the following relationships:

- 1) $M = CR + DD$
- 2) $CR = cM$
- 3) $DD = (1-c)M$
- 4) $RB = rDD$
- 5) $GB = \overline{GB}$
- 6) $BB = \overline{BB}$
- 7) $FR = \overline{FR}$
- 8) $GD = \overline{GD}$
- 9) $FR + GB + BB = RB + CR + GD$
- 10) $RB + LP = DD + BB$

Where the new two variables, r and c , represent required reserves and currency to money ratio.¹ Relations, 5, 6, 7, and 8, represent exogenous variables to express the fact that in Ecuador those variables are determined directly by fiscal policy or by selective quantitative controls as will be explained below.

Together the three assets of the C.B. are the counterpart of its three liabilities, RB , CR and GD , as they are expressed in relation 9. Finally the asset and liability structure of commercial banks is expressed in relation 10.

By substituting the variables RB , CR and GD into relation 9, we obtain the formula for the money multiplier,

$$11) \quad M = (GB + BB + FR - GD) / (c + r - rc)$$

Although this is a highly simplified form to express the money multiplier, it provides an initial point to discuss the potential of monetary policy.

As stated in the last section, monetary policy in the Ecuadorean context means direct control of the money supply with the use of traditional instruments of monetary management such as open market operations -mainly under compulsory schemes-, discount rate and cash reserve requirements; and with the use of non-orthodox qualitative and quantitative controls on commercial credit.

A brief evaluation of these instruments is in order:

¹ The variable SD has been omitted for simplicity. It could be included as part of DD provided the same required reserves hold for both demand and savings and time deposits. If that were the case M would represent money in the broad sense (QM).

Instruments of Control

(a) Traditional instruments.

Changing the required reserves and liquidity ratios, which force c, b, to follow a specific monetary policy since they must adjust to the new rate, have been instruments reserved for crisis situations. The reason is that in Ecuador, currency represents a big proportion of the total volume of money and the reserve ratio is already high.

In terms of the above described money multiplier, the value of the variable c is .45, and the reserve ratio is 30 percent.¹ Therefore, the money multiplier is 1.61^2 , which is very low in relation to the same multiplier in developed economies where this value is expected to be between 4.0 and 5.0 (in developed economies the CR/M ratio is around 10 percent, and the r value is at most 20 percent).

The small value of the money multiplier would require to vary the reserve ratios by larger amounts in order to achieve relatively small impacts on the stock of money. This fact, then, has been a constraint for the frequent use of reserve ratios as an instrument of monetary control.

Other traditional instrument for control of the money supply is open market operations (which is represented by the variable GB

in the above described relation 11). The necessary condition for

¹The value $r = .3$ is the actual reserve ratio (at June, 1978). This value was increased from a former level of .18 as a measure to slow the inflation rate which was increasing since 1974. The value $c = .45$ is the average of the CR/M ratio in the last 29 years.

²i.e., $1.61 = 1/((.45 + .3(.55)))$. The reserve ratio, (.3), excludes government securities (i.e. refers only to high powered money), thus, it is relevant for the estimation of the money multiplier.

the effective use of this instrument, as it is well known, is the existence of an active market for government securities. In principle, the C.B. goes into this market to sell or buy its assets, which may be securities, bonds, and government bills, among others; thus, the success of this operation is subject to the existence of a counterpart willing to sell or buy such assets, when faced with a minimum change in prices. Since the last condition in Ecuador is not satisfied, open market operations, as stated above, has been carried mainly under compulsory schemes.

The next traditional instrument of monetary control is commercial bank borrowing from the Central Bank (represented by the variable BB in relation 11). Two methods are used for the control of BB: either by varying the discount rate charged by the Central Bank or by quantitative controls.

The first method, which is widely and effectively used in most of the developed economies, has the advantage of being an integral part of the money market mechanism. In Ecuador, however, for all practical purposes, the discount rate can be considered as a constant. In fact, since the creation of the C.B., the discount rate has been changed only once, from 5 to 8 percent in 1970,¹ this change, however, was not effective in reducing the amount of credit as expected. The reason is that the marginal amount of transactions in these funds between the C.B. and c.b.

¹See El Comercio(17).

is not large enough to be sensitive to discount rate changes.

The second method, direct quantitative controls, have been relatively more successful since they depend only on monetary authorities legislation.¹

As a result of the limited effectiveness of the traditional instruments of monetary control, the Ecuadorian monetary authorities have devised other non-orthodox methods to deal with both money and credit.

(b) Non-Orthodox instruments.

These include quantitative determination of the c.b.'s portfolio growth, selective credit controls, international reserves management and manipulation of government accounts in the Central Bank.

The Tones de Cartera (portfolio growth ceilings) have limited the expansion of total reserves of c.b. to 3 percent per quarter, their aim supposedly is to avoid monopolistic concentration of funds.

One of the advantages of these ceilings is that they have forced the commercial banks to multiple their number of branches, since the ceilings are not applied on c.b.'s name but on c.b.'s branches?² Selective credit controls involve specific controls on the direction of c.b.'s loans. The desirability of selective credit controls has been argued on the basis of an excessive lending to the commercial sector in relation to the low amount of loans extended to industry and to the inexistent credit to agriculture.

¹This method is not effective either if banks do not borrow from the C.B. at all.

²i.e., The "monopolistic" concentration would refer to geographical areas. See Table B-3a.

However, as stated earlier, these controls have proven to be ineffective in redistributing credit among sectors. Its success has been limited to cease-during the periods in which the regulation was operative -c.b.'s loans to hire- purchase financing of certain commodities that explicitly have been qualified as "luxury goods". In short, this policy has entailed unidirectional and temporary effects only.

The main objective of international reserves management is, supposedly, to achieve both a relatively gradual and continuous increase in reserves and a reduction in the intensity of the monetary impact of the accumulation of reserves. The importance of this kind of policy is due to the importance that foreign markets have in the economy of Ecuador. In the field of imports, the adopted policy has been shaped by statutory advance tariff payments, and by quantitative restrictions, through the use of quotas, in the imports of certain items. The advanced payments on imports are made to and kept by the Central Bank, thus, these payments must be counted as a reduction in reserves available for commercial banks. In fact, this is the one monetary instrument which has been used most effectively in light of the importance of foreign markets in the structure of the economy.

In the field of exports, the international reserves management policy has been identified with the use the Government made of

the foreign exchange provided by its respective share in the co-coa, coffee, bananas and petroleum exports. The last industry, as stated earlier, has become the dominant one since the end of 1973. This fact, combined with a greater Government's need to sell foreign reserves to the Central Bank to meet its increasing expenditure in national currency during the past few years, has determined an intense and direct repercussion of petroleum exports on money supply.

Finally, the last important non-orthodox method of monetary control would be the manipulation of government accounts in the Central Bank. Government payments to the private sector serve to increase the stock of money held by the public, in contrast, a build-up of government deposits in the C.B. produces a drain on the commercial bank's reserves and hence a contraction of the stock of money (in terms of the above described relation 11, this contraction would be equal to the $\text{net}\Delta\text{GD} \text{ minus } \Delta\text{GB}$ value multiplied by the multiplier).

The manipulation of the GB and GD relation, as a potential instrument of monetary policy, is especially important in the case of Ecuador not only because of the lack of an active market for government securities, but because government deposits in the C.B. are large enough¹ to justify their use as an effective monetary control instrument. However, fiscal considerations have been the

¹See Table B-5.

main factor in determining the size of both GB and GD, almost regardless of any monetary consequence.

In sum, through the use of non-orthodox methods, the monetary authorities and the Government have the power to control directly the volume of the nominal supply of money.

However, it is a well known fact, that the quantity of the real stock of money is determined by the behaviour of the public in the market for monetary assets. In other words, the public's demand for real CR, real DD and real SD determines the CR/QM, DD/QM and SD/QM ratios outstanding at whatever real rates of return on CR, DD and SD, and the variance in the rates, that the government determines through its increase in nominal money supply and the controls on interest rates.

The Market for Monetary Assets

In the context of this study, it is necessary to analyse the demand for monetary assets separately for its components since each -currency, demand deposits, and savings and time deposits- have different policy implications. All three constitute liabilities of the monetary sector, but demand and savings and time deposits are liabilities of commercial banks while currency is a liability of the Central Bank.¹

In general, the volume of domestic monetary assets that the pu-

¹For an extensive analysis of the demand for liquid assets in the context of a developed economy see E. Feige(18).

blic is willing to hold depends on the general level of income and on their preferences for monetary assets as opposed to other non-monetary assets such as silver, gold, durable consumer goods, inventories and, in some instances, even foreign currencies.

Demand for Currency

Currency, for all practical purposes, constitutes the only monetary asset used by most of the population in the rural sector, and, thus, it constitutes the only instrument for transactions other than barter. In the urban areas, currency is used for small transactions while large transactions are made by cheques, thus, currency is relatively more important in the rural than in the urban sector.

The amount of currency, therefore, depends on the distribution of income between rural and urban sectors, and on the preferences of the urban population for currency as opposed to demand, savings and time deposits.

The fact that currency has a major role as a medium of exchange among most of the population, explains the relatively high currency to money ratio observed in the Ecuadorean economy. Indeed this ratio¹ -which has fluctuated between .30 and .50 for the CR/QM proportion, and between .36 and .57 for the CR/M₁ proportion- is quite high if we relate it to the same ratio in more mature economies.

¹Banco Central(2)

Currency is also important in its store-of-value function for a big proportion of the population, mainly in the rural sector, that still remains insulated from banking facilities. It is in this function that currency becomes a competing asset with physical goods.

In sum, the currency holding behaviour is determined mainly by its medium of exchange function and, marginally, by its store-of-value function.

Demand for Demand Deposits

The process of the penetration of demand deposits as a medium of exchange, as opposed to currency in the behaviour of the public, has been slow. The demand deposits to narrow money (DD/M) ratio grew from .44 in 1948, to .65 in 1977, a value that is still small if we relate it to the same ratio in more mature economies.¹

In Ecuador, we can say that demand deposits are still at a half way stage towards becoming a medium of exchange in the full sense.

Payment by cheque is acceptable between most of the commercial organizations and all of the governmental institutions, but private individuals, and even small urban businesses, are often unwilling to be paid in this way. Chequing accounts perform the function of a personal safe box rather than an instrument to be used in day-to-day transactions among private individuals.

¹ In the U.S. DD constitutes about 80 percent of M_1

Commercial banks, in general, do not impose service charges on chequing accounts nor do they pay any interest. However, there exists non-price competition among private banks to attract more deposits. This competition has ranged from increases in services such as "weekly balance statements" to such things as drawings among bank customers.

On the other hand, there is complete acceptance among commercial banks of cheques drawn on other banks. Furthermore, commercial banks have built "respectability" in exchanging cheques for currency at any time. The fact that debt payments with cheques instead of currency is still limited to a fraction of the urban population is not due to a lack of confidence in banks but to a lack of confidence between bank customers and, until payments by cheque develop sufficiently to become a normal feature of the day-to-day transactions, demand deposits are likely to remain an imperfect substitute for currency.

In the context of this study it seems plausible to assume that people who use demand deposits, unlike those who use only currency, are more aware of the interest paid on savings and time deposits, and more likely to consider it in their portfolio distribution. Any change in interest rates, therefore, is likely to produce a redistribution of the DD and SD values as components of the stock of money.

In short, although the CR/QM ratio is likely to remain isolated from changes in interest rates, the DD/SD ratio is not.

Demand for Savings and Time Deposits

The behaviour of savings and time deposits is of special interest in the context of this study because they constitute the main item for the development of the financial sector. In Ecuador, for all practical purposes, bonds and stock markets are non-existent, therefore, both savings and time deposits constitute the only interest bearing financial assets available.

For analytical purposes, the main difference between SD and the other two monetary assets, CR and DD, is the fact that SD receives nominal interest and, thus, it is expected to be sensitive to changes in interest rates. Since these rates are government controlled, the volume of SD becomes a direct consequence of interest rate policies. The maximum allowable interest rates on these deposits have fluctuated between the values of 3.0 in 1948 and 8.55 in 1971, while the SD/QM ratios have fluctuated between .12 and .27 for the same two years.¹

The path of growth in savings and time deposits with respect to the stock of money, income, investments, and other economic variables, serves as a proper indicator of the size of the financial sector on the economy.

¹See Banco Central (2). The actual difference between interest rates on loans and SD is .4 percent.

Demand for Credit

The market for credit in Ecuador can be defined as an excess-demand disequilibrium market. The allocation of credit -whether it is government or commercial banks controlled- has distinguishable rationing features.

Individual borrowers, or small firms, seldom possess the types of collateral security conventionally acceptable to banks, such as title deeds to land, marketable physical capital goods or stock exchange securities. This fact, combined with interest ceilings on loans, determines the allocation for private credit to be based on person-to-person knowledge, and the allocation of public credit to be based on the definition of what constitutes "development" projects.

The presence of credit rationing implies that the individual, or firm, borrower is permitted to borrow at a subsidized rate of interest, however, the total amount that it can borrow at that rate is constrained to a fixed supply. Therefore, even if the individual borrower is certain that the marginal profitability of its loan permits an increase in the payment of interest, it can not expand its investment beyond the "ration" limits.

It is beyond the scope of this study to conduct a microeconomic analysis on the consequences of credit rationing on the profit-maximizing behaviour of both bank lenders and individual borrowers. Neither are we interested in an analysis of marginal op-

portunity costs and on its effects on the allocation of credit.¹

Our concern is with the size of the financial sector, which is aggregative by definition, and in the consequences of a change in its size on the overall economic development.

¹For a detailed analysis of those points in the context of a developed economy, see D. Jaffe(42).

4 DEVELOPING THE HYPOTHESIS

In the theoretical framework developed in chapter one for the case of an underdeveloped economy -without capital markets- money performs two separate functions: First, the role of money is to provide liquidity for current account transactions. That is, money is a medium of exchange. In this regard there is no difference with the role of money in the context of a developed economy. Second, the role of money, as a store-of-value, is to facilitate indivisible investments (i.e., purchases of land and machinery). It is in this regard that the role of money becomes important in the context of an underdeveloped economy.

In this environment, individual saver-investors find it convenient to hold their accumulated savings in the form of monetary assets, or in the form of physical assets, until such time as they have accumulated sufficient resources to be able to undertake investment in physical capital goods.

The choice between these two forms of assets in the savings accumulation process rests upon their relative marginal rate of return.

In short, the demand for monetary assets is expected to rise Pari Passu with the productivity of investments on physical capi-

tal in the range where money is viewed as a "conduit" through which the accumulation of capital takes place.

The hypothesis implies that the real money balances to income ratio increases if the propensity to save -and hence the desired rate of capital formation- increases at any given level of real income. Alternatively, the conditions that make real money balances attractive to hold will stimulate the incentives to save, which, eventually, will enhance physical capital accumulation.

It may be useful to clarify the hypothesis with the use of the following diagram:¹

The diagram represents the effect of the real return on holding money on self-financed investment. The relationship is positive within the "complementary asset" range, and negative within the

¹This diagram is fully explained in McKinnon(51), pp. 62

"competing asset" range. From the diagram we can infer that there exists an optimal real rate of return on holding money at the point where $B = i - \dot{P}^e$.

To quote McKinnon:¹

"Hence, a return on money equal to B maximizes the rate of self-financed investment and is the rate of return that a monetary authority should seek in the absence of other avenues for capital accumulation."

Or, quoting Shaw:²

"According to WV (the conventional wealth-view of money and finance) the optimal nominal deposit rate is equal to the money rate of interest. This relationship is not appropriate in lagging economies because there is not just one money rate of interest and because the monetary system incurs real costs. Instead, interest allowances to depositors should exhaust earnings of the monetary system after provision of all costs. The costs include factor payments and a competitive return on net worth. They should include as well premia for insurance of money holders against default by private money issuers. Because a private market for insurance is unlikely to develop in the lagging economy, the monetary authority must assume responsibility

¹McKinnon(51), pp. 62

²Shaw(66), pp. 66

for fixing the premium, administering the insurance fund and defending the markets for money and capital against the shock of banking failure."

However, the empirical work of both Shaw and McKinnon has not been directed to test their hypothesis. They have selected some countries to illustrate the relation between inflation and economic development, nevertheless their empirical examples do not provide a functional relationship between real rates of return on money and capital accumulation, and, therefore, are not able to determine the optimal rate of return on any specific country. To overcome these shortfalls and make their approach empirically testable, it is necessary to test two related propositions: First, the demand for monetary assets must be positively correlated to their real interest rate (i.e., to the real return on money holdings). Second, money and physical capital are not substitutes but complements in the portfolios of wealth-holders, at least in certain range.

Before analysing in greater detail these two propositions it is necessary to point out that we are viewing the capital market as the market for financial assets other than money namely, the market for long-term claims or securities.

Since such an organized market -where stocks and bonds can be bought and sold, using the services of brokers and dealers- does

not exist in Ecuador we are hypothesizing that the traditional interest rate mechanism, which produces equality between real returns on monetary and financial assets through the forces of supply and demand, is encumbered.

The first proposition, then, states the role of money as providing liquidity for current transactions (i.e., its medium of exchange function) and as the only financial asset for wealth-holders (i.e., its store of value function). The implicit assumption is that monetary holdings which are being built up to purchase an investment good cannot at the same time be run down between periods in order to facilitate purchases in current goods. In other words, the total requirement of money balances is additive and directly proportional to the volume of current transactions and to the volume of planned investments.

In this framework, however, a change in the real return on money has no homogeneous impact on the demand for each form of money.

An increase in the rate of interest paid by commercial banks produces an increase in the demand for savings deposits and, at the same time, it reduces the fraction of money held in the form of currency and/or in the form of demand deposits; whereas, the desired holdings of both real savings deposits and real M_1 are reduced with an increase in the inflation rate.

The implication is that M_1 and savings deposits are considered

as substitutes for each other once the level of money holdings in the broad sense (M_2) is established. The real return on money holdings, when money is defined as M_1 , is fully determined by the inflation rate (i.e., $r(M_1) = -\dot{P}$, where $r(M_1)$ is the real return on M_1). However, the monetary authorities also determine the real return on savings deposits by controlling the nominal interest rate on banking deposits (i.e., $r(SD) = i - \dot{P}$, where $r(SD)$ is the real return on savings deposits). Therefore, an increase in the rate of inflation, Ceteris Paribus, may have no effect upon the SD/M_1 ratio, but an increase in the nominal interest rate on bank deposits relatively to the rate of inflation is expected to increase this ratio. On the other hand, higher real interest rates on money holdings are likely to induce a substitution of monetary assets for physical assets in the portfolios of assets-holders.

In short, for a given level of inflation, an increase in the nominal rate of interest on bank deposits will increase the real size of financial resources because of both the substitution of bank deposits for currency and the substitution of monetary assets for physical assets.

The second proposition states that monetary assets are accumulated with the purpose of investing in indivisible capital goods provided that two simultaneous conditions hold:

a) The real cost of holding monetary assets must be lower than the real cost of holding physical assets.

b) The real return on monetary assets must be lower than the expected real return on investment on physical capital.

The first condition is not possible if the real cost of holding monetary assets (i.e., the expected inflation rate minus the nominal interest rate on deposits) is big enough to surpass the cost of holding physical assets (i.e., storage and depreciation). It is in this sense that money, as a store of value, is a competing asset with physical assets.

The incentive for the accumulation of physical assets is due to the fact that they are an hedge against inflation. Although the real rate of return on some physical assets can be negative,¹ it may compare favourably to the cost of holding money. A negative real rate of return on physical assets makes this form of wealth-holding socially inefficient. Nevertheless, it is the best option open to individual private asset-holders who are facing an even lower real rate of return on monetary assets. An increase in the real rate of return on monetary assets, then, makes the assets distribution more efficient.

The second condition is possible only in the range where the real return on monetary assets is smaller than the expected real return on physical investments. If this relation is reversed (i.e., if

¹For instance, crops deteriorating in storage, or livestock with-held from the market and which productivity is being smaller than the cost of feeding them.

the real return on monetary assets rises enough to surpass the marginal productivity of physical investments) the conventional substitution effect between money and physical capital takes place.

High interest rates might normally be expected to reduce borrowing, thus, the low-interest rate policy adapted by the Central Bank is supposed to encourage investment. The foundation of this argument is the belief that the observed low level of private investment is not due to a lack of financial resources but due to an absence of profitable opportunities. This argument, however, is questionable in the Ecuadorian case -where the shortage of financial resources relative to the demand for them has been a persistent phenomenon-.

Since in Ecuador, as explained before, the financial market is constrained to the role of commercial banks as financial intermediary between savers and investor, commercial banks are in a position to attract a larger volume of deposits by raising the explicit interest rate paid on deposits, which, in turn, increases their lending capability and hence the volume of financial sources.

Therefore, the following chain of reactions can be expected given a policy of increased real interest rates,

where i is the nominal interest rate on bank deposits, $\dot{P}$ is the inflation rate, m^d is the demand for real cash balances ($m = M/P$, $M = CR + DD + SD$), EM is the excess supply of money ($EM = M^s - m^d$)¹, $b.d.$ is the real amount of bank deposits, $f.s.$ is the real size of the financial sector (as a direct function of financial sources of commercial banks), and I is investment in physical capital. This chain will be closed, once $(i-\dot{P})$ rises up to the point where it becomes equal to the marginal productivity of investments. The monetary authorities, then, can gradually proceed to reduce the rate of nominal money growth to match the reduction on the inflation rate, so that the flow of real bank credit need not decline during the process.

Policy Implications

There are two implications for monetary policy: First, if the monetary authority initially raises the average rate of returns on monetary assets, there is a subsequent increase in the demand for money balances and, therefore, a reduction on excess supply of money, which brings a downward pressure on the inflation rate. Second, the rise in money balances generates an expansion in bank

¹i.e., It is assumed that a decrease in the excess supply of money results in a decrease in the rate of inflation.

credit which prelude an increase of aggregate demand for the accumulation of working capital.

This process is neither inflationary, because it reduces the excess supply of money; nor contractionary, because it raises the aggregate demand for working capital. Therefore, the basic monetary tool that the authorities have in order to reach the optimal policy -besides the determination of the rate of growth of the nominal money supply- is the manipulation of the nominal interest rate on money deposits (i.e., the release of artificial ceilings imposed on interest rates). However, the final objective is not the increase in interest rate per se, but the minimization of the gap between returns on physical capital and returns on money balances; in this sense, there is an upper bound constraint on the nominal interest rates. Care must be taken to ensure that the nominal interest rate does not exceed the expected nominal profits on working capital, since otherwise the increase in money balances would not serve for financing the accumulation of working capital, and the debt-intermediation function of the banking system would be nil.

The increase in the rate of interest, on the other hand, would not only disclose the scarcity of sources of finance but would also discriminate between unproductive and productive investments. This discrimination would stimulate economic growth

through a more efficient use of factor endowments, because the scarce factor capital -whose price becomes more expensive when the interest rates are raised- will be replaced for factor labor. Since the Ecuadorean economy is basically labor-surplus, the labor force growth can be considered as an endogenous variable. Therefore, the use of labor-intensive techniques instead of capital-intensive techniques, not only are bound to foster an increase in the employment of available resources, but also to increase the labor's income share of total output provided the elasticity of substitution of labor for capital is bigger than one. In other words, the release of artificial constraints on interest rates will show the true price of capital, and will develop production processes that use the scarce factor (expensive capital) more sparingly, and the abundant one (non-expensive labor) more liberally. Thus, the elimination of price ratios' distortions would promote efficiency on the use of available resources.

5 HYPOTHESIS TESTING

The empirical analysis of the monetarist-structuralist controversy developed in chapter two supported the monetarist argument of one way causality from money to prices. The importance of this finding is given by the fact that the hypothesis developed in the last chapter is based on the assumption that an increase in the rate of inflation is produced only when the nominal stock of money grows in excess of the quantity of money that would have been demanded had the level of prices remained the same. That is, in the context of our hypothesis, inflation is defined as a monetary phenomenon.

The remaining task is the empirical testing of the hypothesis.

Two main steps are necessary to accomplish such a task:

First, the definition of the stock of money for the Ecuadorean economy.

Second, the empirical determination of the "complementary" and "substitution" ranges between money and physical capital.

The Definition of the Stock of Money

The importance of the correct definition of the stock of money is due to the fact that monetary authorities can be misled when the regulated stock of money moves in one direction but the true stock moves in another. The initial step is, then, the definition of the stock of money on which the authorities must operate.

There are many alternative definitions of the stock of money.

In conventional monetary theory we can distinguish arguments for and against the definition of money that includes currency and demand deposits, from those that include the latter plus savings and time deposits, and from those that include also the liabilities of the non-bank financial institutions as a true component of the stock of money. Those arguments are well known and there is no need to review them here.¹

In the context of this study, however, two specific arguments should be especially pointed out:

First, the inclusion of liabilities of non-bank financial institutions is clearly dismissed in a country like Ecuador where such institutions are almost non-existent.

Second, an argument against the inclusion of savings and time deposits in the definition of the stock of money can

be based on the assumption that the effectiveness of the monetary mechanism works primarily through the wealth effect. Since changes in savings and time deposits are not considered as changes in net wealth, because the gains -or losses- of the saving sector are offset by the losses -or gains- of the banking sector, savings deposits are not considered as part of money.

The latter argument is clearly invalid in our framework of reference where the institutional environment determines a debt-in-

¹See, for example, L. Yeager(86), D. Laidler(46), W. Newlyn(57), B. Pesek and T. Saving(61), among others.

intermediation role for the banking system by channeling savings deposits into productive investments. Nevertheless, the success of the banking system depends not only on its ability to attract and to distribute savings, but also on the proper definition of the stock of money in order to ensure that its excess supply does not precipitate inflation as well as to ensure that excessive money demand does not generate recession.

In short, the question is whether or not savings and time deposits in commercial banks should be included as part of the stock of money.

A number of methods to test the validity of defining savings deposits as part of the stock of money have been developed elsewhere.¹

We have chosen two methods that are relevant in the context of this study.

The first method provides an indirect measure of the substitutability of time deposits for the conventional definition of money. It attempts to compare the power of time deposits against currency and demand deposits in explaining variations in a real sector variable. As R. Timberlake and J. Fortson put it:²

"The question(about the various possible definitions of the stock of money for testing purposes).... boils down to the "moneyish" influence time deposits exert on the "narrow" stock of money (currency and demand deposits)."

¹For example, C. F. Christ(10), J. Tobin(78), H. Markowitz(50), T. Lee(47), among others.

²Timberlake-Fortson(77), pp. 190

The basic assumption underlying this test is that "money matters" and, therefore, if savings and time deposits are to be considered as part of the stock of money, the variable SD must be able to influence the level of income.

The suggested form of the testing equation is:

$$1) Y^{\circ} = a + b_1(M_1^{\circ} + (b_2/b_1) SD^{\circ})$$

where Y° , M° and SD° , are the increase over time of nominal money income, narrow money, and savings and time deposits respectively.

There are four possible outcomes: First, the test may indicate a negative (b_2/b_1) ratio, in which case SD fails to perform as money. Second, the test may indicate that SD is a perfect substitute for M_1 , in which case the (b_2/b_1) ratio should be unity. Third, the test may indicate a positive (b_2/b_1) ratio but smaller than one, in which case SD is acceptable as money. Fourth, the resulting (b_2/b_1) ratio may be bigger than one, in which case the test would suggest that SD explains the variations of nominal income better than M_1 .

The regression of equation 1 in its alternative form

$$2) Y^{\circ} = a + b_1 M_1^{\circ} + b_2 SD^{\circ}$$

gave the following results:

$$2) Y^{\circ} = 420.7 + 5.405 M_1^{\circ} + 3.881 SD^{\circ} \quad R^2 = 89.39$$

(82.5) (0.597) (2.023) D.W. = 1.67

Standard errors are in parentheses below each of the estimated parameters.

Since the resulting (b_2/b_1) ratio is equal to 0.718 there is no reason to reject savings and time deposits as a component of the stock of money.

The second method deals with a measure of the substitutability between money and savings deposits. This method is based on the work of J. Gurley(33) and V. Chetty(9), and deals with the definition of utility as a function of M_1 and SD^1 ,

$$3) U = (M_1^{-b} + a SD^{-b})^{-1/b}$$

The constraint (C) represents the consumer cash holdings allocated between M_1 and SD , in such a way that the slope of the constraint is the ratio of the prices of money to savings and time deposits.

$$4) C = M_1 + SD/(1+i)$$

where i is the rate of interest on savings and time deposits, M_1 is the amount of narrow money, and SD is the amount of savings and time deposits.²

Maximizing the utility function subject to the constraint C, the relation between M_1 and SD is as follows:

$$5) M_1/SD = (-1/(1+b)) a + (1/(1+b)) (1/(1+i))$$

where the M_1/SD and $1/(1+i)$ ratios are expressed in Logarithms.³

The regression of equation 5 using Ecuadorian data for the period 1948-1976 gave the following results:

¹This method can be extended to include many liquid assets. However, as it was pointed out, we are interested only in one asset, namely, SD .

²The slope of C is the negative of $(1+i)$, so $(1+i)$ is considered as the ratio of the prices of money to savings and time deposits.

³For an extensive explanation of this transformation, see Chetty, particularly pp. 272-275

$$5)' \quad M_1/SD = -1.1405 + 37.3346 (1/1+i) \quad R^2 = .8715$$

$$(.3974) \quad (2.8116) \quad D.W. = 2.4197$$

From the second coefficient we obtain $b = -.973^1$, and, thus, the value of a equals 1.07^2 . These results may be introduced into the specified utility function

$$3)' \quad U = (M_1^{.973} + 1.07 SD^{.973})^{1.028}$$

Since the exponent of the function is close to one, these results suggest that, once the change in interest rates is taken into account, there is almost perfect substitutability between M_1 and SD .

Both tests, therefore, suggest that, for the case of Ecuador, it is valid to consider savings and time deposits as part of the stock of money.

It should be pointed out that such definition could also be considered in the context of a developed economy and within the traditional monetary theory. However, in the latter, money and capital are substitutes since they constitute the only two assets held in a constrained (fixed) portfolio; while our hypothesis, thus far developed, introduces a third kind of asset, namely inflation hedges.

¹i.e., $b = (1/37.34) - 1$

²i.e., $\log a = 1.1405/37.34 = .0305$, thus $a = 1.07$. This result would imply that SD has more "utility" than M_1 , thus, this result may be the subject of some controversy.

Complementarity Between Money and Physical Capital

There have been some attempts to relate monetary variables to the propensity to save ratio. For example, A. Thirlwall(75) had tested the relationship between the rate of inflation and the savings to income ratio, and the relationship between inflation and income growth across countries. His empirical evidence suggests that the correlation between savings and the rate of growth does not arise from their simultaneous dependence on the rate of inflation, but from the savings-investments-growth process. G.T. Brown(5) tested the relationship between the demand for money and propensity to save in Korea, and his empirical results suggest a positive correlation between desired real money balances and the rate of return on capital, thus, it supports the existence of a complementary range between money and physical capital.

On the other hand, especially in Latin America, there have been several empirical studies testing the relationship between inflation and the demand for money, to cite a few examples, Phillip Cagan(7), Antonio Silveria(68), Raúl Prebisch(62), Adolfo Diz(13), Roberto de Oliveira(58), Rosemary Thorp(76), Felipe Pazos(60), Dean Dutton(15), James Hanson and Robert Vogel(37), among others. However, they have concentrated mainly on the impact of inflation on balanced growth or on the impact of inflation on monetary ve-

locity.¹

In this study we are rather interested in the hypothesized causal relationship between the demand for monetary assets, the real size of the financial sector, and the rate of capital accumulation.

Our procedure here basically consists of two steps:

- (i) An empirical test of the hypothesis that a decrease of the real return on money holdings significantly reduces the real size of the financial sector;
- (ii) An empirical test of the hypothesis that the relationship between the real size of the financial sector and capital formation is positive.

The starting point will be the framework of empirical analysis developed by James Hanson and Robert Vogel (37), who estimated the influence of inflation on the income velocity of money in sixteen Latin American countries. Their analysis defines inflation as measured by the annual percentage change in the consumer price index $(P_t - P_{t-1})/P_{t-1}$; the velocity of money is calculated by dividing each country's GNP in local currency by that country's money supply and using three alternative definitions of money: currency (C), currency plus demand deposits (M), and currency plus demand deposits plus savings deposits (SD).

They point out that the use of interest rates as explanatory variables is questionable because of the lack of data representing

¹Below we take a closer look at the study of Hanson and Vogel (37).

the structure of nominal interest rate:¹

"Virtually all Latin American countries attempt to control interest rates below their equilibrium levels and allocate scarce credit by non-market mechanisms; these controlled interest rates do not reflect credit conditions in the uncontrolled sectors, which generally suffer from various market imperfections."

With this shortcoming in mind, the regression used to estimate the velocity of money as function of the expected inflation rate can be represented as

$$1) \quad V = a + b(\dot{P}_t) + c(\dot{P}_{t-1}) + d(\dot{P}_{t-2}) + \dots$$

where t refers to the current time period, V is the income velocity of money, and $\dot{P}$ is the inflation rate in the period denoted by the respective subscript. The coefficients are estimated with the use of three alternative definitions of money:

$$VC = GNP/C \quad ; \quad VM = GNP/M \quad ; \quad VQM = GNP/QM.$$

where VC , VM and VQM , represent the velocity of money, when money is defined as currency, currency plus demand deposits, and currency plus demand deposits plus savings deposits, respectively.

From the empirical results of the pooled regressions for sixteen Latin American countries, they conclude that the rate of inflation has a significant positive impact on the income velocity of money.

Hanson-Vogel(37), footnote #10, pp. 367.

In the context of this study, the latter conclusion constitutes the most important result of the Hanson-Vogel study.

However, it should be pointed out that we are not interested in determining the influence of the rate of inflation on the income velocity of money per se, but on testing the relationship between the expected real rate of return on money and the demand for monetary assets.

An empirical problem in testing such a relationship is the determination of the expected changes in the real rate of return on money holdings. There are a number of different techniques generally involving lagged actual values and elaborate procedures for estimating the formation of expectations.¹ The addition of lagged actual values proved to be feasible in the Hanson-Vogel study. Here we follow the same procedure.

Since our concern is on the real size of the financial sector, our dependent variables are the real value of the three basic forms of money: the real value of currency (CR/P); the real value of demand deposits (DD/P); and the real value of savings deposits (SD/P).

Furthermore, since the real size of the financial sector should be expressed in relation to real income, we must express the currency, demand deposits and savings deposits variables as ratios to real income as follows:

¹For example, see Zvi Griliches(32).

$$2) \quad CR/Y = a + b(\dot{P}_t) + c(\dot{P}_{t-1}) + \dots$$

$$3) \quad DD/Y = a' + b(\dot{P}_t) + c'(\dot{P}_{t-1}) + \dots$$

$$4) \quad SD/Y = a'' + b(i-\dot{P})_t + (i-\dot{P})_{t-1} + \dots$$

Additionally, we must test a fourth equation that includes the implication that an increase of real deposit rates will cause a shift from narrow money to savings and time deposits

$$5) \quad SD/(CR + DD) = e + f(i-\dot{P})_t + g(i-\dot{P})_{t-1} + \dots$$

In short, these four equations express the relationship between the real size of the financial sector and the real return on monetary assets. To quote Shaw:¹

"Low or negative and uncertain real deposit rates repress voluntary and total demand for real stocks of claims, including money, against financial intermediaries. Devices to make indirect finance shallow, they reduce the capacity of this financial process to provide savings for investment.... The presumption must be that repression of indirect finance reduces total desired stocks of financial assets and, given constraints on self-finance of investment, the private domestic ratio of savings to income."

The regression results are presented in Table # 4 which shows

¹Shaw(66), pp. 85

TABLE # 4

The Real Size of the Financial Sector as a Function of Inflation and Real Interest Rates. Ecuador: 1948-1976

<u>DEPENDENT VARIABLE</u>	<u>ESTIMATION TECHNIQUE</u>	<u>INTERCEPT</u>	<u>$\dot{P}_t$</u>	<u>$\dot{P}_{t-1}$</u>	<u>R²</u>	<u>D.W.</u>
CR/GDP	OLSQ	-.813	-.0350 (1.872)	-.0081 (.426)	.3089	1.833
DD/GDP	OLSQ	-1.316	-.0780 (2.005)	-.0687 (1.749)	.5885	1.600
	CORC	-1.376	-.1063 (2.336)	-.1083 (2.275)	.5681	1.924
			<u>$(i-\dot{P})_t$</u>	<u>$(i-\dot{P})_{t-1}$</u>		
SD/GDP	OLSQ	-3.783	.0406 (3.355)	.0030 (2.500)	.5617	1.525
	CORC	-4.222	.0520 (7.123)	.0012 (1.503)	.5485	1.990
SD/(CR+DD)	OLSQ	-2.351	.0362 (11.67)	.0058 (3.210)	.6306	1.512
	CORC	-2.346	.0403 (2.210)	.0029 (1.495)	.6188	1.680

OLSQ: Ordinary Least Squares

CORC: Cochrane-Orcutt Procedure

Note: "t" values are given in parentheses, those marked () are not significant at the 5 percent level. All variables are expressed as logarithms.

the impact of the inflation and interest rates variables on the real size of the financial sector.

The empirical results suggest that the lags due to adjustment and the formation of expectations are not long, requiring independent variables for only two periods, and in some cases for only the current period. In the cases where the Durbin-Watson statistics suggested that a first-order linear correlation of the residuals may exist, the equations were reestimated again making use of the Cochrane-Orcutt iterative technique. Both results are reported. The R^2 's for the regressions show that .3089 to .6306 percent of the variation in the real size of the financial sector is explained for inflation and real interest rates variables. When the Cochrane-Orcutt procedure was used, the R^2 's decreased by an average of two percent.

An analysis of these results support the following conclusions:

- (i) A higher rate of inflation significantly reduces the ratios of both currency and demand deposits to gross domestic product. This shows the negative impact of inflation on the demand for real cash balances.
- (ii) The negative impact of inflation is more noticeable on the demand deposits ratio than on the currency ratio. This suggests that the public tends to "economize" more on the use of money in the form of demand deposits than in the

form of currency when they are faced with an increase in the rate of inflation.

- (iii) An increase of the real interest rate has a positive impact on the ratio of savings and time deposits to gross domestic product. This shows that the real size of savings and time deposits can be stimulated by an increase in the real rate of return on monetary assets.
- (iv) An increase of the real rate of interest on bank deposits has a positive impact on the ratio of savings and time deposits to narrow money. This shows that higher real rates of interest cause a shift from money in the form of currency and demand deposits to money in the form of savings and time deposits.

In sum, the regression results lend support to the assertion that a decrease of the real return on money holdings significantly reduces the real size of the financial sector.

Finally, our hypothesis requires an empirical testing of the effects of financial growth on capital formation. That is, we are still faced with the problem of determining the "complementary" and "substitution" ranges between monetary assets and physical capital.

In other words, we want to test the assertion that:¹

"Financial growth is conducive in other ways
to more discriminating choice between invest-

¹Shaw(66), pp. 75-76

ment alternatives. Larger lumps of investment are feasible in the private sector when savings are pooled in financial markets. Diffusion of superior technologies can be faster on the basis of information and experience that is accumulated in financial institutions, and complementarities between investments may be exploited more quickly than is possible on segmented capital markets."

Clearly, the implication is that a higher real rate of return on money holdings relaxes the savings-investment bottleneck of an underdeveloped economy by increasing its real stock of money, especially by enlarging that fraction of money held as bank deposits, and, thus, generating investment on physical capital.

However, we shall expect a complementary effect only in the range where the real return on money holdings is smaller than the real return on physical capital. Once the real return on monetary assets rises beyond the marginal productivity of investment, the conventional substitution effect between money and capital becomes dominant and generates a reduction in the aggregate flow of investments. The relationship between investment and financial sources, then, has a quadratic form.

Since the main objective is to test the impact of the real size of the financial sector on the investments to output ratio, the

relationship must be expressed in terms of real investment and real bank deposits to real output ratio,

$$6) \quad I/GDP = h + i ((DD+SD)/GDP) + m ((DD+SD)/GDP)^2$$

The dependent variable that we chose to represent capital formation is the share of gross private domestic fixed investment in gross domestic product (GPDFI/GDP).

It should be pointed out that gross investment includes a certain amount of investment undertaken merely to replace old capital that has depreciated by wearing out or becoming obsolete, thus, it is not the best measure of capital formation. However, it is the only available data since reliable information on capital depreciation does not exist.¹

The GPDFI has been estimated by the Central Bank by subtracting increase in stocks (inventories) from total private domestic investment expenditures.

The regressions results of equation 6 follow:

$$6) \quad I/GDP = -.026 \quad + 1.72 (BD/GDP) \quad - 5.06 (BD/GDP)^2 \\ \quad \quad \quad (.017) \quad \quad (.311) \quad \quad (1.526)$$

$$R^2 = .8386 \\ D.W. = 1.897$$

where BD is total bank deposits (BD = DD + SD). The intercept is not significant (standard errors appear in parentheses).

¹For tax purposes, the "depreciation rate" is regulated by law. It is, then, this "rate" which is reported by private enterprises.

Consider the following figure drawn on the basis of the results of the last equation:

It should be pointed out that these results are only tentative since the observable data deals only with the upwards sloping range of the function. Furthermore, the optimum total bank deposits to gross domestic product ratio (17%) must be considered only as a theoretical optimum¹ because more variables are needed to account for the movement of the economy from one stage to another in the process of financial growth.

However, since the coefficient of the first term of equation (6) is positive and the coefficient of the second term is negative, the results suggest that in the Ecuadorean economy there exists a complementary effect between the real size of the financial sector (bank deposits) and private investments in physical capital.

¹The value (17%) may be obtained by differentiating the dependent variable (investments ratio) with respect to the independent variable (bank deposits ratio) and setting the resulting equation equal to zero. On the other hand, the implicit optimum share of bank-financed private investment in GDP is 14.5 percent.

Spectral Analysis

The empirical results discussed in the preceeding section supported the hypothesis of a complementary effect between monetary assets and investment in physical capital. Therefore, an increase of the real rate of return on money holdings is bound to have a positive impact on physical capital formation.

It should be clear that this conclusion rests not only on the statistical results, but also on the analysis of the Ecuadorian financial sector. The latter, as stated earlier, has two principal characteristics: First, commercial bank deposits (demand plus time and savings deposits) are the only external financial resources available for individual investors, due to the absence of capital markets. Second, the scarcity of bank deposits, due to the imposition of interest rates ceilings, determines a bank-credit rationing process. In these conditions, a situation of excess-demand for credit exists and, thus, an expansion of the supply of credit will be absorbed by potential investors up to the point where the real return on monetary assets becomes equal to the marginal productivity of physical capital.

One may argue, however, that nominal interest rates are determined by policy makers to suit the private demand for credit.

To test direction of causality, in this section we use a completely different technique for hypothesis testing. Such a tech-

nique is based on cross-spectral analysis.

Before employing this technique, it is convenient to illustrate the issue under discussion. Let us start with a simple diagrammatic representation of the financial market:

where r is the real rate of interest ($r = i - \dot{P}$), SC is the supply of credit, DC is the demand for credit, BD is bank deposits. The diagram illustrates the fact that the supply of and demand for credit are functions of the real rate of interest on monetary assets.

In equilibrium conditions $r = r^2$, and $SC = DC = BD = BD^2$. However, if a ceiling is imposed on the nominal rate of interest, and prices are not deflating, the real rate of interest will have a ceiling such as $\bar{r}$. In such a case, we will have a situation on which the actual amount of bank credit is determined only by the supply side (i.e., $BD = SC$, as long as $\bar{r} < r^2$).¹

In conditions of excess-credit demand, then, the observations on interest rates and bank deposits will trace the supply curve.

¹The reverse holds if $\bar{r} > r^2$. In which case we will have an interest rates floor.

Since demand for credit is a flow, and bank deposits is a stock, in this model BD refers to change in bank deposits.

In other words, the statistical findings will show a positive correlation between real interest rates and the size of the financial sector. Such a positive correlation was found in the last section.

However, if the supply or demand for credit -or both- do not depend only on real interest rates but on other variables, quantitative or not, which have not been taken into consideration, the statistical results may not represent the actual market situation. In short, the presence of unstable functions makes the results of simple regression analysis uncertain.¹

Alternatively, one may argue that since interest rates are controlled by policy makers, such rates (our $\bar{r}$'s) must be equilibrium values that the authorities have estimated to suit the economic conditions.

To illustrate this argument, let us consider a simple model of the financial sector:

$$1) \quad SC_t = f(i-\dot{P})_t \quad f' > 0 \quad (\text{a priori})$$

$$2) \quad DC_t = h(i-\dot{P})_t + g(Y)_t \quad h' < 0, \quad g' > 0 \quad (\text{a priori})$$

$$3) \quad SC_t = DC_t \quad (\text{market equilibrium})$$

where the supply of credit is assumed to be positively correlated to the real interest rate, the demand for credit is assumed to be negatively correlated to the real interest rate and positively

¹ It should be clear that a certain degree of instability, especially on the demand for credit, must be expected in a country like Ecuador, where political factors may play a non-quantitative role.

correlated to the national income level (Y).

The argument assumes that the policy makers know what the actual parameters are. They then multiply the supply and demand functions by the constants (k) and (1-k) respectively, where $0 < k < 1$ is chosen according to, say, the "state of the economy",¹

$$3) \quad k(SC) = kf(r)$$

$$4) \quad (1-k) (DC) = (1-k) h(r) + (1-k) g(Y)$$

since they are interested in the market clearing conditions, substitute $BD = SC = DC$. Adding the supply and demand equations together, we have:²

$$5) \quad BD = (kf + h - kh) r + (1-k) g(Y) \quad , \text{ or}$$

$$5)' \quad r = (BD - (1-k) g(Y)) / (kf + h - kh)$$

Substituting on equation 5)' the parameters k, g, f, and h, and the variables BD and Y, the policy makers are able to obtain the resulting equilibrium value (r^2).

The specified situation assumes that the resulting interest rate is continuously in equilibrium. That is, it implies that the correct choice of the parameter k will produce market equilibrium. This assumption can also be explained with the use of our simple diagram:

¹To simplify the notation the time subscript t is omitted, and the notation r is used instead of (i-P).

²Clearly, $BD = k(SC) + (1-k)DC$, since $BD = SC = DC$.

Where the empirical observations of the r 's and BD 's are, in fact, equilibrium values. If that were the case, causality would not run from interest rates to supply of credit and, thus, to capital accumulation, as we have argued ($r \Rightarrow SC \Rightarrow DC$); Instead, causality would run from demand for credit to interest rate fixation and, thus, to supply of credit ($DC \Rightarrow \bar{r} \Rightarrow SC$).

However, if we examine again equation 5, we see that the assumed equilibrium does not hold. In equilibrium $BD = SC$, but equation

$$5) \quad BD = (kf + h - kh)r + (1-k) g(Y).$$

contains income, a variable that in the model does not affect the supply of credit. There are, however, two special cases under which equation 5 may represent the supply of credit:

- i) If $g = 0$. In this case income is excluded as a variable affecting the demand for credit, and we are back with the first issue.
- ii) If $k = 1$. In this case only the supply of credit determines the size of the financial sector, which is our argument.

Nevertheless, suppose that equation 5 represents in fact the demand equation and, thus, the demand for credit is observable.

This assumption, however, implies a restriction on the "policy" parameter k . Let us examine again equation 5,

$$5) \quad DC = BD = (kf + h - kh) r + (1-k) g(Y)$$

where the negative interest rate coefficient of the demand function implies,

$$kf - kh + h > 0$$

therefore, k must be restricted to:

$$0 < k < h/(h-f)$$

Let us recall that f represents the positive effect of interest rates on the supply of credit and h represents the negative effect of interest rates on the demand for credit.

However, with f positive and h negative there are many values of k satisfying this restriction. The demand equation is therefore not identified.¹

In sum, the demand for credit is not an observable variable; all that can be observed is bank deposits. We have identified bank deposits with supply of credit. However, questions must arise as to whether one is not inadvertently observing the combined effects of both the supply and demand functions, rather than the supply of credit alone.

This potential controversy may have not been satisfactorily sol-

¹For a detailed explanation of the identification problem in Econometrics see, J. Kmenta(45) chapter 13, H. Theil(74) chapter 9, K. Wallis(85) chapter 4, J. Johnston(44) chapter 12, among others

ved with the use of regression analysis, then, a test on the direction of causality between prices, real interest rates, and monetary assets, with the use of cross-spectral analysis seems more appropriate.

Cross-Spectral Technique

A detailed exposition of this technique can be found elsewhere.¹ Here, however, we introduce only those aspects of spectral methods that are relevant for the issue under discussion, namely, the direction of causality between real interest rates and monetary assets.

To avoid constructing increasingly complicated equations, which are characteristic of this type of methodology, let us define a priori the real rate of interest on monetary assets as the "input variable" and the volume of bank credit as the "output variable" of the system. Then, our hypothesis can be simply expressed as: "input is causing output".²

The relationship between interest rates and bank credit, then, can be expressed as follows:

$$1) X_t = f(Y)_t + U_t$$

$$2) Y_t = h(X)_t$$

where X_t is the amount of bank credit in period t , Y_t is the interest rate in period t , and U_t represents all the information, independent of Y_t , available in period t . The second equation

¹See, for example, C.W. Granger and M. Hatanaka(31), G.S. Fishman(21), M. Nerlove(56).

²It should be clear that if our hypothesis proves not correct, the bank credit variable becomes "input" and the interest rate variable becomes "output".

of the system considers the potential case in which a feedback from bank credit (X) to interest rates (Y) is also present in the system. Clearly, if $h \neq 0$, the "input" variable is itself determined by the "output" variable.

In such a system, causality can be defined as follows:¹

"If $\sigma^2(X/U) < \sigma^2(X/U-Y)$, we say that Y is causing X, denoted by $Y_t \rightarrow X_t$. We say that Y_t is causing X_t if we are better able to predict X_t using all available information than if the information apart from Y_t had been used."

The advantage of using this method, for solving the issue under discussion, is explained by Granger and Hatanaka as follows:²

"One of the important features of spectral and cross-spectral analysis is that it provides ways of observing how certain quantities vary with frequency. Just as it is possible for the strength of the relationship between two series (coherence) and the phase-lag to vary with frequency, so also is it possible that the strength of causality (and thus of feedback) and the causality lag to change with frequency. A simple (and highly unreal) example will perhaps help to show this. Consider two stock exchanges in some country, one of major

¹C.W. Granger(30) pp. 428.

²Granger-Hatanaka(31) pp. 123.

importance (A) and the other of lesser importance (B). Clearly, B will be likely to follow all the fluctuations, both long-run and short-run, of A, and so we have $A \Rightarrow B$. However, A will be unlikely to be affected by the short-run fluctuations of B, but may be concerned by the long-run fluctuations. Thus, if a subscript L denotes the low-frequency component and subscript H the high-frequency component, we may have

$$B_L \Rightarrow A_L$$

$$B_H \not\Rightarrow A_H$$

Thus, in this example, feedback will only occur in the low frequency range."

Such a test of causality is based on the predictability of the linear trend of some variable, say X_t , and on the variance of the residuals from such a trend.

It follows that a purely deterministic series (i.e., series which can be predicted exactly from its past terms such as nonstochastic series) cannot be said to have any causal influences other than its own past. Therefore, to test causality between prices, real interest rates, and money, the implicit assumption is that such series are stochastic.

A test of causality between two series, say X_t and Y_t , using spectral techniques is based on the fluctuations of the two variables from their own trend. If Y_t follows consistently all the fluctua-

tions of X_t , then X_t is causing Y_t . If this pattern is not consistent then we can not say that X_t is causing Y_t .

The resulting pattern between two series is provided by a cross-spectral computer program, in which the only required specification is the definition of the "input" variable. That is, the specification of the hypothesis: " X_t is causing Y_t ". We defined, alternatively, the three basic forms of money as the "output" variable.¹

The computer program prints out a frequency band. The positive range of the band denotes the frequency in which the "output" variable follows the fluctuations of the "input" variable. While in the negative range of the band, the causality is reversed.

Consider, for example, the following figure:

If the computer has printed a frequency band such as A, then

¹Since both "input" and "output" quantities already appear in the computer program, a rerun of the program reversing the input-output definitions is not necessary because the results of the second run are implicit in the first run.

the variable that we have defined as "input" is in fact causing the "output" variable to fluctuate. Whereas the frequency band B denotes that it is the "output" variable which is causing the "input" variable to fluctuate.

One of the reasons why spectral techniques are not very common in economics is the very large number of observations required.¹ We used 84 quarterly observations (1957.1-1977.4) on prices (consumer price indexes), nominal interest rates, and on the three basic forms of money (currency, demand deposits, and savings and time deposits). The resulting cross-spectrum between our reference series of prices and interest rates, against the three basic forms of money respectively, are shown in Figure # 1.²

In interpreting these results, it is necessary to emphasize that these tests do not provide direct evidence on the degree of causality. That is, these results must be interpreted in terms of direction rather than in terms of magnitude.

The analysis of Figure # 1, in general, does not provide clear cut results for the direction of causality between real interest rates and currency (diagram 1.3), and between real interest rates and demand deposits (diagram 1.5); the direction of causality between prices and currency is not clear either (diagram 1.1), the first half of the frequency band suggests causality from currency to prices but, in the second half this role is reversed.

¹A "rule of thumb" defines 90 as the optimal value.

²I would like to thank Pierre Siklos for using his time in the elaboration of the computer program and in the interpretation of the results.

Figure № 1 .Cross-Spectrum of causal relations between input and output

Diagram 1.1 , Input : prices
Output: currency

diagram 1.2 , input : prices
output: demand deposits

diagram 1.3 , input : real interest rate
output: currency

diagram 1.4 , input : prices
output: savings deposits

diagram 1.5 , input : real interest rate
output: demand deposits

diagram 1.6 , input : real interest rate
output: savings deposits

The results reported in the other three diagrams, however, are clear. Diagram (1.2) shows that causality runs only from demand deposits to prices, diagram (1.4) shows that causality runs only from prices to savings deposits, and diagram (1.6) shows that causality runs only from changes in the real rate of interest to changes in bank deposits.

According to these results, an increase in the nominal rate of interest and/or a decrease in the rate of inflation will increase the real amount of bank deposits. Hence both nominal interest rates and inflation influence the desire for real cash balances holdings. We have separated the holdings of real balances into its three components (currency, demand deposits, and savings and time deposits), because movements of the real rate of interest on money do not necessarily have the same impact on the demand for each form of money. As stated earlier, in the Ecuadorian banking system, demand deposits have no deposit rate, therefore, the real interest rate on demand deposits -and on currency- is determined only by the rate of inflation, whereas the real interest rate in savings and time deposits is determined by both nominal interest rates and inflation rate. Furthermore, only bank deposits (demand plus savings and time deposits) determine the volume of financial resources, while holdings of currency do not contribute directly to the availability of credit of the financial sector.

Nevertheless, it should be pointed out, that the conventional measure of the real return on monetary assets in terms of nominal interest rate and/or in terms of the inflation rate does not represent completely the actual return on real money.¹ The return on money depends also on the services it yields as a means of payment and a store-of-value. In the context of this dissertation, however, we are concerned more with the role of the banking system as a financial intermediary between savers and investors than with its role in the determination of the quantity of "inside" money. Hence the return on money associated with its store-of-value function becomes more relevant than the return on money associated with its convenience as a medium of exchange. For this reason, the real return on money holdings have been approximated by the nominal deposit rate of interest minus the expected rate of inflation, since the latter represents the rate of deterioration in the value of real money holdings through time. The expected rate of inflation, in its turn, has been assumed to be the same as the actual rate.

These simplifications, plus the fact that currency and demand deposits bear a zero nominal deposit rate of interest, allowed us to relate the return to holding these two forms of money with the negative of the rate of change in prices. On the other hand, since the nominal deposit rate of interest on savings deposits (which

¹Additionally, the assumption that only one form of money and only one real interest rate exist, is convenient for the microeconomic analysis, however, it can be misleading at the macroeconomic level.

require a one week notice to withdraw) and on time deposits (which have a compulsory six-months minimum term) is minimum, we have assumed their real interest rate to be the same¹.

The assumption that the aggregate accumulation of physical capital is equal to the gross private domestic fixed investment was also a simplifying assumption. As noted earlier, gross investment includes a certain amount of investment undertaken merely to replace old capital that has depreciated by wearing out or becoming obsolete, thus, it is not the best measure of capital formation. However, it is the only available data because statistical observations on the rate of capital depreciation do not exist. Additionally, the lack of quarterly data on gross private domestic fixed investment did not allow us to run a direct test of causality between bank deposits and private investments. This is so because, as noted earlier, both causality tests (regression analysis and cross-spectral analysis) required a large number of observations. We have only 29 yearly observations on investment and GDP. A sample size that is not useful for causality test.

Finally, it should be pointed out, that limitations in data have forced us to avoid the use of sophisticated and complex procedures of hypothesis testing, generally involving lagged dependent variables and elaborate estimation techniques. However, the sim-

¹Time deposits are apparently more attractive to hold, because they entitle certain additional benefits to their holders. For instance, one may become member of the "bank club" which provides lotteries and other attractions. Time deposits receive an additional .25 percent over savings deposits. The relative advantage of the latter is their degree of liquidity.

ple approach of hypothesis testing that we have followed in this thesis , namely, simple regression analysis¹ and cross-spectral techniques, allow us to make some tentative conclusions.

First, the empirical analysis of the monetarist-structuralist controversy suggested that inflation in the Ecuadorean economy can be safely defined as a monetary phenomenon.

However, it must be stressed that the Latin American structuralism should not deny that monetary variables in some sense determine inflation. Implicit in their analysis is the assumption that the monetary system is having to respond to pressure in order that a given rate of growth and level of employment be achieved. There is always a sense in which the rate of inflation can be "explained" in terms of the quantity of money, the desire for liquidity, the output level and so forth. But for Latin American structuralism this is not the point. The structuralists would prefer to debate the relevance of the parameters relating monetary variables to the real variables of output and employment, and the relevance of introducing political and social variables into the analysis. The possible evil effects of inflation are never denied by either the monetarist or the structuralists. But the weight given to bad effects versus good is radically different. The structuralists sceptical of the potential of free enterprise and seeing structural bottlenecks as preceding inflation, see any monetary measure

¹As with all simple regression analysis, the words "explained by" do not necessarily mean "caused by".

to lower the rate of inflation as harmful to the goals of development. The monetarists, believing in the potential for development given by free enterprise in a healthy economy are inclined to stress the negative effects of inflation.

Our analysis has not been concerned on those issues as such, but with the quantitative aspects of the direction of causation between prices and the quantity of money. Since causality seems to run from the stock of money to prices but not from prices to money stock, we concluded that the monetarist explanation of inflation is more relevant for the case of Ecuador. This result permits us to hypothesize that an increase in the demand for money will produce a decrease in the inflation rate.

Second, we have used two different methods to test the validity of the inclusion of savings and time deposits as part of the stock of money; namely, the Timberlake-Fortson method based on the assumption that "money matters", and the Gurley-Chetty method based in the "utility function" of money demanders. The empirical results of both methods suggested that it is valid to consider savings and time deposits as part of the stock of money. These results permit us to hypothesize that the relative size of the three basic forms of money depends directly on their relative rates of return. Therefore, for a given demand of broad money (M_2), there is a substitution to bank deposits from currency as the nominal deposit rate increases.

Third, the empirical results suggested a quadratic relationship between the rate of capital formation and the real size of the financial sector. That is, the hypothesized complementary effect between money and physical capital is supported by the available statistical data. Thus, policies which seek to increase the real size of the financial sector are potentially capable of significantly enhancing the growth rate of capital formation. The increase of the financial sector, in its turn, depends on the success of the banking system in stimulating bank deposits. Since the nominal deposit rate and the rate of inflation are both instruments for regulation of the real rate of interest, and since nominal money is the instrument for regulation of the price level, capital formation becomes a direct function of monetary policies.

6 SUMMARY AND CONCLUSIONS

This dissertation has been devoted largely to an analysis of the role of money in economic development. The centerpiece of analysis was the domestic financial market of Ecuador and the way in which that market is governed by the banking system. The absence of an organized capital market determines that commercial banks are the only channels through which funds flow from savers to investors. The volume of financial resources, then, was identified with monetary assets held as bank deposits.

In this environment, we have emphasized, there exists a complementary effect between the accumulation of monetary assets and physical capital formation. Therefore, policies that promote increased holdings of monetary assets by the private sector are bound to foster private investments on physical capital.

In Chapter I we examined the traditional portfolio approaches designed for developed economies with perfect capital and financial markets. More specifically, we emphasized that, in the context of developed economies, private savers could hold part of their accumulated wealth in the form of real cash balances and part in the form of physical capital. Money and physical capital, then, are viewed as competing assets, and the precise allocation of wealth-holdings between them depends upon the utility function of wealth-holders and upon the relative real rate of returns that

they carried. Therefore, variations in the rate of monetary expansion -which affect the real rate of return on monetary assets- change the equilibrium capital intensity of the economy. The effects of the introduction of money into the economy, however, are subject to a theoretical controversy: On the one hand, Tobin(81) argues that a monetary economy must be characterised by a lower steady-state capital to labor ratio than a barter economy. This is so, because a monetary economy channels only part of its savings to the accumulation of physical capital, while the remainder is allocated to the accumulation of monetary assets. On the other hand, Levhari and Patinkin(48) argue that it is not necessarily the case that a monetary economy exhibits a lower-steady capital to labor ratio, because the use of money permits real resources to be freed from exchange activities for use in productive activities.

In the context of this dissertation, this controversy presents a potential threat. We argued that an increased monetization of the system is necessary for economic growth. Within the theoretical framework of traditional monetary theory, one may argue that increased monetization diverts some savings away from physical capital formation, which would tend to lead the economy to a lower growth path. Alternatively, one may argue that the increased monetization of the system decreases the amount of real resources required to perform a given volume of exchange activi-

ties and, therefore, it leads the economy to a higher growth path.

Fortunately, in two recent works by Shaw(66) and McKinnon(51), which deal explicitly with the role of money in growth of less-developed economies, this controversy is solved. In their theoretical work both Shaw and McKinnon rejected the conventional substitution effect between money and physical capital. Instead, they emphasized that money is a conduit through which capital accumulation takes place, at least in the range where the return on monetary assets is smaller than the return on physical investments. Their attack on the applicability of familiar monetary growth models was based on the fact that the assumption of perfect capital markets and their frequent implication that the holding of increased monetary assets will reduce the volume of physical capital formation, was not applicable in most of the underdeveloped world.

It was stated that an underdeveloped economy has basically the following characteristics:

- i) The markets for inputs and outputs are fragmented. Therefore, the markets do not report uniform prices and the diffusion and adoption of optimal technology is slow and expensive. In this environment, investment requires a longer time interval than consumption and thus desired monetary assets are correlated to the desired rate of capital accumulation.

ii) The store-of-value function of money becomes more important than its medium of exchange purpose. This characteristic was explained on the basis that money is the more important factor in the process of financing the accumulation of capital. Hence, the role of money is the intermediation of debt through the banking system.

iii) Absence of capital markets. This characteristic implies that real money balances are the only financial instruments that can be accumulated as an efficient store-of-value.

These three fundamental characteristics of underdeveloped economies, in their turn, generate the complementary hypothesis and the debt-intermediation function of money emphasized in the Shaw-McKinnon approach. As it was stated earlier, it is this approach which provided us with a theoretical framework of reference for the analysis of the role of money within the institutional economic framework of Ecuador.

In Chapter II, the causes of inflation, as discussed in the Latin American monetarist-structuralist controversy, were examined.

Latin American monetarism suggests that the factors which cause inflation in Latin America are primarily a matter of excess demand and, therefore, inflation is just the logical consequence of the stock of money growing at a faster rate than the growth of physical output. Latin American structuralism, on the other hand, stresses the relative backwardness of the agricultural sec-

tor which results on increasing agricultural prices over time. Since other prices do not fall, the price level increases.

The empirical testing of both hypotheses was two-fold: First, a model of inflation in which relative prices could affect the overall rate of inflation was formulated.

Second, the monetarist-structuralist controversy was examined in terms of causality between money and prices. In this alternative formulation both monetarist and structuralist hypotheses were incorporated. In the monetarist framework the government is viewed as exogenously setting the supply of money to match government expenditure and, therefore, determining the level of aggregate demand. Whereas, in the structuralist framework money becomes an endogenous variable, passively responding to past inflation.

The relevance for testing the causality between prices and money as a way to test this controversy, is due to the fact that if causality runs only from past changes in the supply of money to changes in the rate of inflation, the monetarist position proves to be correct. On the other hand, if causality runs also from past inflation to actual money supply, the structuralist argument that the government, to maintain the real level of expenditure, must print money at an increasing rate, cannot be rejected. The empirical results supported the arguments of the Latin American monetarism. We were able also to infer that the rate of change in the demand for money at a given level of income is determined

by the rate of change of real returns on monetary assets.

In the context of this dissertation these empirical findings are important because, as stated explicitly in Chapter IV, we are adopting a monetarist position to the effect that high rates of inflation are explained in terms of excess supply of money. However, our monetary policy recommendations for ending inflation are not directed towards a reduction of the rate at which the nominal supply of money is expanded, but towards a reduction on the excess supply of money through an increase in the demand for money.

More specifically, our argument was that an increase in the interest rate of bank deposits, which in Ecuador is institutionally determined, will provoke an increase in the amount of real money balances that the private sector want to hold. This mechanism, then, will gradually reduce the rate of inflation, even if the rate of growth of nominal money balances is constant.

In Chapter III, the financial sector of Ecuador was examined. The real size of this sector was measured by two ratios: the ratio of deposit money to money supply, and the ratio of bank deposits to gross domestic product. The increase of both ratios was identified with a growing size of the financial sector because the more deposits liabilities of the banks, the more capable banks are to extend credit to private investors.

While the ratio of bank deposits to GDP is a direct measure of the volume of lending and borrowing operations via the banking system, the ratio of deposit money to money supply indicates the degree in which transactions are settled by deposits money instead of currency (i.e. the importance of the banking system in the overall economy),

It was emphasized that the scarcity of available financial resources has generated a credit rationing process. This peculiarity imposes the question: What relevant monetary measures can be adopted by the Monetary Authority to affect the availability of bank credit to the private sector of the economy?

Ecuadorian governments have employed many types of techniques to influence credit conditions. These have included controls on prices; varying uses of investment subsidies; exchange-rate adjustments; changes in the expenditure-revenue relationship; controls on lending and borrowing; and changes in interest-rates and in the supply of money. Since the volume of money and credit have been affected in some degree by all these types of techniques, it is difficult to draw a clear dividing line between those techniques classified as part of monetary policy and those that are not.

In the context of this study, however, monetary policy was defined as that type of policy which is able to influence the real size of the financial sector. For example, an increase in the expansion rate of the supply of money may not be absorbed by demand for money and, therefore, it may not influence financial re-

sources. Low interest-rates discourage accumulation of monetary assets and the resulting credit rationing forces potential investors to seek non-efficient forms of capital accumulation.

When analysing the role of money in the context of the Ecuadorean economy we can consider two contrasting circumstances:

First, we can assume money to be held constant in the face of changes in exogenous demand. For example, an upward revision of private-sector investment plans may occur at a time when the Central Bank is adopting a tight monetary policy and when commercial banks use all their reserves.

In the context of advanced economies, the fact that money supply is fixed does not prevent additional investment expenditure, since finance can be obtained through the sale of securities to holders of idle balances. The interest-rate mechanism, however, determines a limit in the securities-money substitution: the more difficult is to persuade money-holders to substitute securities for money the greater is the rise of the interest rate. On the other hand, the higher is the rate of interest the more restricted will be the increase in investment. But this type of mechanism is not relevant to the Ecuadorean economy. The absence of well-established bonds, securities and stocks markets, determines a very limited amount of finance obtainable by sales of non-monetary financial assets to the private sector. If private investment is to occur, credit must be obtained from the banking system or from

abroad, and in either case this will mean an increase in the supply of money.

Second, we can assume an exogenous change in the supply of money without a simultaneous exogenous change in demand. In the context of a developed economy an increase in government expenditure in excess of tax revenue (bond financed deficit) can affect income and expenditure through the resulting movement in asset prices, (i.e., through the wealth effect), so that it is possible

for changes in the supply of money to be used as an instrument of policy, at least when the resources of the economy are not at full-employment. But this is not relevant for the Ecuadorean economy because, again, the scope for open-market operations is constrained by the non-existence of domestic capital markets.

Although the analysis of traditional monetary theories for the cases of fixed money-supply and of exogenous changes in money have no obvious relevance to an economy such as Ecuador, this does not mean that monetary policy will not exert any influence in economic development. In Ecuador, as stated earlier, an exogenous -or endogenous- increase in the demand for monetary assets is identified with an increase of the assets of the financial sector. Furthermore, an increase in the volume of real financial resources, at the present institutional economic conditions of Ecuador, is bound to be absorbed by would-be investors. To the extent that monetary policy creates the necessary conditions for

monetary assets to be desirable to hold, it generates a process of capital accumulation.

In Chapter IV, on the basis of the discussion of the preceding chapters, the main hypothesis was developed explicitly. The theoretical arguments can be summarized in two simple propositions: First, for a given level of inflation, an increase in the nominal rate of deposits will increase the real size of the financial sector because of both a substitution of bank deposits for currency and an increase in the attractiveness of holding monetary assets.

Second, an increase in financial resources (bank deposits) would be absorbed by individual investors up to the point where the real rate of interest on loans becomes equal to the expected real return on investment on physical capital.

The imposition of ceilings in the nominal interest rate, however, frustrates the realization of these two propositions, and it creates excess demand for credit which, in its turn, generates a credit rationing process.

Implicit in these propositions were two basic assumptions about the demand for money and the average saving propensity that are applicable to an economy like Ecuador:

- i) The demand for real cash balances is an increasing function of real wealth, of real income, and of the nominal yield on money.

This assumption is also applicable for a developed economy. However, the demand for real cash balances is a decreasing function of the expected marginal productivity of physical capital in a developed economy, while it is an increasing function of the expected marginal productivity of physical capital in an economy without capital markets.

ii) The average saving propensity increases as the interest rate becomes higher in an economy like Ecuador. Thus, the savings-interest relation is positive.

A constant marginal propensity to save is accepted as empirically valid for the case of developed economies, but for the case of underdeveloped economies this assumption is less satisfactory.

As Bruton put it:¹

"Present data are insufficient to test in any reasonably satisfactory way all the many hypotheses that could be used to explain the relationship between S and Y over long periods. Until we know more about the behaviour of the saving-income relation through time in the highly developed countries, it seems futile to speculate on its behaviour in an underdeveloped country."

On the other hand, the fact that private savings in an underdeveloped economy are inadequate to finance economic growth has given

¹H. Bruton(6).pp.329.

rise to theories that stress the use of inflationary policies in order to produce involuntary saving by the private sector. Such theories of "Inflationary Finance" are represented by the work of Mundell¹. The idea that inflation can be used as a means of economic growth is not new in the economic literature. For example, in France in the sixteenth century, in Russia in the seventeenth century, and in England in the second half of the eighteenth century, it has been claimed that inflation, through the favourable effects on profits, savings and investment, has been a powerful stimulant to growth.²

"Inflationary Finance" theories stress the fact that inflation is a tax on real money balances. Therefore, inflation is the means by which resources are effectively transferred to the government.

The "Inflation Tax" consists of the reduction in the real purchasing power of money and the real resources that the holders of money must forgo to restore the real value of their money holdings.

In the absence of a general framework within which to examine the problems of an underdeveloped country, much of the discussion has taken place in the context of the inflationary finance approach. Two principal differences between this approach and the approach that we have analysed in this dissertation must be especially pointed out.

¹R. Mundell(54)

²For a detailed exposition of this point, see E. Hamilton(36).

First, in the context of inflationary finance approaches, if developing countries are characterized as fully employed, any increase in the nominal quantity of money will involve inflation. That is, in full employment, it is assumed that the rate of inflation is equal to the rate of monetary expansion. In the theoretical framework developed in the preceding chapters, however, it is assumed that if the demand to hold money relative to income is rising, monetary expansion to meet this increase in demand will be non-inflationary. In terms of the equation of exchange¹

$$MV = PY$$

where, let us recall, V is the income velocity of money. Defining D as the demand to hold money per unit of income ($D = 1/V$), the equation of exchange in its rate of growth form becomes

$$\dot{M} = \dot{P} - \dot{Y} - \dot{D}$$

so that if $\dot{D} > 0$, we can have monetary expansion ($\dot{M} > 0$) without any increase in the rate of inflation ($\dot{P} = 0$).² In our theoretical framework of reference, the demand to hold money per unit of income is assumed to be a positive function of the real interest rate. So that, if $\dot{P} = 0$, $D = f(i)$. That is, the demand to hold money increases when the nominal interest rate (i) increases. In short, increased monetization of the economy does not necessarily imply inflation.

Second, traditionally monetary growth theories assume that the

¹See equation 18.

²In traditional monetary theory, we can also have $\dot{M} > 0$ without the price level rising, provided that $\dot{Y} > 0$ (i.e., provided that the economy is growing).

ratio of savings to income is constant. The implication is that the level of voluntary saving can not be raised through the use of monetary policies. To raise the level of saving it is necessary to use fiscal policies that are concerned with the implementation of taxes to reduce private consumption. In fact, savings raised by fiscal policy are essentially involuntary savings, except to the extent that fiscal policy may produce some income redistribution between low savers and high savers. The role of monetary policy is also constrained to influence the level of involuntary savings only. This is so, because the government can expropriate private wealth held in the form of real cash balances through the use of the inflation tax. But the use of inflation to expropriate wealth (and thus to increase savings) held by the private sector is another form of "tax" and, thus, one may argue that this is also fiscal policy.

However, in the theoretical framework in which we have developed our hypothesis, we have stressed the fact that monetary policies can raise the level of voluntary savings -held in the form of money- in as much as such policies raise the real rate of return on monetary assets. In fact, it is this possibility which makes monetary policy powerful to increase the rate of capital formation in a country like Ecuador.

The willingness to save, then, depends on monetary policies that determine the real rate of interest and the increase in voluntary

savings is equal to the increase in the real stock of monetary assets. On the other hand, the allocation of the increased private savings into productive investments depends on the commercial banking system which, thus, has two important functions; one to encourage and collect savings in the form of bank deposits, the other to create credit so that savings can be used outside the sector in which they originate.

To quote Shaw:¹

"The function of the monetary system is to supply the appropriate stock and rate of growth of real money balances, providing services of the payments mechanism in which these balances are used. Insofar as growth in real money balances attracts savings of money holder, the function of the monetary system is also to intermediate, allocating the savings between alternative investments in physical wealth or to dissaving. Savings are intermediated, too, between investors repaying debt to the monetary system and investors incurring new debt."

Under those conditions, we have hypothesized, an increase in the nominal rate of interest will result in increased voluntary savings (supply of credit) that will readily find investment outlets (demand for credit) up to the point where the real return on monetary assets (real deposits rate) is equal to the marginal pro-

¹E. Shaw(66) pp. 63.

ductivity of investment in physical capital.

However, a direct empirical test of these propositions is not possible. Especially because of the lack of macroeconomic data on marginal productivity of investment, and because controlled nominal interest rates do not represent the market forces of the monetary sector.

To overcome this problem, an alternative way of empirical testing was developed in Chapter V.

From the empirical results we were able to conclude that:

i) A higher rate of inflation significantly reduces the ratios of both currency and demand deposits to gross domestic product.

ii) An increase of the real interest rate has a positive impact on the ratio of savings and time deposits to gross domestic product.

iii) An increase of the real rate of interest on bank deposits has a positive impact on the ratio of savings and time deposits to narrow money.

These conclusions then, supported the assertion that an increase in interest rates increases the availability of financial resources.

Furthermore, the available data supported the assertion that an increase in financial resources, under the present institutional economic conditions of Ecuador, will be absorbed by potential investors. That is, it supported the hypothesis of a complementary

effect between money and physical capital.

Finally, the empirical results obtained using regression analysis were also confirmed by the results obtained using cross-spectral analysis.

Therefore we conclude that an appropriate use of monetary policy could bring about a higher rate of economic growth and development. By an appropriate monetary policy we mean the release of real rates of interest to disclose the scarcity of capital, to stimulate savings, and to discriminate more effectively between investments. Interest rates ceilings tend to result in a depressed financial system, a lower investment rate and an increased rate spread between investments' marginal product and the real deposit rates paid to wealthowners. This difference gives rise to efforts on the part of investors to secure the rationed credit, as it could be profitably employed for all projects for which the marginal productivity exceeds interest rates. Thus, it generates a rationing process, which is not solved through the price mechanism, so that it not only causes underinvestment, but also presents the possibility of a misallocation of scarce capital.

With regard to complementary policies, the government should encourage the establishment of a broad and active financial market besides the banking system. This can be accomplished by creating an appropriate general economic and political environment on which government as well as private securities become more attrac-

tive to hold. The low-interest rate policy adopted by the Central Bank, supposedly to encourage investment, also works against savings which are the main source of financial growth. Further, low interest on the newly issued government securities determines that bond financed government expenditure can be possible only under compulsory schemes and increases the dependence of government expenditures on newly printed money, which, depresses real financial resources even further. In general, a complementary policy can be accomplished by inducing an increase of all types of financial assets and reducing institutional intervention in the functioning of the financial system.

Nevertheless, it should be pointed out, these conclusions are by no means final. More investigation on the relationships between the monetary sector and the real sector should be made as soon as additional data becomes available. Furthermore, the process of development of financial institutions, other than the banking system, may change the complementary effect between real money and physical capital because monetary assets would not be any longer the only financial instrument that can be accumulated as an efficient store-of-value. In other words, the process of economic development and the change of the economy from one stage to another, must be taken into consideration. Also, similar studies for other developing countries are needed to see if these conclusions can be generalized. However, as they stand now, the

theoretical aspects and empirical results of this study have clearly indicated that institutional financial liberalization would have a significant positive impact on the economic development of Ecuador. This fact should no longer be denied.

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APPENDIX
BASIC DATA

Table A-1

Money Supply, Price Indices, Interest Rates, Ecuador 1957.1-1977.4
(Quarterly Data, in Millions of Sucres and Percentages)

QUARTER	CURRENCY DEPOSITS	DEMAND DEPOSITS	SAVINGS DEPOSITS	M1	M2	PRICE INDICES	NOMINAL INTEREST
1957.1	628.	533.	276.	1161.	1437.	96.2	.062800
1957.2	658.	521.	274.	1179.	1455.	96.8	.065900
1957.3	731.	582.	302.	1313.	1615.	98.0	.064200
1957.4	722.	608.	301.	1330.	1631.	98.5	.066800
1958.1	650.	560.	288.	1210.	1496.	98.0	.067200
1958.2	655.	585.	295.	1240.	1535.	98.5	.068300
1958.3	718.	627.	295.	1345.	1640.	97.5	.064000
1958.4	709.	600.	285.	1309.	1594.	98.1	.063700
1959.1	640.	669.	310.	1309.	1619.	98.0	.064100
1959.2	675.	682.	322.	1357.	1679.	98.0	.063800
1959.3	750.	693.	307.	1429.	1756.	98.1	.064800
1959.4	758.	724.	327.	1482.	1809.	99.0	.064800
1960.1	718.	676.	322.	1394.	1716.	98.1	.064700
1960.2	758.	726.	340.	1484.	1824.	99.1	.064800
1960.3	839.	807.	346.	1646.	1992.	100.2	.062500
1960.4	851.	800.	350.	1651.	2001.	101.6	.061700
1961.1	804.	783.	361.	1587.	1940.	103.0	.061800
1961.2	834.	790.	366.	1624.	1990.	106.1	.061700
1961.3	866.	834.	365.	1700.	2065.	104.0	.063600
1961.4	874.	829.	386.	1703.	2089.	105.2	.065400
1962.1	809.	792.	412.	1601.	2013.	105.0	.065500
1962.2	874.	802.	433.	1676.	2109.	106.0	.064200
1962.3	965.	900.	409.	1805.	2274.	107.0	.063600
1962.4	949.	942.	421.	1691.	2312.	110.2	.064200
1963.1	879.	918.	434.	1797.	2231.	111.0	.064300
1963.2	944.	978.	457.	1922.	2379.	111.0	.064500
1963.3	998.	1033.	464.	2031.	2495.	115.2	.064700
1963.4	1057.	1093.	478.	2130.	2608.	113.5	.064800

(Cont.)

(Table A-1, cont.)

1964.1	982.	1154.	497.	2136.	2633.	114.0	.025400
1964.2	1022.	1142.	527.	2164.	2691.	118.2	.025200
1964.3	1084.	1201.	520.	2265.	2785.	118.1	.025300
1964.4	1156.	1212.	544.	2348.	2892.	116.0	.026900
1965.1	1018.	1122.	572.	2140.	2712.	117.3	.026100
1965.2	1068.	1134.	575.	2222.	2797.	120.6	.026000
1965.3	1176.	1172.	572.	2350.	2922.	121.8	.028200
1965.4	1256.	1203.	605.	2439.	3044.	120.6	.072400
1966.1	1153.	1283.	637.	2436.	3073.	125.1	.022100
1966.2	1171.	1222.	654.	2393.	3047.	126.2	.022000
1966.3	1280.	1298.	649.	2578.	3227.	127.2	.024200
1966.4	1347.	1435.	713.	2782.	3495.	127.5	.075700
1967.1	1256.	1444.	737.	2700.	3437.	128.0	.076500
1967.2	1344.	1526.	787.	2870.	3657.	129.6	.077200
1967.3	1344.	1579.	829.	2923.	3752.	131.6	.077300
1967.4	1404.	1710.	891.	3114.	4005.	134.2	.076500
1968.1	1244.	1838.	1011.	3082.	4043.	135.0	.077100
1968.2	1401.	1876.	1088.	3277.	4365.	135.3	.077300
1968.3	1463.	1957.	1125.	3420.	4545.	137.5	.078400
1968.4	1599.	2083.	1194.	3682.	4676.	138.5	.026400
1969.1	1468.	2060.	1214.	3548.	4762.	140.1	.026000
1969.2	1496.	2002.	1225.	3498.	4723.	142.3	.025500
1969.3	1517.	2100.	1216.	3617.	4833.	143.3	.026200
1969.4	1747.	2434.	1310.	4181.	5491.	145.5	.023300
1970.1	1620.	2320.	1416.	3940.	5350.	145.3	.023400
1970.2	1850.	2306.	1428.	4156.	5584.	145.8	.024200
1970.3	2237.	2631.	1521.	4868.	6389.	151.7	.026100
1970.4	2329.	2855.	1730.	5184.	6914.	158.3	.029000

(Cont.)

(Table A-1, cont.)

1971.1	2059.	2817.	1635.	4956.	6771.	153.1	.089500
1971.2	2170.	2942.	1957.	5112.	7069.	160.7	.089800
1971.3	2225.	3132.	2009.	5375.	7584.	164.5	.095300
1971.4	2414.	3403.	2147.	5817.	7964.	167.5	.095500
1972.1	2424.	3110.	2198.	5534.	7732.	170.1	.096100
1972.2	2493.	3201.	2311.	5694.	8005.	172.7	.096200
1972.3	2609.	3510.	2589.	6179.	8588.	175.5	.096300
1972.4	2690.	4000.	2556.	6690.	9448.	180.5	.096300
1973.1	2734.	4257.	2726.	6991.	9719.	185.5	.096400
1973.2	2897.	4384.	2904.	7291.	10195.	195.5	.096400
1973.3	3207.	4407.	3005.	7614.	10617.	209.0	.096400
1973.4	3610.	5285.	3107.	8903.	12010.	221.8	.089400
1974.1	3482.	5853.	3243.	9355.	12578.	231.0	.089500
1974.2	4032.	4680.	3475.	8712.	14185.	253.5	.072400
1974.3	4295.	6919.	3685.	11212.	14895.	258.7	.072500
1974.4	4770.	8172.	3945.	12968.	16715.	269.6	.063200
1975.1	4457.	8179.	4016.	12656.	16652.	283.0	.063300
1975.2	4626.	8146.	4100.	12776.	16876.	290.5	.063200
1975.3	4857.	9015.	4069.	15670.	17939.	292.0	.063300
1975.4	5308.	9897.	4149.	15283.	19432.	300.5	.073300
1976.1	5931.	10022.	4312.	15053.	19565.	308.0	.073400
1976.2	5945.	10925.	4595.	16870.	21465.	313.0	.073400
1976.3	5540.	11876.	4770.	16422.	23192.	324.7	.072200
1976.4	7570.	13575.	5026.	21145.	25175.	344.6	.060200
1977.1	7595.	13783.	5366.	21088.	26454.	350.1	.060100
1977.2	8240.	14546.	5210.	22786.	27996.	354.5	.062500
1977.3	6731.	15192.	5390.	25923.	29315.	370.2	.062600
1977.4	9152.	16769.	5496.	25901.	31397.	384.2	.067500

Note: Price Indices (Consumer Price Indices)

Interest Rates (Nominal Values) on Savings and Time Deposits (weighted average)

Source: Banco Central del Ecuador, Memorias del Gerente General (1953-1976)
and Boletín Estadístico (Diciembre de 1977)

Money Supply, GPDFI, GDP, Ecuador 1948 - 1976
(Annual Average, in Millions of Sucres)

YEAR	CURRENCY	DEMAND DEPOSITS	SAVINGS DEPOSITS	GDP	GPDFI	M1/GDP	GPDFI/GDP
1948.	355.	272.	89.	6224.	331.	100739	.053181
1949.	373.	268.	96.	6743.	406.	995062	.060211
1950.	476.	390.	130.	7245.	444.	119531	.061284
1951.	479.	340.	123.	7761.	484.	105528	.062363
1952.	535.	439.	144.	8854.	529.	110007	.059747
1953.	566.	461.	173.	9349.	577.	109851	.061718
1954.	662.	562.	217.	10447.	737.	117163	.070547
1955.	627.	515.	230.	11049.	786.	103358	.071138
1956.	705.	593.	268.	11266.	785.	115214	.069679
1957.	722.	608.	301.	12007.	877.	110769	.073041
1958.	709.	600.	285.	12357.	836.	105932	.067654
1959.	758.	724.	327.	13009.	975.	113921	.074948
1960.	851.	800.	350.	14140.	1159.	116761	.081966
1961.	879.	829.	386.	15075.	1276.	113300	.084643
1962.	949.	942.	421.	16104.	1338.	117424	.083085
1963.	1037.	1093.	478.	17437.	1542.	122154	.088433
1964.	1137.	1212.	544.	19414.	1674.	120995	.086226
1965.	1236.	1203.	605.	21675.	1846.	112526	.085167
1966.	1347.	1414.	714.	23542.	2269.	117280	.096381
1967.	1704.	1710.	892.	26012.	2600.	131247	.099954
1968.	1600.	2098.	1145.	27830.	2907.	132878	.104456
1969.	1747.	2434.	1310.	31173.	3329.	134122	.106791
1970.	2329.	2855.	1730.	37064.	3950.	139866	.106572
1971.	2414.	3403.	2147.	40060.	4512.	145207	.112631
1972.	2890.	4131.	2556.	47450.	5821.	147966	.122676
1973.	3618.	5503.	2107.	63142.	7665.	144452	.121393
1974.	4776.	8192.	2945.	91512.	9600.	141708	.104904
1975.	5383.	9897.	2149.	108100.	11188.	141351	.103497
1976.	7570.	13575.	2028.	123870.	13845.	140703	.111770

Note: Gross Private Domestic Fixed Investment (GPDFI)
Gross Domestic Product (GDP)
Currency plus Demand Deposits (M1)

Source: Banco Central de Ecuador, Memorias del Gerente General (1953-1976)

**Table B-1: TOTAL, ECONOMICALLY ACTIVE, INACTIVE, EMPLOYED, AND UNEMPLOYED POPULATION,
BY MAJOR ECONOMIC BRANCHES, ECUADOR, 1950-1975**
(Thousands of Persons)

Major Population Categories	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Total Population	3,230.5	3,328.7	3,429.9	3,534.2	3,641.6	3,752.3	3,866.4	3,983.9	4,105.0	4,229.8
Economically inactive	2,167.8	2,233.9	2,302.0	2,372.1	2,444.1	2,518.2	2,594.4	2,672.7	2,753.3	2,836.2
Economically active	1,062.7	1,094.8	1,127.9	1,162.1	1,197.5	1,234.1	1,272.0	1,311.2	1,351.7	1,393.6
Agriculture	626.1	644.0	662.4	681.2	700.7	720.6	741.2	762.3	784.1	806.5
Mining	5.0	4.9	4.7	4.6	4.5	4.4	4.3	4.1	4.0	3.9
Manufacturing	152.3	156.7	161.1	165.7	170.4	175.3	180.3	185.5	190.8	196.2
Construction	26.5	27.9	29.3	30.9	32.5	34.2	36.0	37.9	39.8	41.9
Electric energy	1.1	1.2	1.4	1.6	1.8	2.0	2.3	2.6	2.9	3.3
Transportation	27.4	28.5	29.6	30.8	32.0	33.3	34.6	36.0	37.4	38.9
Trade	67.9	70.1	72.3	74.5	76.9	79.3	81.8	84.4	87.1	89.8
Services	112.8	116.0	121.6	127.4	133.4	139.8	146.4	153.4	160.7	168.3
Unclassified	45.6	45.5	45.5	45.4	45.3	45.2	45.1	45.0	44.9	44.8
Employed population	1,021.6	1,048.9	1,077.0	1,105.7	1,136.2	1,165.5	1,196.6	1,228.7	1,261.6	1,295.4
Agriculture	604.8	618.2	631.7	645.1	658.4	673.4	687.7	702.3	717.0	732.1
Mining	4.8	4.7	4.6	4.4	4.3	4.2	4.1	4.0	3.9	3.8
Manufacturing	145.5	149.3	153.6	158.1	162.7	167.5	172.3	177.3	182.6	187.8
Construction	25.5	26.9	28.3	30.0	31.4	33.0	34.7	36.5	38.2	40.2
Electric energy	1.1	1.2	1.4	1.6	1.8	2.0	2.3	2.6	2.9	3.3
Transportation	25.8	27.6	28.8	30.0	31.0	32.3	33.5	34.8	36.2	37.6
Trade	65.4	67.4	69.5	71.6	73.8	76.1	78.4	80.8	83.3	85.9
Services	109.8	112.8	118.4	124.0	130.1	136.4	143.0	149.8	157.0	164.2
Unclassified	40.9	40.8	40.7	40.9	40.7	40.6	40.6	40.6	40.5	40.5
Unemployed population	441.1	45.9	50.9	56.4	63.3	68.6	75.4	82.5	90.1	98.2
Agriculture	21.3	25.8	30.7	36.1	42.3	47.2	53.5	60.0	67.1	74.4
Mining	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1
Manufacturing	6.8	7.4	7.5	7.6	7.7	7.8	8.0	8.2	8.2	8.4
Construction	1.0	1.0	1.0	0.9	1.1	1.2	1.3	1.4	1.6	1.7
Electric energy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation	1.6	0.9	0.8	0.8	1.0	1.0	1.1	1.2	1.2	1.3
Trade	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.6	3.8	3.9
Services	3.0	3.2	3.2	3.4	3.3	3.4	3.4	3.6	3.7	4.1
Unclassified	4.7	4.7	4.8	4.5	4.6	4.6	4.5	4.4	4.4	4.3

Table B-1 -- Continued

(Thousands of Persons)

Major Population Categories	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Total population	4,358.4	4,501.1	4,655.1	4,814.3	4,978.9	5,150.3	5,325.9	5,507.5	5,695.3	6,089.7
Economically inactive	2,921.3	3,019.1	3,126.6	3,246.3	3,370.2	3,499.7	3,621.3	3,746.9	3,876.6	4,210.9
Economically active	1,437.1	1,482.0	1,528.5	1,568.0	1,608.7	1,650.6	1,704.6	1,760.6	1,818.7	1,878.8
Agriculture	829.5	853.1	877.5	896.7	916.3	936.4	964.5	993.5	1,023.3	1,053.9
Mining	3.8	3.7	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3
Manufacturing	201.8	207.5	213.5	218.8	224.3	229.9	235.6	241.5	247.6	253.8
Construction	44.1	46.4	48.8	51.9	55.2	58.7	62.6	66.7	71.2	75.9
Electric energy	3.7	4.2	4.7	5.0	5.3	5.6	6.0	6.4	6.9	7.4
Transportation	40.4	42.1	43.7	45.5	47.4	49.4	51.9	54.4	57.1	59.9
Trade	92.7	95.6	98.7	102.2	105.8	109.6	114.3	119.3	124.4	129.8
Services	176.4	184.8	193.5	199.9	206.4	213.1	221.8	230.9	240.3	250.2
Unclassified	44.7	44.6	44.5	44.3	44.2	44.0	43.9	43.8	43.7	43.6
Employment	1,330.1	1,369.4	1,410.3	1,451.3	1,493.7	1,533.9	1,580.5	1,606.9	1,636.8	1,699.9
Agriculture	747.1	765.1	785.5	804.4	823.7	844.9	872.6	883.0	893.6	925.2
Mining	3.7	3.6	3.5	3.5	3.6	3.7	3.8	3.9	4.2	4.3
Manufacturing	193.3	199.5	205.6	212.7	219.8	225.2	228.3	230.3	233.7	241.8
Construction	42.2	44.2	46.6	49.0	51.4	53.9	56.4	59.4	62.4	67.0
Electric energy	3.7	4.1	4.5	4.6	4.7	4.9	5.1	5.7	6.5	7.0
Transportation	39.0	40.7	42.1	44.1	46.0	47.6	49.4	51.1	52.9	55.7
Trade	88.5	91.5	94.2	97.9	101.5	105.3	108.9	112.0	117.7	123.1
Services	171.9	180.1	188.5	195.3	201.7	208.4	216.5	222.5	226.6	236.5
Unclassified	40.7	40.6	39.8	39.8	41.2	40.0	39.5	39.0	39.2	39.3
Unemployment	107.0	112.6	118.2	116.7	115.0	116.7	124.1	153.7	181.9	178.9
Agriculture	82.4	88.0	92.0	92.3	91.2	91.5	91.9	110.5	129.7	128.7
Mining	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.0	0.0
Manufacturing	8.5	8.0	7.9	6.1	4.5	4.7	7.3	11.2	13.9	12.0
Construction	1.9	2.2	2.2	2.9	3.8	4.8	6.2	7.3	8.8	8.9
Electric energy	0.0	0.1	0.2	0.4	0.6	0.7	0.9	0.7	0.4	0.4
Transportation	1.4	1.4	1.6	1.4	1.4	1.8	2.5	3.3	4.2	4.2
Trade	4.2	4.1	4.5	4.3	4.3	4.3	5.4	7.3	6.7	6.7
Services	4.5	4.7	5.0	4.6	4.7	4.7	5.3	8.4	13.7	13.7
Unclassified	4.0	4.0	4.7	4.5	4.3	4.0	4.4	4.8	4.5	4.3

Table B-1 -- Continued

Major Population Categories	1970	1971	1972	1973	1974	1975
Total population	6,177.1	6,384.2	6,598.3	6,819.5	7,048.2	7,284.5
Economically inactive	4,236.2	4,377.1	4,522.6	4,672.6	4,827.4	4,986.9
Economically active	1,940.9	2,007.1	2,075.7	2,146.9	2,220.8	2,297.6
Agriculture	1,085.4	1,119.2	1,154.1	1,190.2	1,227.3	1,265.8
Mining	4.4	4.5	4.7	4.8	5.0	5.1
Manufacturing	260.1	266.6	273.3	280.1	287.1	294.3
Construction	81.0	86.3	91.8	97.7	103.9	110.5
Electric energy	7.9	8.3	8.9	9.4	10.0	10.6
Transportation	62.9	66.0	69.2	72.6	76.2	80.0
Trade	135.4	141.5	147.7	154.3	161.2	168.4
Services	260.3	271.3	282.7	294.6	307.0	319.9
Unclassified	43.5	43.4	43.3	43.2	43.1	43.0
Employed Population	1,765.5	1,830.6	1,903.8	1,977.3	2,053.9	2,133.6
Agriculture	958.0	993.0	1,029.3	1,067.0	1,106.1	1,146.6
Mining	4.4	4.5	4.7	4.8	5.0	5.1
Manufacturing	250.0	254.0	263.5	270.4	277.6	285.0
Construction	71.8	76.8	82.1	87.9	94.0	100.5
Electric energy	7.5	8.0	8.5	9.0	9.6	10.2
Transportation	58.7	61.7	65.0	68.5	72.1	75.9
Trade	128.8	135.0	141.4	148.1	155.2	162.5
Services	246.9	258.1	269.7	281.9	294.6	308.0
Unclassified	39.4	39.5	39.6	39.7	39.7	39.8
Unemployed population	175.4	176.5	171.9	169.6	166.9	164.0
Agriculture	127.4	126.2	124.8	123.2	121.2	119.2
Mining	0.0	0.0	0.0	0.0	0.0	0.0
Manufacturing	10.1	12.6	9.8	9.7	9.5	9.3
Construction	9.2	9.5	9.7	9.8	9.9	10.0
Electric energy	0.4	0.3	0.4	0.4	0.4	0.4
Transportation	4.2	4.3	4.2	4.1	4.1	4.1
Trade	6.6	6.5	6.3	6.2	6.0	5.9
Services	13.4	13.2	13.0	12.7	12.4	11.9
Unclassified	4.1	3.9	3.7	3.5	3.4	3.2

Sources: National Economic Planning and Coordination Board, Section of Human Resources Programming, and IEPD.

**Table B-2: FIRMS REGISTERED UNDER THE INDUSTRIAL DEVELOPMENT LAW
(LEY DE FOMENTO), NUMBER, EMPLOYMENT, INVESTMENT, PRODUCTION,
VALUE ADDED, MATERIALS USED AND ORIGIN -
NEW AND EXISTING - 1957-71**

Years	Classi- fication	Number of Firms	Employ- ment	Investment (S'000)	Value of Production (S'000)	Value Added (S'000)	Primary Materials National	Foreign (S'000)	Foreign as % of Total	Primary Materials Total (S'000)
1957	New	6	327	52,936	113,746	21,244	1,793	64,706	97.3	66,499
1958	Existing	--	--	--	--	--	--	--	--	--
1958	New	13	663	44,081	74,158	19,966	42,090	5,602	11.7	47,692
1958	Existing	2	216	9,586	4,886	2,490	1,979	60	2.9	2,039
1959	New	9	675	100,438	156,010	32,828	48,886	25,523	34.3	74,409
1959	Existing	5	1,304	78,927	43,423	23,214	9,036	7,743	46.1	16,779
1960	New	17	434	69,130	126,675	26,357	69,483	15,141	17.9	84,624
1960	Existing	8	1,889	204,113	85,920	30,129	19,799	24,026	54.8	43,825
1961	New	15	644	197,420	261,935	74,837	58,892	80,491	57.7	139,383
1961	Existing	13	1,468	472,404	229,854	61,561	58,679	27,360	31.8	86,039
1962	New	28	1,048	127,618	123,819	31,951	43,615	24,800	36.3	68,415
1962	Existing	16	2,029	316,476	258,006	62,700	81,558	51,816	38.8	133,374
1963	New	43	1,489	119,179	341,260	92,588	48,152	157,985	76.6	206,137
1963	Existing	25	2,460	533,923	302,017	105,096	85,881	51,253	37.4	137,134
1964	New	49	1,863	286,628	334,080	96,628	59,226	115,689	66.1	174,915
1964	Existing	22	1,412	285,148	183,951	47,449	37,694	49,631	56.8	87,325
1965	New	58	2,132	304,508	600,129	162,265	156,030	201,230	56.3	357,260
1965	Existing	27	2,308	318,730	299,609	81,968	70,117	99,175	58.6	169,292
1966	New	26	732	175,908	200,960	49,553	61,177	49,990	50.0	111,167
1966	Existing	24	1,244	138,483	130,293	28,172	38,571	34,773	47.4	73,344
1967	New	34	1,146	175,747	459,914	87,102	278,124	40,402	12.7	318,526
1967	Existing	18	1,231	192,049	137,787	44,518	49,118	16,196	24.8	65,314
1968	New	32	978	181,766	344,000	85,070	110,158	67,125	37.9	177,283
1968	Existing	10	533	97,576	165,661	23,874	88,535	23,933	21.3	112,468
1969	New	41	1,800	336,761	534,989	150,437	175,828	123,368	41.2	299,196
1969	Existing	17	645	105,903	176,059	37,762	59,571	34,617	36.7	94,188
1970	New	32	1,384	166,268	332,939	102,243	66,119	80,333	54.8	146,452
1970	Existing	13	559	92,340	84,291	21,767	22,847	16,641	42.1	39,488
1971	New	25	1,483	728,897	596,683	248,809	181,994	52,656	22.1	234,650
1971	Existing	16	1,306	109,842	227,999	62,154	102,191	31,040	23.3	133,231
	Total	644	35,402	6,022,785	6,931,052	1,914,732	2,127,143	1,573,305		3,703,448
	New	428	16,798	3,067,285	4,601,297	1,281,878	1,401,567	1,105,041		2,506,608
	Existing	216	18,604	2,955,500	2,329,755	632,854	725,576	468,264		1,193,840

Source: Ministry of Production.

Table B-3a TOTAL CREDITS THROUGH ECUADORIAN FINANCIAL INSTITUTIONS:

By Geographical Regions (Thousands of Sucres)

Years & Months	S I E R R A				C O S T A				REGION INSULAR		
	Banco Nacional		T O T A L		Banco Nacional		T O T A L		O R I E N T E	G A L A P A G O S	T O T A L
	Banco Central	de Fomento	Bancos Privados	d=a+b+c	Banco Central	de Fomento	Bancos Privados	h=e+f+g	Banco Nacional de Fomento(1)	Banco Nacional de Fomento	k=d+h+j+l
	a	b	c	d	e	f	g	h	i	j	k
1971	676.812	304.312	3.659.060	4.640.124	2.085.328	424.721	5.420.387	7.930.436	31.534	2.270	12.604.424
1972	886.758	356.438	4.221.876	5.465.072	2.204.516	407.197	6.319.710	8.931.423	40.450	3.744	14.440.689
1973	799.742	562.092	5.474.992	6.836.826	2.292.602	876.845	7.413.169	10.582.615	64.681	3.951	17.488.073
1974	2.214.363	1.181.837	6.691.326	10.037.523	3.923.399	2.311.913	8.971.325	15.206.637	146.578	5.263	25.446.001
1975	3.635.516	1.249.712	7.816.151	12.701.379	6.393.510	2.545.614	11.266.424	20.205.548	202.954	6.935	33.116.816
1976	3.427.453	1.451.421	9.350.578	14.229.452	9.576.546	2.929.120	14.627.371	27.133.037	190.999	10.441	41.563.929
1977	4.066.333	1.681.157	12.273.483	18.020.973	12.470.640	2.741.716	17.229.434	32.441.790	315.332	5.747	50.783.842
1977—Ene.	525.589	113.186	740.722	1.379.497	684.420	154.275	1.208.290	2.046.985	9.203	141	3.435.826
Feb.	134.074	112.628	783.854	1.030.556	658.774	197.010	1.179.011	2.034.795	21.397	524	3.087.272
Mar.	693.185	154.065	954.888	1.802.138	1.013.492	213.674	1.290.555	2.517.721	24.277	500	4.344.636
Abr.	385.186	141.795	933.660	1.460.641	1.038.224	195.732	1.006.868	2.240.824	12.497	563	3.714.525
May.	502.125	157.605	1.039.940	1.699.670	773.386	252.003	1.381.020	2.406.409	26.539	714	4.133.332
Jun.	321.314	123.365	1.219.005	1.663.684	1.286.101	245.726	1.737.629	3.269.456	31.324	857	4.965.321
Jul.	219.684	117.176	1.090.972	1.427.832	1.494.072	198.193	1.607.484	3.299.749	27.647	329	4.755.557
Ag.	312.564	147.818	1.034.441	1.494.823	1.590.542	270.921	1.555.162	3.416.625	25.143	355	4.936.946
Set.	273.705	156.631	1.082.562	1.512.898	1.010.306	307.504	1.489.351	2.807.161	27.159	363	4.347.581
Oct.	218.389	165.590	956.670	1.340.649	884.105	189.099	1.439.559	2.512.763	43.309	643	3.897.364
Nov.	175.646	154.179	1.091.512	1.421.337	737.782	194.454	1.679.764	2.612.000	36.210	—	4.069.547
Dic.	304.872	137.119	1.345.257	1.787.248	1.299.436	323.125	1.654.741	3.277.302	30.627	758	5.095.935

Source: Superintendencia de Bancos

Table B-3b TOTAL CREDITS THROUGH ECUADORIAN FINANCIAL INSTITUTIONS:

By Sector of Economic Activity

Years & Months	Agricultural	Commercial	Industry	Others	T O T A L e=a+b+c+d
	a	b	c	d	e
1971	1.648.274	7.328.877	2.370.046	1.257.227	12.604.424
1972	2.044.031	8.344.308	2.443.034	1.609.316	14.440.689
1973	2.791.488	9.864.525	3.027.572	1.804.488	17.488.073
1974	4.829.721	12.214.003	4.454.346	3.948.031	25.446.101
1975	6.924.449	15.016.622	6.647.237	4.528.508	33.116.816
1976	8.034.830	19.001.538	9.049.666	5.477.895	41.563.929
1977	9.240.426	21.944.452	12.184.412	7.414.552	50.783.842
1977—Enero	544.997	1.404.012	576.944	909.873	3.435.826
Febrero	506.235	1.470.506	756.097	354.434	3.087.272
Marzo	739.424	1.779.236	940.111	885.865	4.344.636
Abril	677.798	1.584.816	990.127	461.784	3.714.525
Mayo	785.502	1.609.082	1.060.237	678.511	4.133.332
Junio	844.214	2.302.377	1.282.622	536.108	4.965.321
Julio	760.717	2.492.354	1.004.573	497.913	4.755.557
Agosto	858.638	2.163.272	1.055.812	859.224	4.936.946
Setiembre	916.343	1.739.197	1.090.397	601.644	4.347.581
Octubre	773.213	1.502.848	975.629	645.674	3.897.364
Noviembre	849.858	1.842.278	950.839	426.572	4.069.547
Diciembre	983.487	2.054.474	1.501.024	556.950	5.095.935

Source: Superintendencia de Bancos

Table B-4

ECUADOR: INDICATORS OF THE CENTRAL GOVERNMENT'S FISCAL POSITION, 1971-75

(In percentages and in current sucres)

	1971	1972	1973	1974	1975
A. <u>Current Revenues</u>					
Variation during the year	21.4	23.5	48.0	34.3	35.9
Percentage of increase generated in nonpetrol. rev.a/	100.0	51.9	51.6	44.6	67.2
Share of petroleum revenues in the total	-	9.2	21.9	30.8	31.0
B. <u>Current Expenditures</u>					
Variation during the year	9.7	20.8	21.2	51.5	25.7
Increase in current expenditure as percentage of total increase in expenditures	47.2	103.1	47.9	97.5	65.3
C. <u>Savings on current account</u>					
Variation during the year	109.4	370.4	244.0	-11.9	181.6
Savings as a percentage of current revenues	3.3	11.6	27.2	17.9	23.9
D. <u>Capital outlays</u>					
Variation during the year	40.3	-30.7	116.7	9.2	53.6
Share of capital outlays in overall expenditures	25.7	16.5	26.1	20.3	23.8
E. <u>Deficit (-) or surplus (+)</u>					
As percentage of expenditures	-23.1	-5.5	1.4	-3.0	0.02

a. nonpetroleum revenues.

Source: ISRD

Table B-5:

SUMMARY ACCOUNTS OF THE CENTRAL BANK, COMMERCIAL BANKS AND
THE NATIONAL DEVELOPMENT BANK, 1965-71

(In millions of sucres)

	1965/a	1966/a	1967/a	1968/a	1969/a	1969/b	1970/b	1971/b
a. Central Bank								
Net international reserves	687	889	1049	846	924	1283	1379	661
Domestic credit	1582	1745	1716	2394	3298	2969	4174	4899
Central Government (net)	563	701	516	1061	1557	1550	2101	2727
Rest of public sector (net)	8	1	-52	-172	-89	-93	-247	-117
To banks	296	264	320	367	585	585	601	566
To private sector	562	585	549	712	825	825	1094	1154
Unclassified assets (net)	153	194	383	426	420	107 ^c	625	569
Liabilities to banks	611	770	819	983	1289	1316	1656	1966
Commercial banks	546	675	730	867	1165	1192	1471	1770
Development banks	65	95	89	116	124	124	185	196
Liabilities to private sector	1570	1773	1855	2154	2841	2844	3801	3493
Currency outside bank	1215	1320	1371	1564	1702	1702	2273	2342
Demand deposits	95	84	63	54	82	82	93	80
Advance import deposits	189	310	366	436	952	952	1181	693
Other	71	59	55	100	105	108	254	378
Capital and surplus	88	91	91	103	92	92	96	101
b. Private Commercial Banks								
Net international reserves	64	81	73	115	118	164	23	39
Domestic reserves	587	756	833	1035	1366	1400	1652	2066
Domestic credit	2998	3224	3943	4733	5040	5067	5859	6663
Central Government (net)	4	2	6	7	17	17	33	43
Rest of public sector (net)	23	21	27	33	29	29	85	159
Development bank	2	1	-	-	3	3	4	6
Private sector	2537	2707	3286	3894	4099	4099	4878	5419
Unclassified assets (net)	432	493	624	799	892	919 ^c	859	1036
Liabilities	3282	3684	4399	5379	5936	6043	6831	7976
To Central Bank	65	33	67	86	91	91	123	42
To development bank	-	-	-	-	-	-	-	-
To private sector	3217	3651	4332	5293	5845	5952	6708	7934
Capital and surplus	386	397	473	531	617	617	736	828
Interbank shares	-19	-20	-23	-27	-29	-29	-33	-36
c. National Development Bank								
Net international reserves	-	-	-	-	-	-	-	-
Domestic reserves	59	92	84	107	109	109	154	179
Domestic credit	1086	1022	1094	1174	1462	1522	1458	1684
Central Government (net)	-	-	-	-	-	-	-	-
Rest of public sector (net)	-57	-62	-71	-102	-138	-138	-162	-229
Commercial banks	1	-	-	-	-	-	-	-
Private sector	1007	1006	1108	1215	1464	1464	1555	1749
Unclassified assets (net)	135	78	57	61	136	196 ^c	65	164
Medium and long term								
Foreign liabilities	159	148	149	159	155	215	159	188
Domestic liabilities	1447	1474	1475	1444	1782	1782	1773	1944
To Central Bank	202	222	229	267	525	525	453	519
To commercial banks	41	48	59	73	73	73	89	126
To private sector	204	204	187	204	184	184	231	299
Capital and surplus	540	492	554	578	634	634	681	731

/a Accounts denominated at the rate of S/18 per US dollar.

/b Accounts denominated at the rate of S/25 per US dollar.

/c Includes devaluation adjustment.

Source: Superintendency of Banks, Central Bank of Ecuador, and IMF.

Table B-6: GROSS VALUE OF AGRICULTURAL PRODUCTION, ECUADOR,
SUMMARY OF ESTIMATES, 1960-1972
(Millions of Current Sucres)

Year	13 Major and 59 Minor Crops	Livestock	Hunt- ing	Forestry	Fishing	Total	Annual Growth Rate
1960	5,867.6	1,303.6	2.4	432.7	168.4	7,774.7	..
1961	6,307.2	1,397.6	2.3	462.9	189.8	8,359.8	7.5
1962	7,342.3	1,507.4	2.3	481.6	175.8	9,509.4	13.8
1963	7,673.3	1,660.5	2.4	510.3	191.4	10,037.9	5.6
1964	7,980.9	1,656.4	2.5	551.0	176.1	10,366.9	3.3
1965	8,970.1	1,801.3	2.6	600.2	230.7	11,604.9	11.9
1966	9,581.6	1,973.8	2.6	653.7	228.8	12,440.5	7.2
1967	9,943.6	2,113.6	2.6	711.9	320.9	13,092.6	5.2
1968	9,661.9	2,178.6	3.0	861.3	325.7	13,030.5	0.5
1969	11,065.6	2,665.7	3.0	861.3	330.1	14,925.7	14.5
1970	12,668.8	3,084.8	3.2	930.0	359.1	17,045.9	14.2
1971	13,778.0	3,771.7	3.3	1,000.0	575.0	19,128.0	12.2
1972	14,973.8	4,502.3	3.4	1,100.0	660.0	21,239.5	11.0

Sources: Central Bank of Ecuador, National Income Division.

Table 2-7: AGRICULTURAL INCOME DISTRIBUTION, 1965

<u>Decile</u>	<u>Percent of Total Income</u>	<u>Total Income (millions of sucres)</u>	<u>Income Per Active Person (Sucres)</u>
First (lowest)	2.0	171.1	1,820
Second	2.4	205.2	2,183
Third	2.6	223.2	2,374
Fourth	3.0	257.4	2,738
Fifth	3.4	291.6	3,102
Sixth	4.6	392.4	4,174
Seventh	5.0	428.4	4,557
Eighth	6.6	565.2	6,013
Ninth	12.4	1,060.2	11,278
Tenth	<u>58.0</u>	<u>4,959.0</u>	<u>52,755</u>
TOTALS	100.0	8,553.6	9,100 (avg.)

Source: Junta Nacional de Planificación y Coordinación Económica.
El Desarrollo del Ecuador, 1970-1973.

Table B-8: NUMBER OF FARMS AND AREA, BY SIZE AND FORM OF TENURE, 1968

Farm Size Groups (Hectares)	All Forms of Tenure				Owner-Operated				Other Forms of Tenure			
	Number of Farms		Area		Number of Farms		Area		Number of Farms		Area	
	No.	Percent of Total	Hectares	Percent of Total	No.	Percent of Total	Hectares	Percent of Total	No.	Percent of Total	Hectares	Percent of Total
All Sizes	633,218	100.0	6,937,520	100.0	480,479	100.0	5,736,428	100.0	152,739	100.0	1,201,092	100.0
Less than 1	206,273	32.6	93,018	1.3	169,955	35.4	74,196	1.3	36,318	23.8	18,822	1.6
More than 1 to 5	264,074	41.7	615,556	8.9	181,354	37.7	420,660	7.3	82,720	54.2	194,896	16.2
More than 5 to 10	68,527	10.8	466,315	6.7	51,096	10.6	345,796	6.0	17,431	11.4	120,519	10.0
More than 10 to 20	36,228	5.7	485,572	7.0	29,118	6.1	388,805	6.8	7,110	4.7	96,767	8.1
More than 20 to 50	32,746	5.2	1,018,315	14.7	28,090	5.8	870,319	15.1	4,656	3.0	147,996	12.3
More than 50 to 100	15,555	2.5	976,653	14.1	12,447	2.6	810,074	14.1	3,108	2.0	166,579	13.9
More than 100 to 500	8,467	1.3	1,647,904	23.7	7,246	1.5	1,448,554	25.2	1,221	0.1	199,350	16.6
More than 500 to 1,000	922	(-0- 0.2	634,554	9.1	806	(-0- 0.3	548,201	9.5	116	(-0- 0.8	86,353	7.2
More than 1,000	426	(-0-	999,633	14.5	367	(-0-	829,823	14.5	59	(-0-	169,810	14.1

Source: Encuesta Agropecuaria Nacional, 1968.

Table B-9

ECUADOR: ANNUAL GROWTH RATE OF INTERNAL CREDIT

(In percentages)

	1971	1972	1973	1974
<u>Credit to the Private Sector</u>				
1. From private banks	11.8	15.7	21.6	29.2
2. From the National Development Bank	9.2	16.4	44.1	88.9
3. Total	10.4	12.3	23.1	42.1
<u>Credit to the public Sector from the Central Bank</u>				
4. Growth credit	17.9	10.5	4.7	42.3
5. Net a/	39.4	-36.6	-105.3	-477.3
6. Net b/	31.2	-24.3	-44.0	71.7
<u>Total Expansion</u>				
Definition A: (3) + (4)	12.7	11.7	17.2	42.2
Definition B: (3) + (5)	16.2	11.1	-6.5	37.7
Definition C: (3) + (6)	16.1	7.7	6.4	44.9
a. Net monetary deposits in foreign currency and public sector obligations in the Central Bank.				
b. Net Deposits in foreign currency and public sector obligations in the Central Bank.				
<u>Source:</u> Banco Central.				