BANK CREDIT FORMATION, MONEY SUPPLY PROCESSES, AND MONETARY AND FISCAL POLICIES IN AN OPEN ECONOMY: THE ITALIAN EXPERIENCE, 1958-1969

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of the The Ohio State University

By

Michele Fratianni, B.A., M.A.

*******

The Ohio State University 1971

Approved by

[Signature]
Adviser
Department of Economics
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1971
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"Eurodollar Creation: Comments on Prof. Machlup’s Propositions and Developments," Banca Nazionale del Lavoro Quarterly Review, June 1971 (co-authored with Paolo Savona)

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Chapter 1

INTRODUCTION

The objectives of the dissertation are to unveil the forces underlying bank credit and money supply processes in an economy which heavily interacts with the rest of the world; to derive implications concerning the relative effectiveness of monetary policy in an open economy vis-a-vis monetary policy in a closed economy; to describe the actions of the monetary authorities within the proposed theoretical framework; to assess the quality of such actions; and finally, to compare monetary and fiscal actions as instruments of economic stabilization.

I will meet the proposed objectives by advancing two models which will be analyzed in Part I and Part II of the dissertation, respectively. In the first model, presented in Chapter 2, the stock of international reserves will be considered an exogenous variable. This is based on the notion that the monetary authorities, for the present and the long run, view the balance of payments as a constraint on the economy. In their day to day operations the authorities can do little or nothing to alter the course of the country's relationships with the outside world. The nature of the balance-of-payments constraint, thus, is quite similar to that of the government budget deficit.

The long-run constraint on monetary policy imposed by a sys-
tem of fixed exchange rates is sufficiently established and clearly understood. A policy which generates interest rates appreciably below foreign rates, or prices much above foreign prices, will produce a deficit on capital or current account, or both. Such a policy cannot be pursued indefinitely, for the country's stock of international reserves limits upwardly the maximum sustainable loss of foreign exchange.

Over a shorter period of time, however, the monetary authorities can strive for desired levels of international reserves. This is the crucial assumption underlying the second model, developed in Chapter 4, in which changes in the domestic source component of the monetary base (the policy-controlled variable) transmit impulses to interest rates, aggregate income, and ultimately affect the nature and size of balance-of-payments disequilibria.

The failure to distinguish between the long and short-run effects of fixed exchange rates is the primary reason underlying the confusion as to whether monetary policy is effective or not in an open economy. Central bankers as well as economists (including Milton Friedman) have asserted with increasing frequency that the interdependence of national credit markets generates capital flows which tend to offset any actions of the monetary authorities designed to exert a contractive or expansive effect on the economy. In other words, monetary actions are dominated by balance-of-payments developments and consequently lose all leverage with respect to economic stabilization. The second model shall address itself
primarily to an analysis of such a proposition. I shall develop conditions which assure emasculation of monetary policy even in the short run. In the Italian experience since the return to currency convertibility, little or no evidence was found which suggested that such conditions were ever met. Quite to the contrary, the burden of economic stabilization has been almost entirely borne by the Italian monetary managers.
PART I

BANK CREDIT AND MONEY SUPPLY PROCESSES IN AN OPEN ECONOMY:

THE ITALIAN EXPERIENCE, 1958-1969
Chapter 2

BANK CREDIT AND MONEY SUPPLY PROCESSES IN AN OPEN ECONOMY:
A MODEL APPLICABLE TO ITALY

2.1 INTRODUCTION

The purpose of this chapter is to construct a hypothesis which will explain bank credit and money supply processes in Italy since its return to currency convertibility (1958). The schema which I follow is the Brunner-Meltzer nonlinear money supply hypothesis\(^1\) enlarged to include foreign reserves, assets, and liabilities in the balance sheet of banks. International reserves are treated as exogenous to the system. Even though the Brunner-Meltzer schema offers a basic analytic framework which is intended to have general application, the construction of a bank credit and money supply hypothesis will necessarily have to incorporate the major institutional features of the country which is the object of study. Quite broadly, money supply processes are explained by the interaction of the monetary authorities, the banking system, and the public, subject to various constraints—both physical and insti-

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tutional--imposed upon them. The government's budget and the country's economic relations with the rest of the world are the constraints which face the monetary authorities who, in turn, generate regulations which become the constraints under which the banking system and the public operate. At times, the banking system, acting as a monopolist, imposes on itself a code of behavior which becomes, in effect, equivalent to the regulations issued by the monetary authorities. ¹

It follows that the largest social space--namely, the domain of events which a given theory intends to explain--attainable by a money supply hypothesis is an economic system with sovereign monetary authorities. The processes which govern the formation of bank credit and money supply are different among sovereign nations to the extent that there are differences in constraints and in the objects of experience of the economic operators. An example of how differences in objects of experience between two groups of monetary authorities affect the construction of a money supply hypothesis is shown in the analysis of the technical item known as float. The U.S. monetary authorities could decrease the monetary base by simply lengthening the time period of deferred availability credit

¹This is the case for Italy where, since the 1930s, banks have agreed, among other things, that interest rates on deposits and loans should not exceed maximum or go below minimum agreed-upon rates, respectively. See David A. Alhadeff, Competition and Control in Banking: A Study of the Regulation of Bank Competition in Italy, France, and England (Berkeley: University of California Press, 1968).
granted to the banks collecting checks.\textsuperscript{1} Students of U.S. money supply process include (and rightly so) float as a source of base money. However, since the mechanism of check collection in Italy is different from that in the U.S., the Italian monetary authorities would have no use for a hypothesis which included float in the sources of base money since float is a concept which is beyond their realm of experience.

The chapter is organized in the following manner. First, I describe the processes which govern the supply of base money in Italy, paying particular attention to the relationship existing between balance-of-payments disequilibria and base money.

Second, I advance hypotheses concerning the behavior of commercial banks and the public. The behavior of the banking system is described by three demand equations: base money, borrowings from the central bank, and borrowings from the rest of the world. The public, on the other hand, strives for an optimal allocation of financial assets and liabilities by supplying earning assets to the banking system (by selling securities and incurring indebtedness) and by deciding in what proportion to

\textsuperscript{1}Float consists of the dollar volume of checks in process of collection which have been already credited to the collecting banks and not debited yet to the drawing bank. By lengthening the period of deferred availability credit granted to collecting banks, the monetary authorities lower the time spread between actual collection time, which is governed by a stochastic process, and deferred availability credit and, consequently, the amount of base money made available to the banking system under this form.
hold assets such as base money, decreased deposits, and time deposits. Implicitly, the system determines the supply of money and the banks' demand for earning assets.

2.2 DESCRIPTION OF THE MONETARY MODEL

2.2.1 The Monetary Base: Its Sources and Uses

The monetary base or base money (hereafter referred to as B) in a closed economy is generated through the operation of the government budget restraint; in an open economy a second constraint becomes relevant to the formation of B, namely the balance of payments. Broadly speaking, base money comprises a class of financial claims on both the domestic and foreign governments. The largest portion of such a class of assets includes sight liabilities of the Italian and foreign monetary authorities which possess medium-of-exchange properties. Among these, I list the outstanding stock of domestic currency and the country's holdings of these foreign currencies which function as international medium of exchange. The remaining portion of B, even though it does not directly possess medium-of-exchange properties, can be transformed into such with negligible or no transaction costs. Among these, I list postal deposits and interest-bearing government securities during periods of complete price support programs. For example, the outstanding stock of Treasury bills—henceforth referred to as BOT—has been part of the monetary base (see below) because the Italian central bank has guaranteed de facto, by virtue of a complete BOT price support policy,
zero risk of capital loss to the holders of Treasury bills, if sold before maturity. In March, 1969, however, BOT price support policy was abandoned, with the exception of the BOT held by banks to satisfy reserve requirements against their deposit liabilities. Hence, since March, 1969, only this portion of the stock of BOT is included in the monetary base.

Having defined \( B \), I can proceed to describe the processes which govern its supply. First, it is necessary to identify the monetary authorities in Italy. There are four of them: the Bank of Italy, the Italian Exchange Office (U.I.C.), the Treasury, and the Cassa Depositi e Prestiti (hereafter Cassa DD.PP.). The Bank of Italy and the Italian Exchange Office, even though juridically they are two separate institutions, function jointly as Italy's central bank. The U.I.C.'s specific jurisdiction includes the management of foreign reserves and exchange rates and the issuance of regulations pertaining to the position in foreign exchange of banks. The Cassa DD.PP., an independent unit within the Treasury, grants loans to local governments and obtains funds by issuing monetary base in the form of postal deposits and notes. Its independence is only de jure; in fact, the minister of the Treasury is ex officio the chairman of the board of directors of the Cassa DD.PP.

Unlike the U.S., where there is a bookkeeping separation between the fiscal and the monetary operations of the Treasury, no such separation exists in Italy. The annual report of the Bank of Italy publishes the consolidated account of the Treasury, Cassa DD.PP.,
and government corporations; I have simplified the schema of this account for 1968 in Table 1 below with the intention of emphasizing the various methods used by the Italian government to finance budget deficits.

Table 1

The Account of the Treasury, Cassa DD.PP. and Government Corporations for 1968. Data in Billions of Lire

<table>
<thead>
<tr>
<th>Government Deficit</th>
<th>2062</th>
<th>Net sales of long-term government bonds to public and banks</th>
<th>1093</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Net sales of Treasury bills and postal deposits to public and banks</td>
<td>422</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Net sales of long-term government bonds to Bank of Italy</td>
<td>219</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Net sales of Treasury bills, postal notes to Bank of Italy, other accounts with Bank of Italy</td>
<td>281</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decrease in governmental liabilities vis-a-vis foreigners</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase in other domestic sight governmental liabilities.</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Net issue of government coins and currency</td>
<td>13</td>
</tr>
</tbody>
</table>

| 2062 | 2062 |

From the above account (a flow concept) one can reconstruct a balance sheet of the Treasury (a stock concept) by aggregating over
all past governmental deficits. The aggregation over time is feasible because the quantities relative to all the elements on the right-hand side of Table 1 are available also as a stock; the summation of all previous budget deficits can be computed, thusly as a residual. This is done in Table 2 which describes an idealized balance sheet of the Treasury as of the end of 1968.

Table 2

Construction of a Balance Sheet for the Treasury,
Cassa DD.PP., and Government Corporations

Data in Billions of Lire as of Dec. 31, 1968

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sum (G-T) ) = summation over time of all budget deficits</td>
<td></td>
</tr>
<tr>
<td>Minus:</td>
<td></td>
</tr>
<tr>
<td>( S_G^P ) = stock of government bonds held by the public</td>
<td>2684</td>
</tr>
<tr>
<td>( S_G^B ) = stock of government bonds held by the banks</td>
<td>2997</td>
</tr>
<tr>
<td>( F ) = Treasury bills and government bonds held by Bank of Italy and U.I.C.</td>
<td>1335</td>
</tr>
<tr>
<td>( GB ) = (i) advances from Bank of Italy minus:</td>
<td></td>
</tr>
<tr>
<td>(ii) Treasury's holdings of coins and currency</td>
<td></td>
</tr>
<tr>
<td>(iii) compulsory agricultural stockpiling bills</td>
<td></td>
</tr>
<tr>
<td>(iv) Treasury's account with Bank of Italy (when appearing with a negative balance)</td>
<td></td>
</tr>
<tr>
<td>(v) other debit accounts with Bank of Italy and U.I.C.</td>
<td>1684</td>
</tr>
<tr>
<td>( TB ) = (i) postal deposits owned by public and banks</td>
<td>5249</td>
</tr>
<tr>
<td>(ii) Treasury bills owned by public and banks</td>
<td>2171</td>
</tr>
<tr>
<td>(iii) outstanding stock of Treasury's coins and</td>
<td></td>
</tr>
</tbody>
</table>
Some of the items in Table 2 require discussion. F denotes the portfolio of government securities held by the Bank of Italy (it should be understood that by the Bank of Italy I mean the joint activity of the Bank and the Italian Exchange Office). There are no legal restrictions on the amount of government bonds the Bank of Italy can purchase. F has grown appreciably in the last few years, as the monetary authorities have manifested their increasing preference for open market operations as a tool of policy.\(^1\)

The Bank of Italy is the fiscal agent of the Italian government. The Treasury offices are entrusted to the bank, subject to the directions of the directorate general of the Treasury.\(^2\) The range of services performed by the Bank of Italy in favor of the Treasury extends to the payment orders issued by the government departments, the collection of any sum which is due to the state, and the sale and redemption of Treasury bills and government securities. All

\(^1\)It is not the purpose of this section to present the statistical evidence relative to the incidence of open market operations in the total variability of base money. This shall be done in Chapter 3; in the above paragraphs I intend only to offer a panoramic view of the major items which enter into the balance sheets of the monetary authorities.

the above operations are registered in the account "conto corrente per il servizio di tessereria" which the Treasury keeps with the bank. Depending on whether the balance of the account is negative or positive it will appear as a liability or as an asset of the Treasury, respectively (in Table 2 it has been shown as a net liability of the Treasury). The negative balance of the Treasury's account is constrained by law not to exceed 14 percent of the total estimate of budget expenditures for the fiscal year. Except for the periods 1950 II Q - 1954 II Q and 1959 I Q - 1963 II Q, the Treasury's account with the bank has shown a negative balance with a peak of about -1,000 billion lire between 1965 and 1966. I shall examine in a subsequent chapter to what extent, if at all, the behavior of the Treasury's account has been countercyclical.

The Treasury's borrowings from the Bank of Italy are also subject to a ceiling—namely, 100 billion lire. Compulsory agricultural stockpiling bills are Treasury liabilities which have been contracted in connection with the effort on the part of the government to regulate the retail price of basic staples such as wheat and rice. The difference between producer's cost and market price is borne by the Treasury which, unable at times to meet the expense of budget revenues, issues notes having legal tender properties to producers of staples. The item has grown steadily in size since World War II; however, it has reached its peak because the Treasury abandoned its agricultural support program in 1964.

The largest single item in base money issued by the Treasury
directly to the public and banks (TB) is postal deposits.\(^1\) It is noteworthy to point out that the Treasury competes with commercial banks in the market of demand and time deposits, but it is protected against risk of failure because postal deposits are base money. The public's demand for checking accounts and time deposits will have to reflect, other things equal, the one hundred percent safety of postal deposits versus the less than complete safety offered by deposits at commercial banks.

Government agencies hold coins and currency issued by the Treasury and the Bank of Italy. These holdings, which have been isolated in Table 2 under BG (ii), can be thought of either as an asset of the Treasury or as a subtraction from the Treasury's liabilities.

Treasury bills (BOT) have been issued according to a fully elastic supply schedule which has fixed their annual rate of return at 3.75 percent. Beginning in April, 1969, however, BOT have been issued at a fixed price for whatever amount banks request to adjust their required reserve position with the Bank of Italy (see below), and at a variable price-quantity combination for the remainder--i.e., upsloping supply curve. As was mentioned previously, only BOT issued and traded at a fixed price are part of the monetary base.

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\(^{1}\) TB is differentiated from BG and F on the basis of what parties are involved in the items. While the parties involved in TB are the Treasury, on one side, and the banks and public, on the other side, BG and F result from the interaction of the two groups of monetary authorities.
The second balance sheet required in this analysis summarizes the consolidated positions of the Bank of Italy and the Italian Exchange Office (see Table 3).

Table 3

Consolidated Balance Sheet of the Bank of Italy
and the Italian Exchange Office

Data in Billions of Lire as of December 31, 1968

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Outstanding currency</td>
</tr>
<tr>
<td>BG</td>
<td>Deposits of commercial banks</td>
</tr>
<tr>
<td>$A_{BI}$</td>
<td>other liabilities</td>
</tr>
<tr>
<td>discounts to banks</td>
<td>(i) deposits of special credit</td>
</tr>
<tr>
<td></td>
<td>institutions</td>
</tr>
<tr>
<td>$P_{BI}^{RW}$</td>
<td>(ii) foreign deposits</td>
</tr>
<tr>
<td>net short, medium,</td>
<td>(iii) public's deposits</td>
</tr>
<tr>
<td>and long term foreign assets</td>
<td>(iv) other Treasury credits</td>
</tr>
<tr>
<td></td>
<td>(v) net worth</td>
</tr>
<tr>
<td>FR_{F}</td>
<td>convertible currencies held by</td>
</tr>
<tr>
<td></td>
<td>banks</td>
</tr>
<tr>
<td>$O_{A}$</td>
<td>other assets such as advances to</td>
</tr>
<tr>
<td></td>
<td>special credit institutions and</td>
</tr>
<tr>
<td></td>
<td>public</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 was constructed on the information provided by the appropriate tables published in the bimonthly Bollettino of the Bank of
Italy. It differs from the official sources to the extent that I have included the stock of convertible currencies at commercial banks. Legally, in fact, only the Italian Exchange Office can hold foreign exchange on a permanent basis, while banks hold it temporarily and on behalf of U.I.C.

Next, Table 4 shows the combined balance sheet of the Bank of Italy and U.I.C. with that of the Treasury and Cassa DD.PP.

### Table 4

#### Consolidation of Account: Table 2 with Account Table 3

Data in Billions of Lire as of December 31, 1968

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sum (G-t) )</td>
<td>15,016</td>
</tr>
<tr>
<td>Minus:</td>
<td></td>
</tr>
<tr>
<td>( S^P_G )</td>
<td>2,684-</td>
</tr>
<tr>
<td>Bank of Italy's outstanding currency net of Treasury's holdings</td>
<td>5,407</td>
</tr>
<tr>
<td>Minus:</td>
<td></td>
</tr>
<tr>
<td>( S^b_G )</td>
<td>2,997-</td>
</tr>
<tr>
<td>Deposits of commercial banks at the Bank of Italy</td>
<td>2,553</td>
</tr>
<tr>
<td>( F^F )</td>
<td>266</td>
</tr>
<tr>
<td>( P^KW^{BI} )</td>
<td>3,770</td>
</tr>
<tr>
<td>( A^{BI} )</td>
<td>1,828</td>
</tr>
<tr>
<td>( 0 = 0^A - 0^L )</td>
<td>833</td>
</tr>
<tr>
<td>Sources of base money</td>
<td>15,601</td>
</tr>
<tr>
<td>Uses of base money</td>
<td>15,601</td>
</tr>
</tbody>
</table>
To be noted that changes in $\text{POS}_{RW}^{BI}$ and in $\text{FR}_F$ are derived from the analytic statement of the balance-of-payments surplus:

$$\text{BOPS}_t = T_t + K_t = \Delta \text{POS}_{RW}^{BI}, t + \Delta \text{FR}_F, t$$

$$- \Delta (\text{FL}_t - \text{FA}_t - \text{FR}_R, t)$$

where: subscript $t = t^{th}$ time period

$\text{BOPS} = \text{balance-of-payments surplus}$

$T = \text{trade account balance}$

$K = \text{balance on all capital movements net of those generated by banks}$

$\text{FL} = \text{banks' foreign liabilities}$

$\text{FA} = \text{banks' foreign earning assets}$

$\text{FR}_F = \text{banks' foreign liquid assets which are eligible for lire conversion}$

$\text{FR}_R = \text{banks' foreign liquid assets (or reserves) made ineligible as base money by monetary authorities.}$

By aggregating over time and setting

$$\text{(ii)} \text{A}^{RW} = \text{FL} - \text{FA} - \text{FR}_R;$$

I obtain the relationship between the portion of the sources of base money attributable to the country's relations with the rest of the world and all past balance-of-payments disequilibria. That is,

$$\text{(iii)} \sum_{t} \text{BOPS}_t + \text{A}^{RW} = \text{POS}_{RW}^{BI} + \text{FR}_F$$

Recalling the Treasury's balance sheet identity (account Table 2)

$$\text{(iv)} \sum_{t} (\text{G} - \text{T}) - (S_G^b + S_G^P) = \text{TB} + \text{BG} + \text{F},$$

I introduce formally in (1), two equivalent statements concerning
the sources of the monetary base in Italy:

\[ (1) \quad B = \sum_{t} BOFS + A_{RW} + \sum_{t} (G - T) - S^p_G - S^b_G + \Delta BI + 0 \]

\[ = POS_{RW} + FR_F + F + BE + TB + \Delta BI + 0 \]

The monetary base is a key concept in the model for two reasons. First, it stands out as the fundamental policy variable in the hypothesis and, consequently, functions as a gauge of the quality of monetary policy. Second, a great deal of creation and destruction of base money stems from the balance of payments and the Treasury's budget constraints. The usefulness of the two alternative expressions given in (1) is to emphasize, in one case, the nature and size of the two constraints placed on the economy and out of which base money is created and, in the other case, the forms under which such creation occurs.

a) The relation between the budget constraint of the government and the monetary base.

The basic identity relating the deficit of the government to the monetary base is given by equation (iv) above (p. 16).

At this juncture it is useful to explore the interrelationships between budgetary and monetary policies. Of particular interest is the extent to which the latter might become dependent on the former. Consider, for example, the government choosing independently the level of government expenditures, the level of tax
revenues, and the amount of net government securities the banking
and the nonbanking public are willing to hold at any point in time,
given an upward ceiling on the yield the government intends to pay
on its debt instruments. It appears that the third method of
financing expenditures—namely, issue of base money—is not an in-
dependent choice. However, the dependence of monetary policy on
budgetary considerations is limited to those components of the base
whose movements permit the closing of the difference between govern-
ment expenditures and receipts, inclusive of the proceeds from the
sale of securities. These components are readily identified as TB,
BG, and F and represent only a subset of the total monetary base.

The hypothesis that certain components of the monetary base
respond to fiscal considerations more than to the actions of the
monetary authorities has no implication with regard to the global
independence (or lack of independence) of monetary policy, so long
as the balance sheet of the monetary authorities have assets other
than TB, BG, and F. The monetary authorities can, ideally, always
offset any movements in TB, BG, and F to strive for a desired level

---

1 Of course, the statement is not entirely correct because tax reven-
ues are also a function of income. However, the government, with a
knowledge of what income is going to be, can strive for a given target
of tax revenues.

2 If such a ceiling were not a consideration, the government could
finance its budget deficits, at least in the short run, by floating
issues with increasingly higher yields.
of B. Only when the monetary authorities themselves agree to stabilize the price of government securities does base money lose its quality of policy variable. I deal with the implications of a monetary policy which becomes subservient to the management of the public debt in a later section of this chapter.

b) The relation between the balance-of-payments disequilibrium and the monetary base.

Below, I rewrite in a slightly modified manner the definitive statement of the balance-of-payments surplus.

\[ \text{BOPS} \equiv \Delta [\text{POS}_{RW}^{BI} + sFR] + \Delta [(1-s)FR + FA - FL] \]

where

\[ s = \text{proportion of bank-held foreign reserves which is eligible for lire conversion at the Bank of Italy.} \]

\[ sFR = FR_F \]

\[ (1-s)FR = FR_R \]

\[ (1-s)FR + FA - FL = -A_{RW} \]

As a direct implication of the above definition, a surplus in the balance of payments is either reflected in an increase of the foreign source component of the base—that is, \( \text{POS}_{RW}^{BI} + sFR \)—or in a reduction of the net foreign indebtedness of the banking system—the sum of the elements in the second bracketed parenthesis—or in a combination of both. The proposition I analyze at some length below is

---

1The far more relevant question is the empirical issue of whether the incidence of TB + BG + F in the monetary base is so preponderant to restrict effectively any independent action of the monetary authorities.
that the monetary authorities can influence the impact of a given balance-of-payments surplus or deficit on the foreign source component of the base by regulating the banks' position vis-à-vis the rest of the world.

The policy objectives of the authorities are basically to retard the adjustment processes implicit in a gold exchange standard system. In other words, during periods of external surpluses policy aims at sterilizing movements of international reserves (i.e., $s$ is less than unity) and simultaneously to induce the banking system to export funds. During periods of external deficits, on the other hand, policy aims at raising the sterilization parameter $s$ and simultaneously lifting any restrictions on the banking system concerning its ability to import funds. The analysis will be carried out by examining four different cases.

Case 1. Assumptions:

(a) no regulation is imposed on the banks' foreign position which is reflected in $s$ being equal to one;

(b) the Bank of Italy estimates at time $t$ a balance-of-payments surplus of 1,000 billion lire and it is assumed that 10 percent of such a surplus will accrue as an addition to the stock at time $t-1$ of the banks' foreign reserves (the estimate of the Bank of Italy is fully realized);

(c) $FL_t = FL_{t-1}$ and $FA_t = FA_{t-1}$

The balance-of-payments surplus of 1,000 billion lire will in-
crease the stock of international reserves and foreign assets at the central bank \( (\text{POS}^{\text{BI}}_{\text{RW}}) \) by 900 billion lire and the stock of foreign reserves at commercial banks \( (\text{FR}) \) by 100 billion lire. Since the parameter \( s \) is equal to unity the monetary base increases by the full amount of the balance-of-payments surplus, that is by 1000 billion lire.

Case 2. Assumptions:

(a)\(^R\) The central bank imposes the following rule. Foreign reserves plus foreign assets must exceed foreign liabilities before banks are allowed to convert part or all of the foreign reserves into lire. In other words, the banks' reserves sterilization parameter is less than one. The amount of "free" foreign reserves \( (\text{FR}_F = s\text{FR}) \)---that is foreign reserves which are counted as part of \( B \)--depends on two conditions. The inequality

\[
\text{FR} + \text{FA} > \text{FL}
\]

be satisfied and the amount by which all foreign assets exceed foreign liabilities be in the form of technically defined foreign reserves.\(^1\) Both conditions must be satisfied. The use of \( T \) - accounts may help the reader to understand such a regulation which is pecu-

\(^1\)The criteria to differentiate foreign reserves from foreign assets are provided by the central bank.
lier to the Italian monetary system.

<table>
<thead>
<tr>
<th>Situation (i) Foreign position</th>
<th>Situation (ii) Foreign position</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR = 20</td>
<td>FR = 20</td>
</tr>
<tr>
<td>FA = 80</td>
<td>FA = 100</td>
</tr>
<tr>
<td>FL = 90</td>
<td>FL = 90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Situation (iii) Foreign position</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR = 10</td>
</tr>
<tr>
<td>FA = 70</td>
</tr>
<tr>
<td>FL = 90</td>
</tr>
</tbody>
</table>

In situation (i) $F_{R_F} = 10$ ($s = .5$) because, although there are 20 units in foreign reserves, the excess of $FR + FA$ over $FL$ is only 10.

In situation (ii) $F_{R_F} = 20$ ($s = 1$) because, even though the excess of $FR + FA$ over $FL$ is 30, there are only 20 units in foreign reserves. Finally, in situation (iii), $F_{R_F} = 0$ ($s = 0$) because the inequality constraint is violated.

Let assumptions (b) and (c) of Case 1 hold and let (d) $F_{R_{t-1}} + F_{A_{t-1}} - F_{L_{t-1}} = -50$ billion lire. The balance-of-payments surplus will affect the following variables:

\[ \Delta POS_{RW}^{BY} = 900 \]

\[ \Delta FR_R = 50 \]

\[ \Delta FR_F = 50 \]

The monetary base, coeteris paribus, would rise by 950 billion lire. The imposition of the rule on the banks' foreign position has enabled the monetary authorities to sterilize one-twentieth of the effect on
base money of an inflow of international reserves.

It is appropriate to explicitly differentiate the effect on the Italian monetary base of flows of bank foreign reserves from their role in the banks' desired balance sheet. The influence of FR on B is clearly dominated by the existence of policy prescriptions--such as (a)^R--which constrain the banking system with regard to the maximum amount of foreign reserves which is eligible for lire conversion. The banks' demand for FR is influenced by a matrix of foreign and domestic rates of interest, on the one hand, and by the mean and the variance of the density function describing the process of conversion from foreign-denominated deposits into either foreign exchange or Italian currency, on the other hand. The imposition of rule (a)^R in no way restricts the role performed by FR in meeting cash withdrawals, for FR_R does not represent a reserve requirement against foreign-denominated deposits. It follows that it is perfectly consistent for a profit-maximizing bank to hold a stock of foreign reserves in excess of the quota eligible for lire conversion.

Case 3. Let assumptions (a)^R, (b), and (c) hold and let (f) \( FR_{t-1} + FA_{t-1} - FL_{t-1} = -300 \) billion lire. The increase of 100 billion lire in FR due to the balance-of-payments surplus in time period t will not permit banks to zero balance their foreign position. The central bank, however, sells to the commercial banks against lire the equivalent of 200 billion lire in foreign exchange. The 1,000 billion lire balance-of-payments surplus and the swap operation
affect the following variables:

\[ \Delta P_{\text{BI}}^{\text{RW}} = 700 \]

\[ \Delta F_R = \Delta F_R^{\text{R}} = 300 \quad \text{because} \quad s = 0 \]

\[ \Delta (\text{bank-held lire reserves}) = -200 \]

The monetary base, coeteris paribus, will increase in time \( t \) by 500 billion lire, thus permitting the monetary authorities to sterilize one-half of the effect on base money of an inflow of international reserves.

The authorities would want to resort to the actions which are hypothesized in Case 3 when large balance-of-payments surpluses would tend to raise the monetary base beyond a desired level. Also, the authorities may strive for a given level of, or a given growth rate in, international reserves partly because they are sensitive to the opportunity cost of reserve holding and partly to avoid the adverse publicity at the international level connected with a high propensity to hoard reserves.

Case 4. Let assumptions (a)\(^R\) and (c) hold and (g) assume in period \( t \) a balance-of-payments deficit of 1,000 billion lire. Suppose (h) that the deficit does not occur in the upswing of the business cycle, but it is generated by accidental factors such as a sudden shift in preference of the world tourist public from Italy to Spain and Yugoslavia. The shift in preference is expected to be temporary and the monetary authorities decide to counteract the
effect of an unfavorable balance-of-payments disequilibrium on the monetary base. They would do so by relaxing, among other things, rule (a)\(^R\). Suppose

\[ FR_{t-1} + FA_{t-1} - FL_{t-1} = -50 \text{ billion lire} \]

and \( FR_{t-1} = 300 \text{ billion lire} \),

the effect of a balance-of-payments deficit is to reduce \( P\\text{OS}^{BI}_{RW} \) by 900 and FR by 100 billion lire. However, since \( FR_t = 200 \) and \( \Delta FR_F = FR_t = 200 \) by virtue of the fact that rule (a)\(^R\) no longer holds (i.e., \( s = 1 \)), the effect on the base of 1,000 billion lire deficit in the balance of payments is a reduction of 700 billion lire.

c) A brief historical sketch of the regulations pertaining to the foreign position of Italian banks.

To better appreciate the workings of this instrument of monetary policy, which is peculiar to the Italian system, it is necessary to anticipate part of the analysis concerning the banks' demand function for net foreign borrowing, \( A^{RW} \), which will be discussed more fully in section 2.2.2.c below. This in essence depends negatively on both the price and nonprice components of the total cost of borrowing funds abroad. In turn, the nonprice elements can be approximated by the penalty that the monetary authorities are likely to assess against banks which continuously disregard guidelines concerning their foreign
position.1 When rule (a)\textsuperscript{R} described in the previous pages (see Case 3, especially) becomes operative, the nonprice cost of borrowing funds abroad rises relative to borrowing funds from alternative sources.

Generally, the Italian monetary authorities have resorted to the control of the banks' foreign position often and effectively. The history of this regulation begins in 1960, a period of balance-of-payments surpluses. The authorities were convinced that were such surpluses to be reflected dollar for dollar in an expansion of the foreign source component of the base \((\text{POS}_{\text{BI}}^{\text{EW}} + \text{sFR})\), the total monetary base would have increased at a rate higher than desired. Hence, two strategies were pursued in an attempt to sterilize the effect of the surplus on the base. Statements were made about the necessity of the Italian banking system to reduce their net debit position vis-a-vis the rest of the world (i.e., to export funds abroad). In addition, guidelines were issued concerning the proportion of foreign reserves held by banks eligible for lire conversion. In terms of the foregoing discussion, this implies that was made less than one. Both of these measures, which were active

---

1The penalty need not be pecuniary. For example, the president or a high official of the transgressing bank may have his future career endangered or his appointment may not be renewed. Italy's major banks are either public institutions or owned by the government holding company I.K.I. In most instances, appointment of high officials in these banks is conditional upon the approval of the monetary authorities.
from the second quarter of 1960 to the third quarter of 1962, tended to lower the impact of balance-of-payments surpluses on the monetary base.

With the balance of payments drastically deteriorating into a deficit by the latter part of 1962, the monetary authorities again decided not to permit the external imbalance to be fully reflected in a like amount decrease of the foreign source component of the base. Accordingly, a decision was made to raise the value of the parameter s by lifting restriction (a)\(^R\) and simultaneously allowing banks to incur additional net foreign liabilities. The ensuing net inflow of bank capital covered approximately one-half of the 1963 balance-of-payments deficit.

The 1960 (a)\(^R\) restriction was again reintroduced in November, 1965. During the period 1967–68, as interest rate differentials between the Eurodollar and domestic rates widened, Italian banks moved progressively to an increasing net credit position vis-à-vis the rest of the world. With worries of a deteriorating balance of payments, the monetary authorities, wanting to prevent a substantial erosion abroad of the foreign source components of the base, imposed in March, 1969 that banks reduce their net foreign position. In terms of the analysis of A\(^R\)W, the inducement to attract short-term capital from abroad implies that the nonpecuniary cost of borrowing foreign funds became negative. As in the case of the 1963 balance-of-payments deficit, the 1969 deficit was covered approximately by one-half through a net inflow of bank capital.
It is important to differentiate the intended effect of the March, 1969 reenactment of rule (a)$^R$ from the intended effect of the regulation when it was first introduced. While the recent reenactment of (a)$^R$ was motivated by expected balance-of-payments deficits, or at least its deterioration, coupled with a net export position of banks' capital, the factors underlying the 1960 decision were balance-of-payments surpluses coupled with a net import position of bank capital.

d) The adjusted monetary base.

Even though the Italian monetary authorities can exert complete control on the total amount of the monetary base, individual components such as $A^{RW}$ and $A^{BI}$ are controlled only insofar as upward ceilings are set by the authorities from time to time. The adjusted monetary base ($B^a$) is defined as:

\[ (1a) \quad B^a = B - (A^{RW} + A^{BI}) \]

s) Uses of base money.

The public ($B^p$) and the banking system ($B^b$) compete with each other for the use of base money:

\[ (2) \quad B = B^p + B^b \]

In this section I have discussed at great length the constraints on the economy which create and destroy base money: namely, the Treasury's budget and the balance of payments. It was also necessary to discuss the institutional elements which are intimately connected with base money processes. In particular, special attention was given to the analysis of instruments and policy followed by the Italian monetary authorities in sterilizing the flows of interna-
ational reserves. The remainder of the section is devoted to a
description of the behavior of commercial banks and the public and
their role in the hypothesis.

2.2.2 Statements Describing the Behavior of Commercial Banks

Consolidating the balance sheet of all commercial banks\(^1\) and
ignoring net worth I obtain:

\[ E^b + EA = A^{RW} + A^{RI} + D + T \]

where \( EA \) = earning assets

\( D \) = demand deposits

\( T \) = time deposits

I shall advance hypotheses concerning, in order, behavior of banks
with respect to required reserves \((E^b_R)\), excess reserves \((E^b_E)\), and
net borrowing from abroad \((A^{RW})\) and from the Bank of Italy \((A^{RI})\).

a) The banks' desired base money ratio, \( r \)

Banks hold base money to satisfy reserve requirements against
their deposit liabilities and to meet demands for cash by demand and
time deposit holders. The amount of excess reserves also depends
on, in addition to the particular mix of demand and time obligations, how
closely banks match the maturities of their liabilities with those
of their earning assets (loans and investments). The banks' desired

\(^1\) The present study will not concern itself with a group of banks re-
ferred to as "special credit institutions" which form the industrial
credit system. These credit institutions grant medium and long-term
loans and obtain funds mainly by issuing bonds (the rest of their
loanable funds comes from medium-term savings deposits, Treasury
funds, foreign loans and short-term bank credit).

Commercial banks do include savings and first-class pawn banks.
quantity of base money is proportional to the total volume of depositions.

(4a) \( B^b = r (D + T) \)

where \( r = r_R + r_E \)

when \( r_R \) = the required reserve ratio

\( r_E \) = the excess reserve ratio

b) The required base money ratio, \( r_R \)

The complexity of regulations pertaining to reserve requirements compels a lengthy historical digression. Reserve obligations against deposit liabilities were first introduced in Italy in 1947. All commercial banks other than savings and first-class pawn banks (from now on referred to as savings banks for short) were compelled to "freeze" base money—vault cash, deposits with the Bank of Italy, and Treasury bills—and/or long-term government obligations according to the formula:

\[
\frac{2}{10} \text{ (total deposits—10 · Net worth as of September 30, 1947)}
\]

\[
+ \frac{4}{10} \text{ (total deposits—total deposits as of September 30, 1947)}
\]

provided that (i) the first part of the statement did not exceed 15 percent of outstanding total deposits and (ii) total required reserves did not exceed 25 percent of total deposits.

---

1 This topic is developed more fully in Paolo Ranuzzi De Bianchi and Michele Fratianni, "La Moneta Potenziale e la Base Monetaria Aggiustata in Italia dal 1958 al 1969," Banco, March 1971.
The use of long-term government bonds worked to lower the lira amount of base money per one lira of deposit liabilities. The stock of nonbase money used to satisfy reserve obligations, however, was small and decreased from 1953 to September, 1965 a period during which government bonds were disqualified from meeting reserve obligations.

Savings banks were subjected to reserve requirements in 1958. These requirements could be satisfied by either depositing base money or long-term government bonds with the Bank of Italy. Subsequent legislation has virtually eliminated the base money requirement against deposit liabilities of savings banks.¹

Reserve requirement legislation has also favored the smaller commercial banks. This is clear after an examination of the criteria upon which requirements are based. Depending on the ratio of deposit liabilities to net worth, a commercial bank can fit into one of four reserve requirement brackets. If total deposits do not exceed 11.11 percent of the net worth, the requirement ratio is zero; if they do, the requirement is 10 percent of total deposits.² A bank must place

¹The ratio of base money to total deposit liabilities of savings banks went from \( \frac{80}{6242} \) in December, 1966 to \( \frac{35}{8339} \) in December, 1968—less than one half of one percent.

²Deposits which are subject to reserve obligations are demand and time deposits of nonbanking public, deposits of special credit institutions and lira-denominated deposits of nonresidents. Some minor items are subtracted from the aforementioned deposits to arrive at a quantity of net deposits against which required reserves are actually computed. See Associazione Bancaria Italiana, Le Legge Bancarie (Rome, 1969), pp. 537–38.
in reserve 40 percent of the difference between total deposits and
ten times its own net worth, when the quantity of reserves so com-
puted is larger than 10 percent of net deposits. The maximum amount
of required reserves, however, cannot exceed 25 percent of net depo-
sits (see footnote 2, p. 31, for the concept of net deposits). The
25 percent maximum rate was lowered to 22.5 percent beginning in

Differential treatment between demand and time deposits was
introduced in September, 1965, when the central bank requalified as
eligible for reserve purposes a list of long-term bonds issued by
the government or on behalf of the government to finance large social
programs (such as education and housing). While the spirit of the
1965 regulations intended that the maximum additional amount of base
money required per an additional lira of demand and time deposits
would be respectively .225 and .10 lira, in practice it worked that
the two marginal requirement ratios were .225 and zero, respectively.
(I arrived at that conclusion by working out the statements of the
form which banks fill out to report their month-end deposit figures
and to adjust their position of required reserves.)¹ For example,
assume a bank whose deposits net worth ratio is such that it is sub-
jected to the maximum rate, i.e., .225; the 1965 regulations assert,
in order, that the maximum additional reserves (ΔR MAX ) to be depo-
sited with the Bank of Italy are equal to

¹See Associazione Bancaria Italiana, ibid. The form is commonly known as "Mod. 109 Vig."
(A) $\Delta R_{\text{MAX}} = .225 \Delta (\text{demand deposits + time deposits})$, of which in the form of base money must be at least

(B) $\Delta R_{R,\text{MIN}} \geq .10 \Delta (\text{demand deposits + time deposits})$ and the maximum amount of bonds eligible for reserves cannot exceed

(C) $\Delta R_{\text{bonds}} \leq .225 \Delta \text{time deposits}$

Statements (A), (B), and (C), I repeat, express synthetically the body of reserve requirement regulations for commercial banks. Because long-term bonds have yielded in excess of 5 percent and base money deposits with the Bank of Italy only 3.75 percent, I can consider (B) and (C) strictly as equalities. There is a fourth statement in the 1965 regulations: the difference between (A) and (B) plus (C) must take the form of either Treasury bills and/or cash—namely, base money:

(D) $\Delta R_{R,d}^b = \Delta R_{\text{MAX}} - \Delta R_{R,\text{MIN}} - \Delta R_{\text{bonds}}$

$$= .225 (\Delta T + \Delta D) - .10 (\Delta D + \Delta T) - .225 \Delta T$$

$$= .125 \Delta D - .10 \Delta T$$

The additional lira amount of required base money per one lira of deposit liabilities is easily obtained by adding (B) plus (D). Thus:

$$\Delta B_R^b = \Delta R_{R,d}^b + \Delta R_{R,\text{MIN}}^b = .125 \Delta D - .10 \Delta T + .10 (\Delta D + \Delta T) = .225 \Delta D$$

The marginal ratio of required monetary base to demand deposit liabilities is $\frac{\Delta B_R^b}{\Delta D} = .225$

Additions to the stock of time deposits are free from base money requirements (Q.E.D.).

At this point, I can introduce the equation of the ratio of
required base money to total deposits:

\[ r_R = \frac{1}{1+t} \left( d^1 r^d + d^2 r^t \right) \]

where, \( t = T/D \)

\( d^1 = \) ratio of demand deposit liabilities of non-savings banks to demand deposits of the banking system

\( r^d = \) average ratio of required base money per one lira of demand deposit liabilities of non-savings banks

\( d^2 = \) ratio of time deposit liabilities of nonsavings banks to time deposits of the banking system

\( r^t = \) average ratio of required base money per one lira of time deposit liabilities of nonsavings banks

The term \( r^d \) is a weighted average of the four requirement ratios discussed above. Since there are no data which provide the values of the four weights (i.e., deposits are not broken down according to reserve requirement brackets), the exact knowledge of \( r^d \) is possible only as an observed value. Examination of \( r^d \) over time, however, suggests the value to be between .21 and .222. In this study, I consider \( r^d \) a policy variable. \( r^t \) can qualify as a policy variable up to September, 1965, (bearing the same limitations which
apply to \( r^d \). After this date, the following formulation is more appropriate:

\[
\begin{align*}
\frac{r^t_{19xx}}{r^t_{1965}} &= \frac{T_{NSB}^{1965}}{T_{NSB}^{19xx}} \\
\end{align*}
\]

where \( T_{NSB}^{1965} \) = time deposits at nonsavings banks at the end of September, 1965

\( T_{NSB}^{19xx} \) = time deposits at nonsavings banks at time period 19xx

and \( r^t_{1965} \) is the policy instrument.

The erosion of \( r^t_{19xx} \) with respect to the policy instrument \( r^t_{1965} \) is the greater, the greater the growth of time deposits at nonsavings banks since September, 1965. I would also expect \( r_R \) to decline so long as time deposits rise faster than demand deposits. I assume \( d^1 \) and \( d^2 \) to be determined by factors such as the convenience of the location of banking offices and the preference of the banking clientele for dealing with a bank with which a long relationship has been

---

The quality of the average requirement ratios on demand and time deposits as policy instruments is further weakened by the following two institutional features. Required reserves are computed on the end-of-the-month figures of deposit liabilities; the settlement date falls approximately a month after the computation day. To the extent that the end-of-the-month volume deposits requires a larger amount of base money than is available on the reserve settlement day, the monetary authorities are "induced" to accommodate banks by issuing the additional monetary base needed. My argument, at present, wants only to point out the potential threats to an independent monetary policy inherent in the body of regulations pertaining to reserve requirements.
established. Price competition between nonsavings and savings banks is not an explanatory determinant of the parameters $d_1$ and $d_2$. It is expected that $d_1$ and $d_2$ would be stable over relatively short periods of time. In the longer run, nonprice competition in the form of differentiated product is likely to affect the value of the two parameters. Sharp changes in $d_1$ and $d_2$ reflect basic changes in the relative quality of banking services in the industry. It should also be taken into account that the Interbank Agreement is violated and that the frequency of violations depends on the pull that interest rates on the Eurodollar market exert on domestic rates. A relative higher frequency of violations of the Cartel Agreement among savings banks vis-a-vis nonsavings banks will tend to lower $d_1$ and $d_2$ and, consequently, $r_R$.

From formulation of $r_R$ in (4b) I derive implications as to the relative effects on $r_R$, and hence on $r$, of changes in $r^d$, $r^t$, $d_1$, $d_2$, and $t$. In the form of elasticities, such effects are as follows:

$$E(r_R, d_1) = E(r_R, r^d) = \frac{d_1^d r^d}{\Delta t} > 0$$

$$E(r_R, d_2) = E(r_R, r^t) = \frac{d_2^t r^t}{\Delta t} > 0$$

$$E(r_R, t) = \frac{t(d_2^t r^t - d_1^d r^d)}{(1+t) \Delta t} < 0, \text{ provided } d_1^d r^d > d_2^t r^t$$

$$\Delta' = d_1^d r^d + d_2^t r^t$$

\[1\] In fact, the Interbank Agreement prohibits banks from paying rates on deposits above the agreed-upon ceilings.
The relative effectiveness of the policy parameters \( r^d \) and \( r^t \) on \( r_R \) depends on the empirical relationship of \( d^r r^d \) and \( r^t d^2 \). The larger the former is relative to the latter, the larger \( E(r_R, r^d) / E(r_R, r^t) \).

c) The excess base money ratio \( r_E \)

\[
(4c) \quad r_E = \frac{r_E (i_{GL}, i_{EU} - i_{GL} + P, i_{EU} + \pi_1, \rho + \pi_2)}
\]

- \( i_{GL} \) = an index of domestic credit market rates
- \( i_{EU} \) = short-term rate in the Eurodollar market
- \( P \) = premium (+) or discount (-) on forward exchange
- \( \pi_1 \) = parameter which measures the degree of "moral suasion" exercised by the central bank regarding the foreign position of banks
- \( \rho \) = discount rate
- \( \pi_2 \) = parameter which measures the degree of "moral suasion" exercised by the central bank in granting credit to commercial banks

where the sign of the partial derivatives are in order

\[
r'_{E,1} < 0, \quad r'_{E,2} < 0, \quad r'_{E,3} > 0, \quad r'_{E,4} > 0
\]

The level of the index of credit market rates, \( i_{GL} \), measures the opportunity cost to hold excess reserves. In an open economy, banks will invest in foreign assets so long as the rate of return abroad is higher than the domestic rate, after the risk of exchange fluctuations has been eliminated by a forward exchange transaction in the opposite direction. Let \( P^F \) and \( P^S \) denote respectively the
forward and spot rate of exchange of lire for, say, one U.S. dollar, (b) the premium that one must pay to insure himself against a change in exchange rate be defined as

\[ p = \frac{P_F - P_S}{P_S} \]

and (c) \( i_{EU} \) denote an index of short-term interest rates in the Eurodollar market; then capital will move from Italy to the Eurodollar market whenever the following inequality holds

\[ \frac{P_F}{P_S} (1 + i_{EU}) > (1 + i_{GL}) \]

which, after noting that the term \( P \cdot i_{EU} \) can be disregarded because of vanishing order, can be expressed as

\[ i_{EU} - (i_{GL} - P) > 0 \]

For brevity, I refer to the term on the left-hand side of the above inequality as AIF (arbitrage interest factor). AIF must exceed some minimum amount before capital will move from Italy to the Eurodollar market because of arbitrage costs. If AIF exceeds a minimum posi-

---


2 See, for example, William H. Branson, "The Minimum Covered Interest Differential Needed for International Arbitrage Activity," *Journal of Political Economy*, Nov.-Dec., 1969. Branson estimates that the absolute value of AIF exceeded 0.18 percent per annum between the U.S. and the United Kingdom in the period 1959-64.
tive amount, banks will export capital; hence AIF measures the
cost of holding excess reserves where there exists a profitable
opportunity to invest funds in the Eurocurrency or Euro-bond mar-
ket. The third and fourth arguments in the $r_E$ function measure, re-
spectively, the pecuniary and nonpecuniary cost of borrowing abroad
and from the Bank of Italy.

d) The banks' domestic borrowing ratio, $b_H$.

The amount the banks want to borrow from the Bank of Italy
is proportional to the total volume of deposits

$$A^{BI} = b_H (D + T)$$

and

$$b_H = b_d (i_{GL}, AIF, i_{EU} + \pi_1, \rho + \pi_2)$$

where the partial derivatives are in order

$$b'_{H,1}, b'_{H,2}, b'_{H,3} > 0; b'_{H,4} < 0$$

for $AIF >$ minimum positive amount.

Since changes in $i_{EU}$ and $i_{GL}$ affect $b_H$ also via AIF, I differ-
entiate between the two effects by postulating the following quanti-
tative order on the partial derivatives

$$b'_{H,1} \quad \text{and} \quad b'_{H,3} > b'_{H,2}$$

The formulation (5b) emphasizes the substitutability between indebted-
ness of the Italian banking system to the rest of the world and
indebtedness to the central bank. The existence of $\pi_1$ increases the
cost of borrowing abroad to the extent that a penalty is assessed on
the banks which continuously ignores the body of regulations relative
to their foreign position.

Italian banks may obtain loans from the Bank of Italy by actually rediscounting commercial bills and/or by pledging government securities as collateral. Borrowing against the collateral of securities is classified as "ordinary advances" or "fixed maturity advances," depending on the term of the loan. "Ordinary advances" involve a credit line the Bank of Italy grants to each bank against the deposit of government securities. The credit line represents the maximum amount of credit a bank can obtain within a given period of time (the standard practice is to grant the line of credit for a period of 4 months and renew it). The credit line can be raised if the central bank accepts more government securities as collateral. Banks, for precautionary motives, will maintain with the central bank a margin of credit (which is equal to the line of credit minus the activated loans) at their own disposal as liquidity of last resort. This unutilized margin, known technically as margine disponibile, is counted both as a use and source of base money.  

"Fixed-maturity advances" are to be repaid by banks at the end of a fixed date (7, 15, or 22 days).

---

1 It enters as a plus item in $A^B$ and $B^E$. 

Borrowing is not a right but a privilege granted by the Bank of Italy to banks. A historical review of $A^B_I$ and of the discount rate reveals that the Bank of Italy has seldom changed $\rho$ to influence the variable $A^B_I$. From 1958 to August 1969 $\rho$ has been 3.50 percent per annum.\(^1\) The control on the upper limit of $b_H$ is exercised by an outright rationing policy. The demand and supply of $b_H$ are depicted on the graph below.

\[\begin{align*}
\text{DD} &= \text{demand of } b_H \text{ by banks} \\
\text{SS} &= \text{supply of } b_H \text{ by Bank of Italy}
\end{align*}\]

\(^1\) Since August 14, 1969 the following amendments have been enacted:

(1) $\rho$ has gone from 3.50 to 4.00 percent;

(2) a penalty rate of 1.50 percent is to be added to $\rho$ when the discounted bills of a bank during a six month period exceed 5 percent of required reserves.

(3) penalty rates of 0.50 percent are added to $\rho$ every time a bank renews a fixed-maturity loan up to a maximum of three additional renewals. Hence, the maximum rate is 5.50 percent on the fourth time the bank renews the short-term loan.
The supply curve SS is an uninterrupted horizontal line during periods within which the monetary authorities have no concern over the growth of base money. Alternatively, the monetary authorities have in mind an upper limit to the supply of lendable funds. The constraint \( \pi_2 \), given the demand schedule DD, has no effect whatsoever. Banks will borrow \( \hat{b}_H \) at a price \( \hat{\rho} \). If the constraint is placed at \( \pi_2^2 \), banks as an aggregate still would want to borrow \( \hat{b}_H \) (note: the price \( \rho \) remains unchanged at \( \hat{\rho} \)) but they are prevented from doing so by a rationing system. The most the banking system can obtain is \( b_H^{\pi_2^2} \) at the price \( \hat{\rho} \). An upward movement in the Euro-dollar rates and/or a relaxation of regulations relative to the banks' foreign position will shift the demand curve to, say, \( D^1 \) \( D^1 \), whereby making the constraint \( \pi_2 \) effective.

To summarize, the analysis of the borrowing ratio has a dual nature. So long as the desired borrowing ratio is below the upper limit set by the monetary authorities, the function (5b) holds. If the inequality is reversed, i.e., if

\[
(5c) \quad b_H > b_H^{\pi_2^1}
\]

then,

\[
(5d) \quad b_H = b_H^{\pi_2^1}
\]

e) The banks' net foreign borrowing ratio, \( b_F \).

The banks' desired quantity of net borrowings from the rest of the world is proportional to the total volume of deposits

\[
(6a) \quad \Lambda^{RW} = b_F (D + T)
\]

and
(6b) \( b'_F = b'_F(i_{GL}, AIF, i_{EU} + \pi_1, \rho, \pi_2, P) \)

where the partial derivatives are in order

\[
\begin{align*}
b'_{F,1}, b'_{F,4}, b'_{F,5}, b'_{F,6} & > 0; \\
b'_{F,2}, b'_{F,3} & < 0 \quad \text{for } AIF > \text{minimum positive amount.}
\end{align*}
\]

More should be said about the effects of a rise in AIF (again, AIF being larger than a minimum positive amount) and \( i_{EU} + \pi_1 \) on \( b'_F \). The former will induce banks to increase their foreign assets as yields on investments abroad rise relative to yields on domestic investments; the latter will tend to depress foreign liabilities as the cost of borrowing abroad rises relative to the cost of borrowing from the domestic central bank. Although unambiguous qualitative effects are registered on \( b'_F \), the composition of the banks' foreign position changes in various manners as a result of autonomous changes in the variables which are the arguments of the \( b'_F \) function. To analyze in detail the various behavior patterns I disaggregate \( b'_F \) into:

\[
(6c) \quad b'_F = \frac{FL}{D+T} - \frac{FR + FA}{D + T} = f_2 - f_1
\]

where

\[
(6d) \quad \frac{FL}{D+T} = f_2(P, i_{EU} + \pi_1, \rho, \pi_2)
\]

\[
\begin{align*}
f'_{21} & > 0, f'_{22} < 0, f'_{23} > 0, f'_{24} > 0
\end{align*}
\]
\[ (6e) \quad \frac{FR_R + FA}{D + T} = f_1(AIF, i_{GL}) \]

\[ f'_{11} > 0, f'_{12} < 0 \]

The sign of the partial derivatives of the \(f_2\) and \(f_1\) functions are self-explanatory, except for \(f'_{21}\). If banks could borrow everything they desired (for a given structure of interest rates) from the central bank—i.e., \(\pi^1_2 = 0\)—and this form of borrowing were cheaper than borrowing from the rest of the world, on this consideration alone there would be no incentive for banks to go into debt abroad. However, independently of considerations about relative borrowing costs and availability, credit institutions would opt to raise foreign indebtedness whenever the premium of an insurance which covers against the loss of a devaluation of foreign-denominated assets rose. More specifically, a rise in \(i_{EU} - i_{GL}\) would induce banks to acquire more earning assets dominated in dollars relative to lira-dominated assets. Assuming a risk-averting behavior and that banks are prohibited from issuing foreign liabilities, banks would increase their foreign exchange spot balances and reduce correspondingly their forward balances by selling forward foreign exchange for lire at a predetermined exchange rate \(F^F\). If banks are allowed, as they are, to issue liabilities denominated in foreign currencies, the risk of depreciation of assets denominated in foreign currencies due to a devaluation of such currencies is met by increasing liabilities denominated in the same currencies. As the insurance premium \(P^F\) rises, the relative convenience to raise \(FL\) over
the use of forward contracts also rises.

I summarize the final effect on $b_F$ of changes in $P$, $\pi_1^* + \pi_1$, $\rho$, $AIF$, $i_{GL}$, and $i_1$ as follows:

(i) A rise in $P$ raises $f_2$ and hence raises $b_F$,
(ii) A rise in $i_{EU}^* + \pi_1$ lowers $f_2$ and hence lowers $b_F$,
(iii) A rise in $\rho$ raises $f_2$ and hence raises $b_F$,
(iv) A rise in $AIF$ raises $f_1$ and hence lowers $b_F$,
(v) A rise in $i_{GL}$ lowers $f_1$ and hence raises $b_F$,
(vi) A rise in $\pi_1^*$ raises $f_2$ and hence raises $b_F$.

2.2.3 Statements Describing the Behavior of the Public

Four allocative parameters and the supply function of earning assets to the banks fully describe the behavior of the public in the hypothesis. The allocative parameters are defined:

(7a) $C^P/D = K_1$
(7b) $PDD/D = K_2$
(7c) $PTD/D = K_3$
(7d) $T/D = t$

$C^P = \text{currency in the hands of the public}$

$PDD = \text{postal demand deposits}$

$PTD = \text{postal time deposits}$

$C^P + PDD + PTD = \text{public-held base money}$

$T = \text{time deposits}$

$D = \text{demand deposits}$

Before introducing the public's supply function of earning assets to the banks and the functional equations relative to each
of the four ratios, it is useful to digress in order to analyze the public's behavior following a nonratio approach. It will be seen that the ratio approach implies the nonratio approach, while the opposite is not true.

The starting point is the balance sheet of the public.
\[ C^P + PDD + PTD + D + T + OA = EA \]

The public allocates its total assets among currency, postal demand and time deposits, bank demand and time deposits, and other assets (OA) which need not be specified for my purposes. In addition, the public supplies earning assets to the banking system (EA). Net worth has been omitted because it is assumed to be constant. The demand equations for each asset and the supply of earning assets are:

\[ C^P = C^P (W, Y, \text{distr.}, i^P) \]
\[ PDD = PDD (W, Y, \text{distr.}, i^P) \]
\[ PTD = PTD (W, Y, \text{distr.}, i^P) \]
\[ D = D (W, Y, \text{distr.}, i^P) \]
\[ T = T (W, Y, \text{distr.}, i^P) \]
\[ EA = s (W, Y, p_Y, p^E, i^P, S_G) \]

\[ W = \text{nonhuman wealth} \]
\[ Y = \text{national income} \]
\[ \text{distr. = proportion of wage income to total income} \]
\[ i^P = \text{vector of interest rates relevant to the public's portfolio decisions. It includes the rate paid on PDD (} i_{PD} \text{), PTD (} i_{PT} \text{), D (} i_D \text{), T (} i_T \text{), the credit market rate } i_{GL} \text{, the Eurodollar rate } i_{EU} \text{, and} \]

the real rate of return $\beta$.

$p_y = $ national income implicit price deflator

$p^E = $ expected price level

$S_G = $ stock of government securities net of the portion absorbed by monetary authorities.

The demand for OA, implicitly determined by the six equations plus the balance sheet of the public, has been omitted. The demand for each of the five assets explicitly considered responds positively to changes in $W$ and $Y$, and negatively to changes in the credit market rate. Quite generally, the assets are assumed to be gross substitutes. An increase in the rate on a given asset increases the demand of the public for the asset, while it tends to lower or leave unchanged the public's demand for any other assets. All rates on deposits are constrained by ceiling rates set by the Interbank Agreement.

The absence of a developed money market in Italy has shifted onto demand and time deposits the role usually assigned to money market instruments, such as Treasury bills and commercial paper. One investment opportunity, however, which has been increasingly available to Italian investors is the Eurodollar market. Hence, the rate $i^P_E$ has been included in the vector of interest rate $i^P$.

A few remarks are in order to elucidate the role played by income distribution (distr.) in the demand for financial assets. Traditionally, families in Italy use cash rather than checks to settle transactions. This custom is further reinforced by the almost uni-
versal practice of business firms and governmental agencies of paying salaries to blue and white collar workers in currency. A redistribution of income in favor of wage earners, who make up the largest number of families (i.e., nonbusiness firms), will thus cause an upward shift in the demand for $C^p$.

Income distribution, in addition, captures a second effect: the obstacles which prevent the small saver from going into the open market in search for higher yields. The obstacles appear both in the form of significant minimum lot sizes of market instruments and ignorance. With respect to the former, banks have been known to violate the Interbank Agreement to attract large deposit holders. The maximum rates prescribed by the Interbank Agreement are strongly enforced, however, to small deposit holders, regardless of their knowledge about market yields. The greatest beneficiary of the relative absence of information about market yields, on the other hand, are the institutions to which the investor has been most often exposed. The Post Office in Italy, through its capillary branch system, is entrusted with the payment of a great many government obligations, including retirement checks. The exposure of a small saver to the Post Office is continually reinforced by this. To summarize, it would be expected that a redistribution of income in favor of wage earners, ceteris paribus, would cause a redistribution among financial assets from bank demand and time deposits to currency and postal deposits.

The allocative parameters $K_1$, $K_2$, $K_3$, and $t$ depend on the argu-
ments of the functions which explain both numerator and denominator. To obtain unambiguous responses, however, the ratio formulation is enriched by introducing order constraints on the value of the partial derivatives of the public's demand functions. The order constraints are:

(i) the wealth elasticities are of the following ascending order: \( 0 < E(C^p, W) < E(T, W) < E(D, W) \);

(ii) all demand functions are assumed to be homogeneous of degree one with respect to \( Y \);

(iii) the effects of an income redistribution are those outlined above.

Because of the additional order constraints, the ratio formulation implies the nonratio approach, while the opposite is not true.

To summarize, the public's behavior in the hypothesis is synthesized by the following five functional equations.

\[
\begin{align*}
(8a) \quad K_1 &= K_1(W, \text{distr.}, i^p) \\
(8b) \quad K_2 &= K_2(W, \text{distr.}, i^p) \\
(8c) \quad K_3 &= K_3(W, \text{distr.}, i^p) \\
(8d) \quad t &= t(W, \text{distr.}, i^p)
\end{align*}
\]

where the partial derivatives of \( K_1, K_2, K_3 \), and \( t \) with respect to \( W \) are negative and with respect to distr. positive.

\[
(9) \quad EA = S(W, Y, p_Y, p^E, S_G, i^p)
\]

where the partial derivatives of \( s \) with respect to the first five arguments are positive.
2.2.4 The Relation Between the Time to Demand Deposits Ratio and Credit Market Rates

In terms of elasticities, the relation between $t$ and $i_{GL}$ is postulated as:

$$E(t,i_{GL}) = [E(t,i_{P-T}) + E(t,i_T) E(i_T,i_{P-T})] E(i_{P-T},i_{GL})$$

where $i_{P-T}$ stands for a vector of yields on financial assets, excluding time deposits, and $E(i_{P-T},i_{GL})$ is a weighting factor.

The elasticity of the time deposit ratio $t$ with respect to the vector of yields $i_{P-T}$ measures the response of the public in allocating bank deposits between time and demand deposits to a given change in yields on assets other than time deposits. Such a response is negative, provided the substitution between other assets (including Eurodollars) and time deposits is more pronounced than the substitution between other assets and demand deposits, for a given change in $i_{P-T}$.

The elasticity of $t$ with respect to $i_T$ measures the response of the public in allocating bank deposits between time and demand deposits to a given change in the yield on time deposits. The size of this elasticity is unambiguously positive since a rise (fall) in $i_T$ causes an increase (decrease) in time deposits with a simultaneous

---

1 This section draws heavily on the lecture notes of the Monetary Theory courses Professor Karl Brunner has taught at Ohio State University and on Albert Burger, *An Explanation of the Money Supply Processes* (Wadsworth Publishing Company, forthcoming).
decrease (increase) in demand deposits.

The term $E(i_T, i^{P-T})$ expresses the response of the banking system in adjusting the rate paid on time deposits to a given change in the yield vector $i^{P-T}$. The sign and size of such a response stems from the banks' supply function of time deposits which is expressed by the following price setting function:

$$i_T = i_T(\bar{i}_T, i^{P-T})$$

where

the rate $\bar{i}_T$ stands for the ceiling rate on time deposits set by the Interbank Agreement.

Quite generally, the profit-maximizing behavior of banks shapes the size of $E(i_T, i^{P-T})$. Consider a situation in which the marginal cost of acquiring an additional lira of time deposits equals the marginal revenue generated by such an additional lira of time deposits. Given the initial state of equilibrium, an increase in $i^{P-T}$ will cause marginal revenue to rise relative to the marginal cost of time deposits. Profit-maximizing behavior requires that banks increase time deposit liabilities by offering higher rates; such an expansion of time deposits will cease, of course, when a new equilibrium point is reached. Thus it is established that the response of $i_T$ to a change in $i^{P-T}$ is positive.

Next, I argue that the elasticity $E(i_T, i^{P-T})$ is not independent of the level of the credit market rate $i_{GL}$. The argument is best developed by assuming a neutral monetary policy (i.e., $B^a$ is not changing). It follows that banks can strive for an optimal
balance sheet by altering (a) the level of excess reserves \( B^E \), (b) the borrowed amounts from the Bank of Italy \( A^BI \), (c) the net borrowed amounts from abroad \( A^{RW} \), and (d) deposit liabilities. The responses of \( B^E \), \( A^BI \), and \( A^{RW} \) to a given change in the rate \( i_{GL} \) are assumed to possess the following nonlinear properties: the elasticity of \( B^E \) with respect to \( i_{GL} \) tends to increase numerically as \( i_{GL} \) declines in relation to past historical averages; while the interest elasticities of \( A^BI \) and \( A^{RW} \) tend to decline as \( i_{GL} \) rises in relation to past historical averages. Two distinct situations arise. During low interest rate regimes, it is expected that banks would expand earning assets by lowering \( B^E \) and/or increasing \( A^BI \) and \( A^{RW} \) relative to an expansion of deposit liabilities. A reversed pattern would hold during high interest rate regimes: banks would tend to expand earning assets by expanding deposit liabilities relative to an increase in \( A^BI \) and \( A^{RW} \) and/or decrease in \( B^E \). The conclusion is that \( E(i_T, i^{P-T}) \) is expected to rise as the credit market rate \( i_{GL} \) moves up in relation to past historical averages.

The existence of ceiling rates on deposits, however, reverses the response pattern I have just outlined. As the general level of interest rates rises, \( i_T \) will gradually approach the ceiling prescribed by the Interbank Agreement. With \( E(i_T, i^{P-T}) \) approaching zero \( B(t, i_{GL}) \) will also approach zero. When ultimately \( i_T \) equals the ceiling rate \( i_T \), the elasticity of the time deposit ratio with respect to credit market rates will be negative. On the other hand, during low interest rate regimes \( E(t, i_T) E(i_T, i^{P-T}) \) is expected
to dominate \( P(t, i) \) and consequently \( P(t, i_{GL}) \) is expected to be positive.

In an open economy such as that of Italy, the relation between \( t \) and \( i_{GL} \) can become crucially dependent on the pull outside interest rates exercise on domestic time deposits. Given the existence of regulations which benevolently aim at reducing competition among banks, the lower the ceilings are in relation to interest rates in the international money market, the more likely it is that the Italian banking system will experience a process of disintermediation.

2.2.5 Two Definitions of Money Supply

Two analytical statements of the money stock, one exclusive and the other inclusive of term deposits, complete the model

\[
\begin{align*}
(10a) \quad M^1 &= C^P + D + PDD \\
(10b) \quad M^2 &= M^1 + T + PTD
\end{align*}
\]

The money stock can be expressed in terms of a money multiplier \( m \) times the adjusted base \( B^a \) by substituting equations (2) to (8) into (1a) and by the use of (10a) and (10b).

\[
\begin{align*}
(11a) \quad M^1 &= m^1 B^a \\
(11b) \quad M^2 &= m^2 B^a \\
& \quad m^1 = \frac{1 + k_1 + k_2}{\Delta} ; \\
& \quad m^2 = \frac{1 + k + t}{\Delta} \\
& \quad \Delta = (1 + t) (r - b_H - b_F) + k, \quad k = k_1 + k_2 + k_3
\end{align*}
\]
By a similar procedure the domestic earning assets of the banking system are expressed as:

\[(1)\] \( EA = ah^a \)

\[
\frac{a = (1 + t)[1 - (r-b_H-b_P)]}{\Delta} = \text{asset multiplier}
\]

Simple algebraic manipulations result in the following relationships among the three multipliers:

\[(i)\] \( a = m^2 - 1 \)

\[(ii)\] \( m^2 > a \)

\[(iii)\] \( m^2 > m^1 \)

\[(iv)\] the relationship between \( m^2 \) and \( m^1 \) depends on the empirical relationship among \( t, k_3, \) and \( \Delta; \) for \( t + k_3 \geq \Delta, \) \( a \) is larger, equal to, or smaller than \( m^1, \) respectively.

\[(v)\] from \( (ii), (iii) \) and \( (iv) \) I can state that

\[
m^2 > a > m^1, \text{ for } t + k_3 > \Delta
\]

or

\[
m^2 > m^1 > a, \text{ for } t + k_3 < \Delta.
\]

To recapitulate, I have presented in Section 2.2 the three major building blocks of the money supply hypothesis. In turn, I have uncovered my "vision" concerning the behavior of the monetary authorities, the commercial banks, and the public. What remains to be done is an analysis of the basic properties and principal implications of the model.
2.3 PROPERTIES AND SOME IMPLICATIONS OF THE MODEL

For convenience, the complete model has been summarized in Table 5. The Brunner-Meltzer nonlinear hypothesis is usually synthesized by an equilibrium market for bank credit which serves to obtain a solution for the index of credit market rates $i_{GL}$, and a statement of the money supply which is used to obtain a solution for the money stock. Both the money supply and bank credit are expressed in terms of a multiplier ($m^1$ and $a$, respectively) times the adjusted base, $B^a$. The multipliers, intended as theoretical magnitudes, depend on the arguments of the seven proximate determinants of the money supply; namely, $k_1$, $k_2$, $k_3$, $t$, $r$, $b_h$, and $b_f$. They, in turn, respond to the policy parameters of the model which are the adjusted monetary base ($B^a$), the average reserve requirement ratios ($r^d$ and $r^t$), the body of regulations pertaining to the banks' foreign position ($\pi_1$), the discount rate ($\rho$), the degree of rationing exercised by the central bank in granting loans to commercial banks ($\pi_2^1$), the ceiling rates on deposits at commercial banks and at the Post Office, and the supply of government securities ($S_G$). Nonhuman wealth ($W$), national income ($Y$), the price level ($P_y$), the real rate of return ($\beta$), and the expected price level are the variables which are exogenous to the credit and money markets in an economy which does not interact with the outside world. Since the model envisions an open economy, I have to add to the list of exogenous variables those forces which influence the economy from the outside: namely, the Eurodollar rate ($i_{EU}$) and the exchange rate premium or discount ($P$).
Finally, the distribution of income, and the distribution of deposits between savings and nonsavings banks \((d^1, d^2)\) are given to the model.

2.3.1 Solution for the Bank Credit Rate \(i_{GL}\) and Interest Rate Responses to Changes in Relatively Exogenous Variables.

By equating the logarithmic form of (9) to the logarithmic form of (11c), I obtain the following solution for the bank credit rate \(i_{GL}\); namely,

\[
(12) \log i_{GL} = \frac{1}{E(a, i_{GL}) - E(s, i_{GL})} \left[ -\log B^a + \{E(s, W) - E(a, W)\} \log W \right. \\
\left. + \{E(s, i_{EU}) - E(a, i_{EU})\} \log i_{EU} + \{E(s, p_y) - E(a, p_y)\} \log p_y \right. \\
+ \{E(s, i_D) - E(a, i_D)\} \log i_D \text{ plus similar terms for} \\
\bar{1}_r, \bar{1}_pt, \bar{1}_pd + E(s, p^E) \log p^E + E(s, \beta) \log \beta + \\
E(s, S) \log S - E(a, \rho) \log \rho - E(a, \pi_1) \log \pi_1 \\
- E(a, \pi_2) \log \pi_2 - E(a, r^d) \log r^d - E(a, r^t) \log r^t \\
- E(a, p) \log p - E(a, d^1) \log d^1 - E(a, d^2) \log d^2 \\
- E(a, \text{distr.}) \log \text{distr.}
\]

---

\(^1\)For example, let the logarithmic form of (11c) by \(\log EA = \log B^a + E(a, i_{GL}) \log i_{GL} + E(a, \rho) \log \rho + \text{similar terms for the remaining arguments, where } E(x, y), \text{ which denotes the elasticity of variable } x \text{ with respect to the parameter } y, \text{ can be approximated by a constant.}
By virtue of equation (12) and the use of the model's behavioral equations I can derive the response of domestic credit market rates to changes in relatively exogenous variables and policy variables. These responses are summarized in Table 6 (p. 59).

Notice that all the elasticities in Table 6 include the elasticity of the credit market rate with respect to the adjusted base as a multiplicative term. Most of the signs of the elasticities are unambiguous. The positiveness of $E(i_{GL}, W)$ depends on the relative influence wealth exerts on the public's supply of earning assets to the banking system, on the time to demand deposits ratio and on the currency to demand deposits ratio. In the empirical work of Brunner and Meltzer $E(s, W) - E(a, W)$ in the U.S. was found to be 1.78. Similarly, the positiveness of $E(i_{GL}, i_T)$ depends on the empirical relationship of the relative effect $i_T$ exerts on the $s$ function vis-a-vis its effect on the asset multiplier $a$.

Of particular importance is the "pull" exercised by outside interest rates on internal ones. The elasticity of $i_{GL}$ with respect to $i_{EU}$ can be expressed as:

$$E(i_{GL}, i_{EU}) = -E(i_{GL}, B^a) \left[ E(s, i_{EU}) - E(a, i_{EU}) \right]$$

While the reader is referred to (12j) of Table 6 for a discussion of the order constraints which will assure the positiveness (or negativeness) of the elasticity, it is useful to outline here the

1"Liquidity Traps," p. 34.
mechanisms through which \( i_{EU} \) exerts its influence on the asset multiplier. As \( i_{EU} \) rises, banks are induced to reduce their net foreign debit position—via a reduction in FL and a rise in FA—and to increase net borrowings from the central bank. The excess reserve ratio will be affected in a downward direction to the extent that a rise in \( i_{EU} \) raises AIF. Provided \( b_F \) is negative, the increase in \( i_{EU} \) will raise the asset multiplier via its effect on the bank-related parameters. The public, on the other hand, reacts to a higher level of \( i_{EU} \) by lowering the time to demand deposit ratio and by raising the \( k \) ratios with a total effect of lowering the asset multiplier. \( E(a, i_{EU}) \) will be positive (negative), provided the sum of the elasticities of the asset multiplier with respect to \( r_E \), \( b_H \), and \( b_F \) multiplied by their Eurodollar interest rate elasticities is larger (smaller) than the sum of the corresponding elasticities involving the public's four allocative ratios. Even though \( E(a, i_{EU}) \) is positive, \( E(i_{GL}, i_{EU}) \) can still be positive provided \( E(s, i_{EU}) > E(a, i_{EU}) \). In this case, it should be noted that only a value of \( E(i_{GL}, i_{EU}) \) bigger than unity will assure a reduction in the difference between external and internal interest rates.

2.3.2 Solution for the Money Supply and Bank Credit

In a manner similar to the derivation of the solution for \( i_{GL} \), I take logarithms of (11) and substitute (12) for \( \log i_{CL} \)

\[
\log M = \log B^a + E(m^i, i_{CL}) \log i_{CL} + E(m^i, i_{EU}) \log i_{EU} \
\]

plus similar terms for \( W, p_y, \bar{T}_D, \bar{T}_T \), etc., \((i = 1,2)\)
and

\[(14) \log EA = \log b^8 + E(a, i_{GL}) \log i_{GL} + E(a, i_{EU}) \log i_{EU}\]

plus similar terms for \(w, p_y, \bar{T}_D, \bar{T}_T, \text{etc.}\).

Table 7 summarizes the effects of a change in most of the policy and exogenous variables on \(M^i\) and \(EA\). Before evaluating these findings it is necessary to turn to a discussion of \(E(m^i, i_{GL})\) and \(E(a, i_{GL})\).

a) The elasticity of the multipliers with respect to the credit market rate

The channels through which \(i_{GL}\) affect \(m^i\) and \(a\) are the approximate determinants of the money supply \(r, b_H, b_F, t, \text{and } k\). The elasticity of \(m^i\) and \(a\) with respect to \(i_{GL}\) is given by the following two expressions:

\[(15a) E(m^i, i_{GL}) = E(m^i, r) E(r, i_{GL}) + E(m^i, b_H) E(b_H, i_{GL}) \]

\[+ E(m^i, b_F) E(b_F, i_{GL}) + E(m^i, t) E(t, i_{GL}) + E(m^i, k) \]

\[E(k, i_{GL}) \]

\[(15b) E(a, i_{GL}) = \frac{\sigma}{a} E(m^2, i_{GL}) \]

During low interest rate regimes \(E(m^2, i_{GL})\) and \(E(a, i_{GL})\) are unambiguously positive, with \(E(a, i_{GL})\) being larger than \(E(m^2, i_{GL})\).
(cf. [15b] and the fact that $m^2$ is larger than $a$). The positive-
ness of $E(m^1, i_{GL})$ requires that the multiplicative term $E(m^1, t)$
$E(t, i_{GL})$, which is negative, not be large enough numerically to
offset the other four multiplicative elements of the expression
which are positive.

During high interest rate regimes, the interest elasticities
of the two borrowing ratios and the reserve ratio approach zero.
The nonlinear properties of the three elasticities were discussed
in connection with the examination of the sign of $E(t, i_{GL})$. The

---

Recall that:

(i) $E(m^1, r), E(m^1, t), E(m^1, k), E(m^2, k) < 0$

(ii) $E(m^1, b_H), E(m^1, b_F), E(m^2, t) > 0$

(iii) $E(t, i_{GL})$

> 0 during low interest rate regimes
< 0 during high interest rate regimes

(iv) $E(k, i_{GL})$

< 0 during low interest rate regimes
< 0 during high interest rate regimes

(v) $E(r, i_{GL})$

> 0 during high interest rate regimes
< 0 as a direct implication of the hypothesis

(vi) $E(b_H, i_{GL})$

> 0 as a direct implication of the hypothesis

$E(b_F, i_{GL})$

> 0 during high interest rate regimes

(vii) $\frac{m^2}{a} > 1$
latter turns negative because of the restraint ceiling rates impose on the banks' effort to adjust time deposit yields to changes in credit market rates. It follows that the sign of the interest elasticities of the multipliers is determined by the relative strength of the following two components:

\[(15c) \ E(m^1, t) \ E(t, i_{GL}) \ vis-a-vis \ E(m^1, k) \ E(k, i_{GL})\]

I start with the multiplier \(m^2\). The first element of \((15c)\) is negative \([E(m^2, t) > 0 \text{ and } E(t, i_{GL}) < 0]\) while the second is positive \([\text{both } E(m^2, k) \text{ and } E(k, i_{GL}) \text{ are negative}]\). The term \(E(k, i_{GL})\) is likely to be characterized by the same nonlinear properties of the interest elasticity of the reserve ratio. Namely, the higher the general level of interest rates, relative to past historical averages, the lower \(E(k, i_{GL})\) will be numerically.

I conclude that during high interest rate regimes \(E(m^2, i_{GL})\) is negative. The same holds for \(E(a, i_{GL})\). The sign of \(E(m^1, i_{GL})\), instead, is positive as a direct consequence of the negative value of \(E(m^1, t)\). The asymptotic properties of \(E(k, i_{GL})\) are not sufficient in reversing the sign of \(E(m^1, i_{GL})\) between low and high interest regimes.

With this information the signs of the expression listed in Table 7 can be evaluated. This is done by distinctly separating low from high interest rate regimes.
b) $M^1$ and EA responses to changes in policy parameters and relatively exogenous variables during periods of historically low interest rates.

Recalling that the elasticity of the interest rate with respect to the adjusted base is negative and that the interest elasticities of the multipliers are positive during low interest rate regimes, it can be seen that the terms $E(m^1, i_{GL}) E(1_{GL}, B^a)$ and $E(a, i_{GL}) E(i_{GL}, B^a)$ appearing in Table 7 are negative and quite likely less than one. Using the previous result that the interest elasticity of the asset multiplier is numerically larger than the interest elasticity of the $M^2$ multiplier, it follows that

$$0 < E(EA, B^a) < E(M^2, B^a) < 1$$

$E(M^1, B^a)$ assumes also a value which falls between zero and one; however, no unambiguous inference can be made about its value relative to the expression (16).

Second, $E(M^1, x)$ and $E(EA, x)$ assume negative values for $x = r^d, d^1, r^t, d^2, \rho, \pi$, and positive values for $x = P, i_T, S_G$; the positiveness of $E(M^1, \pi_2^1)$ and $E(EA, \pi_2^1)$ depends on the empirical relationship $E(b_F, \pi_2^1) b_F$ being larger than $E(r, \pi_2^1) r$. The negativeness of $E(M^2, i_{EU})$ and $E(EA, i_{EU})$ depends on the first multiplicative term on the right-hand side of (13k') and (14k) being numerically larger than the second term. Also ambiguous, without further order constraints, are the signs of $E(M^1, i_{EU})$ and $E(EA, i_{EU})$; these expressions are made up of two multiplicative terms which are negative and positive, respectively.
the Third, effectiveness of the instruments of monetary policy can be ranked according to the size of the elasticities listed in Table 7. The only requirement necessary to create such "policy effectiveness" scale is the knowledge of easily ascertainable empirical relationships. For example, the impact of a given change in the monetary base on the money stock $M_r$ is larger than the impact of an equivalent change in the reserve requirement ratio $r^d$ on $M^2$. This can be readily seen by comparing equations (13a) with equation (13c) of Table 7. For convenience (13c) is rewritten

$$E(M^2, r^d) = -\frac{d1_r^d}{\Delta} E(EA, B^a)$$

Since $0 < E(EA, B^a) < E(M^2, B^a)$ and $\frac{d1_r^d}{\Delta}$ is less than one, it follows that $E(M^2, B^a)$ is larger than the absolute value $E(M^2, r^d)$. In addition, $r^d$ has a comparative advantage in influencing banks' earning assets over $M^2$. That is, the absolute value of $E(EA, r^d)$ is larger than the absolute value of $E(M^2, r^d)$ because $\frac{m^2}{a}$ is bigger than one—a direct implication of the hypothesis.

Similar comparisons can be made between the adjusted base elasticity of the money supply (or earning assets) and $E(M^i$ or $EA, x)$ for $x = r^t, \rho, \pi_1, P, i_T, S_G$; among the latter, statements can be made about their relative effectiveness in influencing $M^i$ and EA.

c) $M^i$ and EA responses to changes in policy parameters and relatively exogenous variables during periods of high interest rates

As shown above, the pull exercised by the Eurodollar market
on an economy which is subjected to rate ceilings on bank deposits is a major cause accounting for the switch in sign of the elasticity of the money multiplier $m^2$ and asset multiplier $a$ with respect to domestic credit market rates. As a consequence of this phenomenon, the numerical value of most of the response patterns listed in Table 7, for which an unambiguous sign was evaluated, increases. In particular, it is noticeable that both $E(EA, B^a)$ and $E(M^2, B^a)$ are larger than one with $E(EA, B^a)$ exceeding $E(M^2, B^a)$, the opposite of the rank order under low interest rate regimes. All other elasticities which include $E(M^2, B^a)$ and $E(EA, B^a)$ will be higher than those under low interest regimes. The "policy effectiveness" scale undergoes no qualitative change for $x = r^d, d^1, d^2, r^t, r, \pi_1, \pi_2, P$; simply, the numerical value has risen for all elasticities.

The change in sign of $E(m^2 \text{ or } a, i_{GL})$ makes the reading of the sign of $E(M^2 \text{ or } EA, i_T)$ ambiguous and $E(M^2 \text{ or } EA, S_G)$ negative.

Finally, the $M^2$ and EA responses to changes in the Euro-dollar market rates is unambiguously negative, again with EA responding numerically more than $M^2$ [note that $E(a, i_{EU}) = E(m^2, i_{EU}) < 0$]. The numerical value of these two elasticities increases relative to their value under low interest rate regimes.$^1$

---

$^1$ This is true because $E(EA, B^a)$ increases in value and because the second multiplicative term on the right-hand side of (13$k'$) and (14$k$) reinforces the direction given by the first multiplicative term to the elasticity. Under low interest rate regimes, the second multiplicative term of (13$k'$) and (14$k$) works instead as an attenuating force.
To summarize, the pressure exerted by an international money market on an economy which suffers from self-imposed rate ceiling regulations reinvigorates the partial effect of the various policy parameters on the crucial aggregate monetary magnitudes. At the same time, forces external to the economy—summarized by $i_{EU}$—exert an inverse influence on the same aggregate magnitudes. This influence is more pronounced the lower the rate ceilings are on bank deposits relative to domestic credit market rates.

The next issue to be discussed is whether or not the existence of an international monetary system such as the Eurodollar market aggrandizes the effect of a change in a policy parameter on aggregate monetary magnitudes such as $M^t$ and $EA$. To do so, it is assumed that the Italian monetary authorities pursue whatever policy they have in mind by manipulating only the monetary base. The combined effect, in percentage term, of the forces external to the economy (namely, changes in $i_{EU}$) and policy actions (namely, changes in $B^a$) on earning assets denominated in domestic currency is expressed by:

---

1Consider the following three hypothetical cases as an illustration of the enhanced effectiveness of monetary policy in an open economy:

(i) low interest rate regime.
Let $E(a, i_{GL}) = 1.5$ and $E(s, i_{GL}) = -.5$. This implies that $E(i_{GL}, B^a) = -.5$ and $E(EA, B^a) = .25$

(ii) medium interest rate regime.
Let $E(a, i_{GL}) = 0$ and $E(s, i_{GL}) = -.5$. It follows that $E(i_{GL}, B^a) = -2$ and $E(EA, B^a) = 1$

(iii) high interest rate regime.
Let $E(a, i_{GL}) = -.4$ and $E(s, i_{GL}) = -.5$. It follows that $E(i_{GL}, B^a) = -10$ and $E(EA, B^a) = 4$. 
\[ \frac{\Delta EA}{EA} = E(EA, B^a) \frac{\Delta B^a}{B^a} + E(EA, i_{EU}) \frac{\Delta i_{EU}}{i_{EU}} \]

Suppose \( \frac{\Delta B^a}{B^a} = \frac{\Delta i_{EU}}{i_{EU}} \)

then (17) would become, after appropriate substitutions and simple algebraic manipulations

\[ (17a) \frac{\Delta EA}{EA} = \{ E(EA, B^a) [1 + E(a, i_{EU}) - E(s, i_{EU})] + E(s, i_{EU}) \} \]

\[ \frac{\Delta B^a}{B^a} \]

The growth rate of bank credit in an open economy under assumptions of perfect positive correlation between movements in the base and movements of outside interest rates (i.e., expression [17a]) can be compared to the corresponding growth rate which is relevant for a closed economy. This can be done by dividing \( E(EA, B^a) \frac{\Delta B^a}{B^a} \), the growth rate of bank credit in a closed economy—into (17a); the result is given in (17b).

\[ (17b) 1 + E(a, i_{EU}) - E(s, i_{EU}) + \frac{E(s, i_{EU})}{E(EA, B^a)} \]

which is less than unity because \( E(a, i_{EU}) \) is negative, \( E(s, i_{EU}) \) positive, and \( E(s, i_{EU}) / E(EA, B^a) \) is expected to be substantially less than \( E(s, i_{EU}) \). Next, the other extreme case of perfect negative correlation between the movements of the adjusted base and those of the Eurodollar rate is examined. For \( \frac{\Delta B^a}{B^a} = -\frac{\Delta i_{EU}}{i_{EU}} \),
expression (17b) now becomes

$$ (17c) \quad 1 - E(s, i_{EU}) + E(s, i_{EU}) - \frac{E(s, i_{EU})}{E(EA, B^a)} $$

which is larger than unity.

From the foregoing analysis, it follows that a given change in $B^a$ will produce a response in bank credit which is more pronounced the closer to -1 is the correlation between the adjusted base and the Eurodollar rates. Conversely, the response in bank credit is the least pronounced when the growth path of the adjusted base is identical to that of Eurodollar rates.

2.3.3 Implications of a Bond Price Stabilization Policy

In Section 2.2.1 I have asserted that monetary policy becomes subservient to the management of the public debt only when the central bank stabilizes the price of government securities. Since the Italian monetary authorities, as shall be seen later, actually stabilized interest rates during the 1966-68 period, it is imperative that implications of such a policy be formally analyzed. This can be done by substituting a predetermined level of interest rates, $\bar{i}_{GL}$, for $i_{GL}$ in the following two semireduced equations system in which the adjusted monetary base and $M^\dagger$ are the endogenous variables. The stock of government securities, $S_G$, together with $\bar{i}_{GL}$ are the two crucial policy parameters of the system.

$$ (18) \quad M^\dagger = m^\dagger (\bar{i}_{GL}, \ldots) B^a $$

$$ a(\bar{i}_{GL}, \ldots) B^a = s(\bar{i}_{GL}, \ldots, S_G) $$
After appropriate differentiation of (18) with respect to \( \bar{I}_{GL} \) and \( S_G \), the following system is obtained:

\[
\begin{align*}
(18a) \quad & \begin{bmatrix} 1 & -m^1 \end{bmatrix} \begin{bmatrix} \frac{dM^1}{dx} \\ \frac{dB^a}{dx} \end{bmatrix} = \begin{bmatrix} 0 \\ \frac{dS}{dS_G} - \frac{dS}{d\bar{I}_{GL}} \end{bmatrix}, \\
& \begin{bmatrix} x = S_G \\ x = \bar{I}_{GL} \end{bmatrix}
\end{align*}
\]

from which

\[
(18b) \quad \mathbb{E}(B^a, S_G) = \mathbb{E}(M^1, S_G) = \mathbb{E}(s, S_G) > 0
\]

\[
(18c) \quad \mathbb{E}(M^1, \bar{I}_{GL}) = \mathbb{E}(m^1, \bar{I}_{GL}) + \mathbb{E}(a, \bar{I}_{GL}) - \mathbb{E}(s, \bar{I}_{GL})
\]

which is unambiguously positive during low interest rate regimes, while during high interest rate regimes it is positive only if

\[
|\mathbb{E}(s, \bar{I}_{GL})| > |\mathbb{E}(m^1, \bar{I}_{GL}) + \mathbb{E}(a, \bar{I}_{GL})|
\]

\[
(18d) \quad \mathbb{E}(B^a, \bar{I}_{GL}) = \mathbb{E}(a, \bar{I}_{GL}) - \mathbb{E}(s, \bar{I}_{GL}) \text{ is unambiguously positive [but smaller than } \mathbb{E}(M^1, \bar{I}_{GL})] \text{ during low interest rate regimes, while during high interest rate regimes the value of} \mathbb{E}(B^a, \bar{I}_{GL}) \text{ depends on the empirical relationship of the interest rate elasticity of the asset multiplier vis-a-vis the corresponding elasticity of the public's supply function of earning assets to the banking system.}
\]

To summarize, the major implication of a bond price stabilization program is that the stock of government securities replaces
the adjusted monetary base as the crucial policy parameter. The money supply and \( B^a \) respond to changes in the stock of government securities to a degree equal to the sensitivity of the public's supply of earning assets to the banking system to changes in \( S_G \).

2.3.4 Interest Rate Effect of a Change in the Composition with Which the Government Deficit is Financed (for a Given Deficit) and of an Open Market Operation

Suppose the government decides to finance a constant deficit by reducing the net issue of government securities; it follows from the equation of the budget constraint that the following equality must hold

\[
\Delta B^a = -\Delta S_G
\]

The effect on \( i_{GL} \), in percentage terms, of the aforementioned shift in the preferences of decision makers is:

\[
(19) \quad \frac{\Delta i_{GL}}{i_{GL}} = E(i_{GL}, B^a) \left[ 1 + E(i_{GL}, S_G) \right] \frac{\Delta B^a}{B^a}
\]

Equation (19) also represents the effect on \( i_{GL} \) of an open market policy-induced change in the monetary base.\(^1\) Since (19) is numerically larger than \( E(i_{GL}, B^a) \frac{\Delta B^a}{B^a} \), I conclude that the effect of a shift in the composition of deficit financing on the interest rate (for a given deficit) and of an open market policy-induced change

---

in the monetary base exceeds the effect of an equivalent increase or retirement of public debt held by the public and/or the banking system and of an equivalent change in any source item of the adjusted monetary base other than the stock of government securities held by the central bank.

2.4 SUMMARY OF THEORETICAL FINDINGS

The aim of the chapter was the construction of a hypothesis of money supply processes and bank credit formation in an economy which heavily interacts with the rest of the world. The resulting model was quite complex in view of the fact that the Italian institutional peculiarities had to be incorporated into a relatively large set of proximate determinants of the money supply. On the other hand, the hypothesis was found to be rich with test implications. Among the most important:

(a) The monetary base, which is a crucial variable in the hypothesis, can in principle be controlled by the monetary managers so long as they don't decide, as was the case in Italy from 1966 to 1968, to stabilize the price of government securities.

(b) Since September, 1965, the marginal reserve requirement against time deposits has lost its quality of instrumental variable. In addition, the one-month lag between settlement and required reserves computation dates weakens in principle the effectiveness of the average requirement ratios.
(c) Interest rate determination occurs in the bank credit market.

(d) It was found quite generally that the interest rate effect of a shift in the composition with which the government deficit is financed, for a given level of the deficit, and of an open market operation exceeds the effect of an equivalent increase or retirement of public debt and of an equivalent change in the monetary base brought about by changes in source items other than the stock of government securities held by the central bank.

(e) The supply of money and bank credit are expressed in terms of a multiplier times the monetary base net of commercial bank borrowings from the central bank and the rest of the world. The multipliers are a function of interest rates in the bank credit market, among other things.

(f) The response of the money supply and bank credit to changes in instrumental and exogenous variables depends on the initial level of interest rates. In most instances, the responses are more pronounced during high than low interest rate regimes. This is so because the response of the multipliers to changes in interest rates switches from a positive to a negative value as a consequence of the pull exercised by the Eurodollar market and other domestic financial assets on bank deposits subject to rate ceilings.

(g) Rate ceilings on deposits, in addition to causing disi-
termediation in the banking system during regimes of high interest rates, are discriminatory against small savers for whom minimum lot sizes of market instruments and relative ignorance are serious obstacles to their search for higher yielding assets at home and abroad.
Table 5
Summary of the Model Explaining Bank Credit and Money Supply Processes in Italy as an Open Economy

<table>
<thead>
<tr>
<th>No.</th>
<th>Equation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>$B = P_{WR}^{B} + P_{F}^{B} + F + BG + TB + A_{1}^{B}$</td>
<td>Definition sources of the base</td>
</tr>
<tr>
<td>II</td>
<td>$B_{a} = B - (A_{WR}^{B} + A_{1}^{B})$</td>
<td>Definition of adjusted base</td>
</tr>
<tr>
<td>III</td>
<td>$B = B_{P}^{B} + B_{b}^{B}$</td>
<td>Definition uses of the base</td>
</tr>
<tr>
<td>IV</td>
<td>$B_{P}^{B} = C^{P} + PDD + PTD$</td>
<td>Definition of public-held base</td>
</tr>
<tr>
<td>V</td>
<td>$B_{b}^{B} = B_{R}^{B} + B_{E}^{B}$</td>
<td>Definition of bank-held base</td>
</tr>
<tr>
<td>VI</td>
<td>$B_{b}^{B} + EA = A_{WR}^{B} + A_{1}^{B} + D + T$</td>
<td>Banks' balance sheet</td>
</tr>
<tr>
<td>VII</td>
<td>$B_{R}^{B} = r(D + T)$</td>
<td></td>
</tr>
<tr>
<td>VIII</td>
<td>$r = r_{R} + r_{E}$</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>$r_{R} = \frac{1}{\lambda + t} (\lambda r_{d} + \lambda^{2} r_{t} t)$</td>
<td>Banks' required reserve ratio</td>
</tr>
<tr>
<td>X</td>
<td>$r_{E} = r_{E} (i_{GL}, AIF, i_{EU} + \pi_{1}, \rho + \pi_{2})$</td>
<td>Banks' excess reserve ratio</td>
</tr>
<tr>
<td>XI</td>
<td>$A_{1}^{B} = b_{H}(D + T)$</td>
<td></td>
</tr>
<tr>
<td>XII</td>
<td>$b_{H} = b_{H} (i_{GL}, AIF, i_{EU} + \pi_{1}, \rho + \pi_{2})$</td>
<td>Banks' domestic borrowing ratio</td>
</tr>
<tr>
<td>XIII</td>
<td>$A_{WR}^{B} = b_{P} (D + T)$</td>
<td></td>
</tr>
<tr>
<td>XIV</td>
<td>$b_{F} = b_{F} (i_{GL}, AIF, i_{EU} + \pi_{1}, \rho + \pi_{2})$</td>
<td>Banks' foreign borrowing ratio</td>
</tr>
<tr>
<td>XV</td>
<td>$C^{P} = K_{L} D$</td>
<td></td>
</tr>
<tr>
<td>XVI</td>
<td>$K_{L} = K_{L} (W, distr., l^{P})$</td>
<td>Public's currency to demand deposits ratio</td>
</tr>
<tr>
<td>Equation</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>XVII PDD = K₂D</td>
<td>Public's postal demand to bank demand deposits ratio</td>
<td></td>
</tr>
<tr>
<td>XVIII K₂ = K₂ (W, distr., iₚ)</td>
<td>Public's postal time to bank demand deposits ratio</td>
<td></td>
</tr>
<tr>
<td>XIX PTD = K₃D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XX K₃ = K₃ (W, distr., iₚ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XXI T = t₀</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XXII t = t (W, distr., iₚ)</td>
<td>Public's bank time to demand deposits ratio</td>
<td></td>
</tr>
<tr>
<td>XXIII EA = s (W, Y, pₚ, pₑ, S₀, iₚ)</td>
<td>Public's supply of earning assets to the banking system</td>
<td></td>
</tr>
<tr>
<td>XXIV M¹ = C₀ + PDD + D</td>
<td>Narrow definition of money supply</td>
<td></td>
</tr>
<tr>
<td>XXIVa M² = M¹ + PTD + T</td>
<td>Broader definition of money supply</td>
<td></td>
</tr>
</tbody>
</table>

There are 24 endogenous variables.

1. B = base
2. Aᵣᵢₚ = banks' borrowing from the rest of the world
3. Aᵦᵢₚ = banks' borrowing from the Banca d' Italia
4. Bᵢₚ = publicly held base money
5. Cᵢₚ = currency in the hands of the public
6. PDD = postal demand deposits
7. PTD = postal time deposits
8. Bᵇ = bank-held base money
9. Rᵦᵢₚ = banks' required reserves
10. Rᴱᵢₚ = banks' excess reserves
11. EA = earning assets
Table 5 (cont.)

12. \( D \) = bank demand deposits
13. \( T \) = bank time deposits
14. \( r \) = total reserve ratio
15. \( r_R \) = required reserve ratio
16. \( r_E \) = excess reserve ratio
17. \( i_{GL} \) = credit market index rate (element of vector \( i^P \))
18. \( b_H \) = banks' domestic borrowing ratio
19. \( b_F \) = banks' foreign borrowing ratio
20. \( k_1 \) = currency to demand deposits ratio
21. \( k_2 \) = postal demand to bank demand deposits ratio
22. \( k_3 \) = postal time to bank demand deposits ratio
23. \( t \) = bank time to demand deposits ratio
24. \( M^1 \) (or \( M^2 \)) = money stock

The instrumental variables are:

1. \( B^a \) = the adjusted base
2. \( r^d \) = average reserve requirement ratio against demand deposits
3. \( r^t \) = average reserve requirement ratio against time deposits
4. \( \rho \) = the discount rate
5. \( \pi_1 \) = parameter summarizing regulations of banks' foreign position
6. \( \pi_2 \) = ceiling on banks' aggregate borrowings from Banca d’Italia
Table 5 (cont.)

Ceiling rates as they affect

8. \( i_{PD} \) = rate paid on postal demand deposits (element of vector \( i^P \))

9. \( i_{PT} \) = rate paid on postal time deposits (element of vector \( i^P \))

10. \( i_D \) = rate paid on bank demand deposits (element of vector \( i^P \))

11. \( i_T \) = rate paid on bank time deposits (element of vector \( i^P \))

The exogenous variables are:

1. \( i_{EU} \) = the Eurodollar rate (element of vector \( i^P \))

2. \( P \) = the exchange rate premium or discount

3. \( W \) = nonhuman wealth

4. \( Y \) = national income

5. \( p^E_y \) = national income implicit price deflator

6. \( p^E \) = expected price level

7. distrib. = distribution of income between wage and nonwage income earners

8. \( d^1, d^2 \) = distribution of deposits between savings and non-savings banks

9. \( z \) = the real rate of return

The model can be collapsed into two semireduced equations:

\[
s(W, Y, p_y, p^E, S_C, i^P) = a \cdot B^a
\]

\[
M^i = m^i \cdot B^a \quad i = 1, 2
\]

\[
a = \frac{(1 + t) [1 - (r - b_H - b_F)]}{\Delta} = \text{asset multiplier}
\]
Table 5 (cont.)

\[
\begin{align*}
\text{\(m_1\)} & = \frac{1 + k_1 + k_2}{\Delta} \\
\text{\(m_2\)} & = \frac{1 + k_1 + k_2 + k_3 + t}{\Delta} \\
\Delta & = (1 + t) (r - b_H - b_P) + k_1 + k_2 + k_3 \\
\end{align*}
\]

monetary multipliers
Table 6

Summary of Responses of Credit Market Rates to Changes
in Relatively Exogenous Variables and Policy Parameters

(12a) \[ E(i_{GL}, B^a) = -\frac{1}{E(a, i_{GL}) - E(s, i_{GL})} < 0 \]

(12b) \[ E(i_{GL}, W) = -E(i_{GL}, B^a) [E(s, W) - \frac{K}{\Delta} \int \frac{t}{1+\Delta} E(t, W) - \frac{K}{1} E(K_1, W) - \frac{K_3}{K} E(K_3, W)] > 0, \]

provided \[ E(s, W) + \frac{1}{\Delta} K_3 E(K_3, W) > \frac{1}{\Delta} \int \frac{K}{1+\Delta} t E(t, W) - K_1 E(K_1, W) \]

(12c) \[ E(i_{GL}, r^d) = E(i_{GL}, d^1) = -E(i_{GL}, B^a) \frac{m_2}{a} \frac{d^1}{\Delta} r^d > 0 \]

(12d) \[ E(i_{GL}, r^t) = E(i_{GL}, d^2) = -E(i_{GL}, B^a) \frac{m_2}{a} \frac{d^2 t}{\Delta} r^t > 0 \]

(12e) \[ E(i_{GL}, \rho) = -E(i_{GL}, B^a) \frac{m_2}{a} \frac{t}{\Delta} E(r, \rho) r \]

(12f) \[ E(i_{GL}, \pi_1) = -E(i_{GL}, B^a) \frac{m_2}{a} \frac{(1+t)}{\Delta} E(r, \pi_1) r > 0 \]
(12g) \[ E(i_{GL}, \pi_2^i) = E(i_{GL}, B^a) \frac{m^2}{a} \frac{(1+t)}{\Delta} [E(b_F, \pi_2^i) b_F - E(r, \pi_2^i) r] \]

\[ \leq 0 \]

depending on

\[ E(b_F, \pi_2^i) b_F \geq E(r, \pi_2^i) r \]

(12h) \[ E(i_{GL}, i_T) = -E(i_{GL}, B^a) [E(s, i_T) - E(a, i_T)] \leq 0 \]

where \( E(a, i_T) = \frac{K}{\Delta} \left[ \frac{t}{1+t} E(t, i_T) - \frac{K}{K} E(K_3, i_T) \right] > 0 \)

(12i) \[ E(i_{GL}, S_G) = -E(i_{GL}, B^a) E(s, S_G) > 0 \]

(12j) \[ E(i_{GL}, i_{EU}) = -E(i_{GL}, B^a) [E(s, i_{EU}) - E(a, i_{EU})] \]

\[ E(a, i_{EU}) = E(a, r_E) E(r_E, i_{EU}) + E(a, b_H) E(b_H, i_{EU}) + E(a, b_F) E(b_F, i_{EU}) + E(a, t) E(t, i_{EU}) + E(a, K_1) E(K_1, i_{EU}) + E(a, K_2) E(K_2, i_{EU}) + E(a, K_3) E(K_3, i_{EU}) \]

Table 6 (cont.)

$E(a, t), E(a, b_H) > 0$

$E(a, b_F) < 0$ depending on whether $b_F < 0$

$E(a, r_E), E(a, K_1), E(a, K_2), E(a, K_3) < 0$

$E(r_E, i_{EU}) < 0$ to the extent a rise in $i_{EU}$ raises AIF

$E(b_H, i_{EU}) > 0$

$E(b_F, i_{EU}) < 0$

$E(t, i_{EU}) < 0$ to the extent that a rise in $i_{EU}$ raises the differential $i_{EU} - i_T$ and thus causes a decline in time deposits relative to demand deposits.

$E(K_1, i_{EU}), E(K_2, i_{EU}), E(K_3, i_{EU}) > 0$ to the extent a rise in $i_{EU}$ raises the differential $i_{EU} - i_D$ and thus causes a decline in demand deposits relative to currency, postal demand deposits, and postal time deposits, respectively.
For $b_F < 0$, the first three multiplicative terms of $E(a, i_{EU})$ are positive, while the remaining four are negative. Hence the positiveness of $E(i_{GL}, i_{EU})$ depends on $E(s, i_{EU})$ plus the value of the four negative multiplicative terms being numerically larger than three positive multiplicative terms of the elasticity of the asset multiplier with respect to the Eurodollar rate.

\[(12k) \quad E(i_{GL}, P) = E(i_{GL}, B^a) \frac{1 + t + K}{\Delta[1-(r-b_H-b_F)]} E(b_F, P) \quad b_F > 0\]

depending on $b_F$ being $< 0$. 
Table 7

Summary of Responses of $M^1$, $M^2$, and EA to Changes in Relatively Exogenous Variables and Policy Parameters

(13a) $E(M^1, B^a) = 1 + E(m^1, i_{GL}) E(i_{GL}, B^a), i = 1, 2$

(14a) $E(EA, B^a) = 1 + E(a, i_{GL}) E(i_{GL}, B^a)$

(13b) $E(M^1, W) = E(m^1, W) + E(m^1, i_{GL}) E(i_{GL}, W), i = 1, 2$

where $E(m^1, W) = E(m^1, t) E(t, W) + E(m^1, K_1) E(K_1, W)$

$+ E(m^1, K_2) E(K_2, W) + E(m^1, K_3) E(K_3, W)$

(14b) $E(EA, W) = E(m^2, W) \frac{m^2}{a} + E(a, i_{GL}) E(i_{GL}, W)$

(13c) $E(M^1, r^d) = E(M^1, d^1) = - \frac{d_{r^d}}{\Delta} [q]$

(13c') $E(M^2, r^d) = E(M^2, d^1) = - \frac{d_{r^d}}{\Delta} E(EA, B^a)$

(14c) $E(EA, r^d) = E(EA, d^1) = - \frac{d_{r^d}}{\Delta} \frac{m^2}{a} E(EA, B^a)$

(13d) $E(M^1, r^t) = E(M^1, d^2) = - \frac{d_{r^t}}{\Delta} r^t [q]$

(13d') $E(M^2, r^t) = E(M^2, d^2) = - \frac{d_{r^t}}{\Delta} r^t E(EA, B^a)$
Table 7 (cont.)

(14d) \( E(\text{EA}, r^t) = E(\text{EA}, d^2) = E(M^2, r^t) \frac{m^2}{a} \)

(13e) \( E(M^1, \rho) = - \frac{(1+t)}{\Delta} E(r, \rho) r \) [q]

(13e') \( E(M^2, \rho) = - \frac{(1+t)}{\Delta} E(r, \rho) r E(\text{EA}, B^a) \)

(14e) \( E(\text{EA}, \rho) = \frac{m^2}{a} E(M^2, \rho) \)

(13f) \( E(M^1, \pi_1) = - \frac{(1+t)}{\Delta} E(r, \pi_1) r \) [q]

(13f') \( E(M^2, \pi_1) = - \frac{(1+t)}{\Delta} E(r, \pi_1) r E(\text{EA}, B^a) \)

(14f) \( E(\text{EA}, \pi_1) = \frac{m^2}{a} E(M^2, \pi_1) \)

(13g) \( E(M^1, \pi_2^i) = \frac{(1+t)}{\Delta} [E(b_F, \pi_2^i) b_F - E(r, \pi_2^i) r] \cdot [q] \)

(13g') \( E(M^2, \pi_2^i) = \frac{1+t}{\Delta} [E(b_F, \pi_2^i) b_F - E(r, \pi_2^i) r] E(\text{EA}, B^a) \)

(14g) \( E(\text{EA}, \pi_2^i) = \frac{m^2}{a} E(M^2, \pi_2^i) \)

(13h) \( E(M^1, F) = \frac{(1+t)}{\Delta} E(b_F, F) b_F \) [q]

(13h') \( E(M^2, F) = \frac{(1+t)}{\Delta} E(b_F, F) b_F E(\text{EA}, B^a) \)
Table 7 (cont.)

\[(14h) \quad E(\text{EA}, P) = \frac{m^2}{a} E(M^2, P) \]

\[(13i) \quad E(M^i, t_T) = E(m^i, t_T) + E(m^i, i_{GL}) E(i_{GL}, t_T), \ i = 1, 2 \]

where \( E(m^i, t_T) = E(m^i, t_T) E(t, i_T) + E(m^i, K_3) E(K_3, i_T) \)

\[< 0 \text{ for } i = 1 \]

\[> 0 \text{ for } i = 2 \]

\[(14i) \quad E(\text{EA}, t_T) = E(a, t_T) E(\text{EA}, B^a) - E(a, i_{GL}) E(i_{GL}, B^a) E(s, i_T) \]

\[(13j) \quad E(M^i, S_G) = E(m^i, i_{GL}) E(i_{GL}, S_G), \ i = 1, 2 \]

\[(14j) \quad E(\text{EA}, S_G) = E(a, i_{GL}) E(i_{GL}, S_G) \]

\[(13k) \quad E(M^i, i_{EU}) = E(m^i, i_{EU}) + E(m^i, i_{GL}) E(i_{GL}, B^a) E(a, i_{EU}) \]

\[\quad - E(m^i, i_{GL}) E(i_{GL}, B^a) E(s, i_{EU}) \]

\[(13k^{-1}) \quad E(M^2, i_{EU}) = E(m^2, i_{EU}) E(\text{EA}, B^a) - E(m^2, i_{GL}) E(i_{GL}, B^a) \]

\[E(s, i_{EU}) \]
Table 7 (cont.)

\[(14k) \quad E(E_A, i_{EU}) = E(a, i_{EU}) E(E_A, B^a) - E(s, i_{GL}) E(i_{GL}, B^a)\]

\[E(s, i_{EU})\]

where \(E(m^2, i_{EU}) = E(a, i_{EU}) \frac{a}{m^2} < 0\)

\[q = 1 + E(m^1, i_{GL}) E(i_{GL}, B^a) \frac{m^2}{a}\]
CHAPTER 3

EMPIRICAL ANALYSIS

In this chapter I examine the actions of the monetary authorities and the major forces underlying the behavior of the proximate determinants of the money supply. The identification of these forces permits me to narrow down the reduced-form equations of the rate of interest and the supply of money to be subjected to empirical verification. In this context, related issues, such as what forces account for the cyclical behavior of the rate of interest, and the effect of expected price changes and open market operations on the interest rate are analyzed. Finally, an assessment is made of the relative contribution of the adjusted base and the monetary multiplier to the growth of the money stock, for both the long and short run. A concluding section is devoted to the "pull" exercised by the Eurodollar market on the domestic money supply.

3.1 THE BEHAVIOR OF THE MONETARY AUTHORITIES

Monetary policy in Italy, as discussed above, is achieved through the following basic instruments:

(a) the control of the monetary base—or alternatively, the control of the long-term interest rate in the case of a pegging
policy;¹

(b) quantitative ceilings placed on the aggregate amount of base money banks can borrow from the Bank of Italy;

(c) the intermittent regulation of banks to maintain a zero net position vis-a-vis the rest of the world; and

(d) reserve requirement against bank deposit liabilities.²

In the hypothesis under consideration, instrument (a) is represented by $B^2$, while instruments (b), (c), and (d) affect the monetary and credit multipliers via their effect on $b_H$, $b_p$, and $r$, respectively. Alternatively, it is easy to demonstrate that the effects of the four instruments are invariably reflected in changes in the

¹Lacking a developed money market, the central bank has attempted to control the bond rate from 1966 to the beginning of 1969. See below.

²The list is not exhaustive. I have omitted purposely two other instruments of policy. One, not considered explicitly in the model of Chapter 2, is the control that the authorities can exercise over the issue of nongovernment bonds. This tool allows the Bank of Italy to either set the bond rate or the quantity of funds, other than bank loans, available to firms. Since the central bank can strive for desired levels of bank loans through the control of the base, the Bank of Italy disposes the means to affect the nation's investment expenditures through the additional option of a quantity policy.

The second instrument are the swap operations in foreign exchange occurring between U.L.C. (Foreign Exchange Office) and commercial banks. The transaction entails a spot purchase of foreign exchange against lire by banks which agree to a forward sale at an agreed-upon price. The forward sale price may not include a premium $P$ or, if included, its level may differ from the market-determined $P$. The timing, the period elapsing between the spot and the forward sale, and the level of $P$ are part of the decision-making universe of the authorities who have resorted to swap operations with their banks with the intent to (i) finance foreign trade to Italian residents and/or (ii) reduce the banks' foreign liabilities. More will be said on the subject in Part II of the dissertation, in connection with the examination of the sterilization policy of the authorities.
total base B (i.e., $B^a$ plus banks' borrowings from the Bank of Italy plus net borrowings from the rest of the world) plus the amount of liberated (sterilized) base resulting from changes in reserve requirement ratios ($B^r$).\(^1\)

Even though movements in $B + B^r$ are a good indicator of the policy actions taken by the monetary authorities, it remains understood that different tools produce different impulses. In this respect, the hypothesis discriminates distinctly among the impacts of instruments (b), (c), and (d) which, I repeat, on the three bank-related proximate determinants of the money supply rather than on the base.

Table 8 provides basic information concerning the average yearly growth rate of the base and the contribution of each component to such a growth rate both for the entire period under consideration and for periods of economic expansion and contractions. During the twelve-year period, B increased at the relatively high average rate of 10 percent per year, the increase being far more pronounced during upswings than during downswings. The two foreign components of the base ($POS_{RW}^{BI}$ and $FR_F$), which account for about one-third of the total variation in B, behave strongly procyclically. The procyclical movement is absent, on the other hand, in the domestic components of the base. This piece of evidence bears specifically on the issue of the

\(^1\)It is useful to recall that the imposition referred to in (c) above implies that the banks' foreign reserves are counted as addition to the base only for that amount which equals their net credit foreign position (cf. Chapter 2).
1969.II
its Components, and Liberated Base Requirement Ratios

<table>
<thead>
<tr>
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<th>ΔTB/B</th>
<th>ΔA^BI/B</th>
<th>ΔO/B</th>
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<td>61.I-63.III</td>
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<td>Contraction:</td>
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<td>63.IV-64.IV</td>
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<td>65.I-69.II</td>
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<td>679.5</td>
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Notes: The table (except for B\^*) has been constructed according to the following formula:

\[
\frac{\Delta B}{B} = \frac{\Delta \text{POS}_{BI}}{\text{POS}_{BI}} \cdot \frac{\text{POS}_{RW}}{B} + \text{similar terms for all other components of the base as they appear in (1), Section 2.2.1. First differences refer to corresponding quarters of adjacent years.}
\]

\[
B^{*} \text{ has been computed according to the formula: } \frac{1969.II}{1958.I} \cdot \left( r_{R,t} - r_{R,t-1} \right) (D + T)_{t-1}
\]

where \( r_{R} \) is the average reserve requirement ratio (cf. Chapter 2).

effectiveness of monetary policy in an open economy, the subject of Part II of the study. At this point, I shall limit myself to remark that the domestic and foreign components of B move in opposite directions. For example, during the 1963.IV - 1964.IV severe economic contraction, large balance-of-payments deficits were compensated for by the behavior of BG, the item which synthesizes the relationship between the Treasury and the Bank of Italy. Not unexpectedly, the growth path of BG is found to be opposite to that of the business cycle. In fact, the recourse of the Treasury to the central bank will rise proportionately more in the downswings, as government expenditures rise relative to revenues coming from both taxation and net sales of bonds.

The largest single contributor to the growth in B has been the base issued directly by the Treasury (TB) in the form of postal deposits. The contribution of TB, however, declined over the years (see Section 3.3 for the reasons underlying such a decline).

While, on the average, open market operations have generated less than 4 percent in the total variation of the base, their impact has been growing over time.

The last column in Table 8 gives in lire the amount of base money liberated during the period as a result of changes in reserve requirements regulations. The largest amount of $B^r$ occurs after 1965 where changes in time deposits, more by accident than by intention, have been exempted from obligatory reserves in the form of base money (cf. Section 2.2.1).
3.2 THE BEHAVIOR OF THE BANKS AND ITS DETERMINANTS

The excess reserve ratio \( \tau_E \) and the domestic \( b_R \) and foreign borrowing \( b_F \) ratios synthesize the contribution of the banking system to the formation of bank credit and money supply processes. Regression results relative to the three ratios can be found in Table 9. They refer to the theoretical relationship of Chapter 2, Section 2. More precisely, regressions 1 and 2 refer to equation (4c), regressions 3 and 4 to (5b), and regression 5 to (6b), regression 6 estimates directly (4c) minus (5b) minus (6b). Since the equations subjected to empirical test are seldom a mirror image of the functions postulated in Chapter 2, it is important to underscore, when necessary, the divergence between the empirical and theoretical relationships. I begin with a discussion about the procedure I have followed in quantifying some of the relevant variables.

The yield on bonds issued by the Special Credit Institutions \( i_B \) has been used as a proxy for an index of domestic credit market rates, since there are no published statistics concerning bank-loan rates (whose minimum levels are set by the Interbank Agreement). \( \pi_1 \), the parameter which summarizes the body of regulations regarding the foreign position of banks, has been quantified by assigning values of 0, 1, -1, depending on whether the monetary authorities:

(a) had taken a position of noninterference (periods 1958.I - 1960.II and 1962.III - 1963.III);

(b) had invited banks to balance their net debit position (1960.III - 1962.III and 1963.IV - 1969.1); or
(c) had invited banks to balance their net credit position (1969.II - 1969.IV).

\( \pi_2 \), the parameter which measures the degree of "moral suasion" exercised by the central bank in granting (or better, in refusing to grant) credit to banks, is the only cost of borrowing at home I have considered, since the discount rate has remained constant throughout the twelve-year period under consideration. \( \pi_2 \) assumes a value of 0 when the supply of loanable funds of the Bank of Italy is completely price elastic (1958.I - 1963.II and 1964.II - 1969.I) and a value of 1 when the historical review of events suggests that the central bank has restrained the banking system from borrowing whatever amount would be demanded at the current level of the discount rate, given the cost of borrowing abroad and credit market rates at home and abroad (1963.III - 1964.I and 1969.II - 1969.IV).\(^1\)

The procedure used to assign values of 0 and 1 is tantamount to identify periods during which the domestic borrowing ratio \( b_H \) is endogenously and exogenously determined, respectively. The arbitrage interest factor AIF has been quantified by the Eurodollar rate minus the average yield on government securities plus the premium or discount on foreign exchange market.

The regressions of Table 9 differ from the corresponding relationship of Chapter 2 in two minor aspects. First, some of the

---

\(^1\) I have relied on the Relazioni and seminars conducted at the Bank's research department to assign values of 0, 1, and -1 to specific periods for both \( \pi_2 \) and \( \pi_1 \).
arguments appearing in (4c), (5b), and (6b) of 2.2 do not appear in the regressions. This is the case of the discount rate which has remained virtually unchanged during the sample period; also, the Eurodollar rate and the arbitrage interest factor do not appear concomitantly because the strong collinearity between the two variables reduces substantially the explanatory power of the regressions.

Second, two new elements appear in the $r_E$ regressions with respect to the function (4c) of Chapter 2: two dummy variables which capture respectively an institutional element and the effect of the pegging policy from 1966 through 1968 on the excess reserve ratio. More will be said about these two variables below. At the present time it suffices to say that their introduction was required to incorporate in the formulation of $r_E$ a specific institutional arrangement and a nonrecurrent policy posture. These additions in no way detract from the generality of the theoretical formulation of the excess reserve ratio.

Both the domestic rate and the arbitrage interest factor AIF affect $r_E$ as postulated in the hypothesis, the latter with a numerically higher and more reliable coefficient than the former (see regression 1 in Table 9). To the extent that $\pi_1$ represents an additional cost of borrowing abroad, its coefficient should be positive. It is negative, instead. The following explanation can be offered. When banks receive instructions from the central bank to reduce their net debit position vis-à-vis the rest of the world, they respond in the short run by transforming excess reserves into
Table 9

Italy: 1958.1 - 1969.IV
Regression Estimates of the Banks' Excess Reserve Ratio, Domestic and Foreign Borrowing Ratios

<table>
<thead>
<tr>
<th>Regr. No.</th>
<th>Dependent Var.</th>
<th>Form</th>
<th>Constant</th>
<th>$i_B$</th>
<th>AIF</th>
<th>$\pi_1$</th>
<th>DTax</th>
<th>DSTAB</th>
<th>$i_{EU}$</th>
<th>$\pi_2$</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>$r_E$</td>
<td>Linear</td>
<td>.153</td>
<td>-.0091*</td>
<td>-.0123</td>
<td>-.032</td>
<td>-.0301</td>
<td>(.039)</td>
<td>(.0060)</td>
<td>(.00204)</td>
</tr>
<tr>
<td>2</td>
<td>$r_E$</td>
<td>&quot;</td>
<td>.145</td>
<td>-.0077*</td>
<td>-.0127</td>
<td>-.029</td>
<td>-.0286</td>
<td>-.0112*</td>
<td>(.039)</td>
<td>(.0060)</td>
</tr>
<tr>
<td>3</td>
<td>$b_H$</td>
<td>&quot;</td>
<td>-.048</td>
<td>.0122</td>
<td>.0024*</td>
<td>(.012)</td>
<td>(.0022)</td>
<td>(.0019)</td>
<td>(.00072)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$b_H$</td>
<td>&quot;</td>
<td>-.022</td>
<td>.0098</td>
<td>.0032</td>
<td>.0031*</td>
<td>(.013)</td>
<td>(.0020)</td>
<td>(.00069)</td>
<td>(.0018)</td>
</tr>
<tr>
<td>5</td>
<td>$b_F$</td>
<td>&quot;</td>
<td>.0368</td>
<td>.0086</td>
<td>.0201</td>
<td>-.0114</td>
<td>.0158</td>
<td>(.0189)</td>
<td>(.0033)</td>
<td>(.0033)</td>
</tr>
<tr>
<td>6</td>
<td>$r_E - b_H - b_F$</td>
<td>&quot;</td>
<td>.133</td>
<td>-.0253</td>
<td>-.0173</td>
<td>-.0146</td>
<td>-.031</td>
<td>.0092</td>
<td>(.049)</td>
<td>(.0072)</td>
</tr>
</tbody>
</table>

Note: For meaning of each symbol see text (Section 3.2) and notes to Table 10.

* = not significant at the 5 percent confidence level
<table>
<thead>
<tr>
<th>Regr. No.</th>
<th>$\bar{R}^2$</th>
<th>$\sigma_u$</th>
<th>D.W.</th>
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</thead>
<tbody>
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<td>1</td>
<td>.694</td>
<td>.0216</td>
<td>.66</td>
</tr>
<tr>
<td>2</td>
<td>.700</td>
<td>.0214</td>
<td>.66</td>
</tr>
<tr>
<td>3</td>
<td>.581</td>
<td>.0083</td>
<td>.66</td>
</tr>
<tr>
<td>4</td>
<td>.675</td>
<td>.0073</td>
<td>.84</td>
</tr>
<tr>
<td>5</td>
<td>.726</td>
<td>.0120</td>
<td>.60</td>
</tr>
<tr>
<td>6</td>
<td>.589</td>
<td>.026</td>
<td>.59</td>
</tr>
</tbody>
</table>
Figure 3
Italy

- - - Actual
--- Estimated (eq. 16)

Shaded areas represent business contractions; unshaded areas, business expansions.
foreign assets. Since instructions to reduce a net import position correspond to an increase in the value of the parameter, \( \pi_1 \), an inverse association between \( \pi_1 \) and \( r_E \) is consistent with the above postulated behavior. Next, consider the case of a net credit position vis-a-vis the rest of the world. The instructions of the monetary authorities to banks to reduce their net export position is equivalent to a reduction in \( \pi_1 \). Banks comply with the policy of "moral suasion" by transforming foreign assets into excess reserves. Again, an inverse association between \( r_E \) and \( \pi_1 \) should be observed.

The tax variable (D Tax) has been introduced to isolate the pronounced drop in \( r_E \) which occurs at midyear. A review of the institutional evidence suggests that the phenomenon is attributable to income tax payments which fall due in June and cause more than an average outflow of reserves.\(^1\)

I shall turn now to a discussion of the effect of the interest rate pegging policy on \( r_E \). The hypothesis is the following: to the extent that a component of the banks' earning assets (namely, bonds) is not subject to price fluctuations and, thus, acquires characteristics proper of the assets defined as part of the monetary base, the demand for excess reserves would shift to the left. Evidence in support of the hypothesis requires indications that for the sub-

\(^1\)D Tax is a dummy variable which assumes a value of 1 in the second quarter and 0 in the remaining quarters.
period 1966.II - 1969.I the demand for the excess reserve ratio shifted downward because of the pegging policy. The test is carried out in (2) of Table 9. The demand for r_E for the periods during which the monetary base was exogenous is given by

\[(2a) \quad r_E = .145 - .0077 (I_B) - .0127 (AIF) - .029 (\pi_t) - .0286 (D\ Tax) + \text{error term}\]

while for the period in which the quantity of base money was endogenously determined in such a manner as to maintain a given level of interest rates, the demand for r_E was

\[(2) \quad r_E = (2a) - .0112 (D\ STAB)\]

\[D\ STAB = \begin{cases} 1 & (66.II - 69.I) \\ 0 & (all\ other\ observations) \end{cases}\]

However, the coefficient of D STAB is not significantly different from zero at the .05 level.¹

Equations (3) - (5) give supporting evidence to the hypothesis that domestic and foreign borrowings are alternative ways for the Italian banking system to acquire fresh funds (cf. Figures 2 and 3). The cost of borrowing abroad, to repeat, is the Euro-dollar rate plus \(\pi_t\). Clearly, these two components affect b_H and

¹Would one want to accept a lower confidence level as a criterion of the acceptability of the evidence presented above, the effect of the pegging policy has tended to lower the mean value of r_E (= .075) by about 1/7.
b_F in opposite directions. The coefficients of the domestic and the arbitrage interest factor appear with the expected signs.

Since the bank related proximate determinants of the money supply always appear in the multipliers as

\[ r_E - b_H - b_F \]

I have found it useful to estimate the three proximate determinants as a group (eq. [6] in Table 9).\(^1\)

While the evidence presented in Table 9 generally supports the importance and the direction of impulses generated by the arguments considered in the hypothesis, the low value of the Durbin-Watson statistic suggests that there is more in the determination of \( r_E \), \( b_H \), and \( b_F \) than considered in the regressions.\(^2\)

For example, the drastic decline in \( r_E \) over the sample period—from .124 in 1958.I to .031 in 1969.IV, cf. Figure 1—reflects that in addition to a general rise in market rates, Italian bankers have learned, either from experimentation or from exposure to more illuminated foreign banking practices, that they could lower their excess reserve ratio without appreciably raising the risks connected with unforeseen outflows of reserves. Also, substantial economies

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1 Notice that \( r_E - b_H - b_F \) is the concept of free reserves enlarged to incorporate foreign borrowings.

2 A low value, especially below unity, of the Durbin-Watson statistic indicates either (a) absence of crucial variables or (b) functional mis specification of the equation or (c) presence of serial correlation in the error term, or a combination of (a), (b), and (c). Quite subjectively, I propend for cause (a).
of scale, which cursory observations seem to indicate to have taken place in Italy in the last decade, might have contributed to the sharp negative trend in $r_E$.

To recapitulate, this section was devoted to an empirical analysis of the effect of the behavior of the banking system on the excess reserve ratio and the domestic and foreign borrowing ratios. Following the outline of the theoretical chapter of Part I, I will now turn my attention to the effect of the public's behavior on the remaining four proximate determinants of the money supply. Only after having discussed quantitatively each component of the money multiplier shall I proceed to estimate the reduced-form equations for the interest rate and the money supply.

3.3 THE BEHAVIOR OF THE PUBLIC AND ITS DETERMINANTS.

The contribution of the public's behavior to the money supply processes is summarized by the following ratios: currency to bank demand deposits ($K_1$); postal demand to bank demand deposits ($K_2$); postal time deposits to bank demand deposits ($K_3$); and bank time deposits to bank demand deposits ($t$). The general functional forms of the four ratios were discussed in Section 2.3; to summarize briefly, all four ratios depend on nonhuman wealth ($W$), income distribution (distr.), and the vector of interest rates ($i^P$). Since the latter includes a large number of yields, it is necessary to narrow down the specification of the public's proximate determinants in a way which is amenable to empirical verification. This is done by considering the rates paid on bank time deposits, on
bank demand deposits, and in the Eurodollar market as the only three yields relevant to the public's allocative decisions. The analysis starts with $K_1$. Let (8a) of Chapter 2 be approximated by the following nonlinear formulation:

$$
\frac{C^P}{D} = \frac{a(W)^a (\text{distr.})^a (i_T)^{-a_3}}{b(W)^b (i_{EU} - i_D)^{-b_2}}
$$

from which $\ln K_1 = A + (a_1 - b_1) \ln W + a_2 \ln \text{distr.} - a_3 \ln i_T + b_2 \ln (i_{EU} - i_D)$

where $A = \ln a - \ln b$

As a direct implication of (8a) derived in Section 2.3, $a_1$ must be less than $b_1$. Moreover, the rate paid on time deposits, $i_T$, represents, as a first approximation, the opportunity cost of holding currency, on the ground that time deposits are the closest alternative to currency demanded for precautionary purposes. Non-human wealth, $W$, was approximated by the aggregate amount of financial assets owned by the public. Finally, $i_{EU} - i_D$ stands for the differential between the three-month Eurodollar rate and the rate paid on bank demand deposits. This differential plays a double role in the hypothesis. On the one hand, it measures the sensitivity of $K_1$ to changes in short-term rates (in the absence of a developed money market, $i_{EU}$ stands as the only alternative short-term rate to those paid on bank and postal deposits). On the other hand, it measures the pull the Eurodollar market exercises on domestic funds. As mentioned earlier, not all domestic deposit holders
are potential customers of the Eurodollar market.

Because of the considerable lot size of the investment and relative ignorance of the public about market yields, the competition for deposits between the Eurodollar market and the Italian banking system has been restricted to large deposit holders. The latter have obtained at home rates higher than those prescribed by the Interbank Agreement. There is ample (unofficial) evidence that violations of the Cartel first began in 1965 and spread with such rapidity as to induce banks to officially repeal the Cartel late in 1969.¹

The year 1965 marks roughly the beginning of a period during which the Eurodollar rate differential was thought to have caused an outflow of Italian capital. To be sure, capital had gone out of the country before 1965, but for different reasons. There are several pieces of evidence which corroborate the notion that the Eurodollar market began to exert an influence in 1965, via rates higher than the domestic ones. For example, the monetary authorities² attribute a large portion of the outflow of bank notes to the tax structure which favored nonresident relative to resident owners of Italian bonds and securities. The discriminatory tax law, enacted

¹In October, 1970, a new Interbank Agreement was drafted, prescribing maximum rates of 6.75 percent on demand deposits (vs. 2 percent of the previous Cartel) and 6.00 percent on time deposits (vs. 3.75 percent).

in 1965, was intended to promote large inflows of foreign capital. The actual effect was opposite to the desired one: Italians sold their bonds and securities to buy them back under the legal qualification of "nonresident," via the intermediation of foreign (mainly Swiss) brokers. The discriminatory treatment was virtually eliminated in 1964; it was reinstated in the first quarter of 1967.¹

Also, the recent work done by Prof. Fausto Vicarelli suggests quite strongly that interest rate differentials have influenced the outflow of short-term capital primarily since 1965.²

With that experience in mind, the variables \( i_{EU} - i_D \) or \( i_{EU} - i_T \), which appear in all the regressions, have been multiplied by zero for the period 1958.I - 1964.IV and by one for the period 1965.I - 1969.IV. The regression coefficients and test statistics of (7) above are presented in regression 7 of Table 10. All the coefficients have the expected sign and are significant at the 5 percent confidence level. The elasticity of \( K_1 \) with respect to \( i_{EU} - i_D \) is small (.013); the rate on time deposits and income distribution has the strongest influence on \( K_1 \). An alternative test to measure the pull exercised by the Eurodollar market on Italian demand deposits was made by substituting the quarterly amount of

¹For a useful summary of the tax legislation pertaining to the above problem see Bance d'Italia, Relazioni and Victor Mesalles, "Banknote Remittances: Italy's Recent Experience, BNL Quarterly Review, March 1968.

²"Le Rimesse di banconote nella recente esperienza italiana: un tentativo di interpretazione," mimeographed.
### Table 10

**Italy: 1958.I - 1969.IV**

Regression Estimates of the Public's Allocative Ratios $K_1$, $K_2$, $K_3$, and $t$

<table>
<thead>
<tr>
<th>Regression Number</th>
<th>Dependent Variable</th>
<th>Functional Form</th>
<th>Constant</th>
<th>$(i_{EU} - i_D)_{65-69}$</th>
<th>$(i_{EU} - i_T)_{65-69}$</th>
<th>$i_T$</th>
<th>$W$</th>
<th>Distr.</th>
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</thead>
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<td>7</td>
<td>$K_1$</td>
<td>LOG</td>
<td>12.302</td>
<td>.013</td>
<td>-1.626</td>
<td>.772</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.004)</td>
<td>(.244) (.041)</td>
<td>(.173)</td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>$K_1$</td>
<td>LOG</td>
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<td>-1.636</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.295) (.041)</td>
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<td>$K_2$</td>
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<td>.006*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(.010)</td>
<td>(.609) (.103)</td>
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<td>(.746) (.159)</td>
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<td>(.699) (.106)</td>
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<tr>
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<td>$K_2 \cdot 1000$</td>
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<td>Constant</td>
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<td>$(i_{EU} - i_T)^*$</td>
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<td>Distr.</td>
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<td>- .0016*</td>
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<td>(114.01)</td>
<td>(.0015)</td>
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<td>(105.92)</td>
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<td>$S_2$</td>
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<td>7</td>
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<td>$-0.140$</td>
<td>$-0.068$</td>
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<tr>
<td>8</td>
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<td>$-0.146$</td>
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<td>$0.033$</td>
<td>$1.00$</td>
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<td>($0.014$)</td>
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</tr>
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<td></td>
<td>$-0.176$</td>
<td>$-0.021^*$</td>
<td>$0.015^*$</td>
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<td>($0.056$)</td>
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<td>($0.033$)</td>
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<td>$0.029^*$</td>
<td>$-0.117^*$</td>
<td>$0.00012^*$</td>
<td>$0.00376^*$</td>
<td>$0.629$</td>
<td>$0.077$</td>
<td>$1.51$</td>
</tr>
<tr>
<td></td>
<td>($0.012$)</td>
<td>($0.023$)</td>
<td>($0.066$)</td>
<td>($0.035$)</td>
<td>($0.035$)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>11</td>
<td>$0.00069^*$</td>
<td></td>
<td>$-0.169$</td>
<td>$-0.018^*$</td>
<td>$0.015^*$</td>
<td>$0.611$</td>
<td>$0.079$</td>
<td>$1.42$</td>
</tr>
<tr>
<td></td>
<td>($0.016$)</td>
<td></td>
<td>($0.061$)</td>
<td>($0.034$)</td>
<td>($0.035$)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>$-9.46$</td>
<td>$-1.09^*$</td>
<td>$0.96^*$</td>
<td>$0.631$</td>
<td>$3.49$</td>
<td>$1.66$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>($2.31$)</td>
<td>($1.47$)</td>
<td>($1.47$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>$0.011^*$</td>
<td>$0.01^*$</td>
<td>$0.018^*$</td>
<td>$0.979$</td>
<td>$0.028$</td>
<td>$0.69$</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>($0.020$)</td>
<td>($0.012$)</td>
<td>($0.012$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>$0.0243$</td>
<td>$-0.002^*$</td>
<td>$0.009^*$</td>
<td>$0.031$</td>
<td>$0.975$</td>
<td>$0.031$</td>
<td>$0.82$</td>
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<tr>
<td></td>
<td>($0.006$)</td>
<td>($0.024$)</td>
<td>($0.013$)</td>
<td>($0.014$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$0.732$</td>
<td>$60.31$</td>
<td>$0.67$</td>
</tr>
<tr>
<td>16</td>
<td>$-0.0087^*$</td>
<td>$-0.628$</td>
<td></td>
<td></td>
<td></td>
<td>$0.821$</td>
<td>$49.23$</td>
<td>$1.20$</td>
</tr>
<tr>
<td></td>
<td>($0.071$)</td>
<td>($0.090$)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>17</td>
<td>$-0.626$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$0.825$</td>
<td>$48.68$</td>
<td>$1.20$</td>
</tr>
<tr>
<td></td>
<td>($0.088$)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* indicates that coefficient is not significant at the 5 percent confidence level.
Table 10 (cont.)

Notes: On Seasonally Unadjusted Data

All data are end-of-the period figures, seasonally unadjusted. The source, unless otherwise specified, is the Bank of Italy. While the unadjusted data give the entire flavor of the phenomena, they are less pliable for obtaining significant test statistics such as the Durbin-Watson test. In the few instances in which adjusted and unadjusted series were available, regressions using seasonally adjusted data indicated little or no presence of significant autocorrelation in the residual term, whereas the same data, unadjusted, indicated the presence of positive serial correlation. Unfortunately, the Bank of Italy does not publish seasonally adjusted series and current statistical procedures of deseasonalization based on moving averages require a minimum of 5 years of monthly observations.

Columns 5, 6, 7—\((i_{EU} - i_D)_{65-69}, \ (i_{EU} - i_T)_{65-69}, i_T\) are expressed in basis points (100 basis points = 1 percentage point). Rates on demand and time deposits (\(i_D, i_T\)) have been obtained from interpolating yearly averages of market (and not administered) rates paid by a large Italian commercial bank.

Column 8—W stands in the empirical work of this chapter for the totality of financial assets, both domestic and foreign.

Column 9—Distr. is equal to labor income divided by national income at current prices. Since national income data is yearly, quarterly observations are the estimates (unpublished) made by the Research Department of the Bank of Italy.

Columns 10, 11—EC_{60-64}, EC_{65-69} are the repatriated banknotes for the period 1960-64 and 1965-69, respectively (millions of dollars).

Columns 12, 13, 14—S_1, S_2, S_3 are seasonal dummy variables.

Column 15—\(R^2\) is the coefficient of determination corrected for degrees of freedom.

Column 16—\(\sigma_u\) is the standard error of estimate of the regression.

Column 17—D.W. is the Durbin-Watson test statistic.

Numbers in parenthesis are the standard error of the coefficients.
Shaded areas represent business contractions; unshaded areas, business expansions.
Figure 7

Italy Actual and Estimated Bank Time to Demand Deposit Ratio (1858.I-1969.IV)

Shaded areas represent business contractions; unshaded areas, business expansions.

---

Actual

--- Estimated (eq. 11)
Italian repatriated banknotes (EC) in lieu of the interest rate differential. Assuming a one percent increase in \( i_{EU} - i_D \) brings about a one percent increase in the outflow of Italian currency. Then the coefficient of EC (for the period 1965.I - 1969.IV) is expected to appear in the \( K_1 \) regression with the same sign and size of the \( i_{EU} - i_D \) coefficient. Regression 8 corroborates this view. A low value of the elasticity of \( K_1 \) with respect to \( i_{EU} - i_D \) (or repatriated banknotes) does not imply, of course, that the effect of the Eurodollar market is negligible. To the extent that rates on domestic deposits are constrained by an upward ceiling and the Eurodollar rate is characterized by a pronounced variability the interest rate differential could impart considerable fluctuations to the currency to demand deposits ratio. Similarly, to assess the contribution of currency outflows to the change in \( K_1 \) I must multiply the relevant elasticity by the percent change in currency outflows whose variability rises dramatically during periods of uncertainty at home and rising interest rate differentials. The empirical evidence regarding the contribution of the Eurodollar market to changes in the proximate determinants of the money supply will be presented in Section 3.6 below when all effects have been taken into account.

I conclude the analysis of the currency to demand deposits ratio by noting its strong negative trend (see Figure 4): \( K_1 \) has gone from a maximum of .66 in 1958.I to .35 in 1969.IV, almost a 50 percent decrease over the twelve-year period.

Table 10 also contains the major empirical findings concerning
the determination of $K_2$, $K_3$, and $t$, whose specifications adhere substantially to (7). In interpreting the results it should be recalled that, insofar as $K_2$ is concerned, the coefficient of the independent variable distr. registers the ability of the Post Office to attract funds from small savers to whom the market of higher yielding assets is inaccessible because of the significant minimum denominations and lot sizes of market instruments (Eurodollar market and domestic market for large deposit holders) and because of the small savers' ignorance. The major determinants of $K_2$ are the rate paid on bank time deposits—which measures the opportunity cost in holding postal demand deposits—and income distribution. No evidence was found that the Eurodollar market has had an appreciable effect on $K_2$ (both by using the rate differential and repatriated banknotes). The coefficient of $W$ appears with the unexpected sign and is fairly unstable.

A more detailed analysis of the $K_2$ ratio would require an investigation into the range and quality of services, for a given level of interest rates, obtained by holding a checking account with the Post Office vis-a-vis a commercial bank. Cursory observations indicate that the Post Office competes against commercial banks by providing services such as free postage, continuously updated information on the account's balance, and a convenient payment system through its vast number of offices throughout the country, rather than through price competition (rates on postal demand deposits have remained constant at 1.50 percent throughout
the twelve-year period).

Devoid of any long-run trend, the $K_2$ ratio moves broadly in a manner opposite to the business cycle (see Figure 5). In terms of the magnitudes involved, the importance of $K_2$ is relatively small. At the trough of the 1963-64 recession, postal demand deposits represented slightly more than 5 percent of bank demand deposits; then the percentage decreased towards the 3.5 percent level registered at the end of 1969.

The Eurodollar rates appear with statistically significant coefficients again in the regressions of $K_3$ and $t$ ratios. The elasticity of $K_3$ with respect to $i_{EU} - i_D$ during the 1965-69 period is approximately equal to the corresponding $K_1$ elasticity. Note-worthy are the substantial improvements in the $R^2$ and D.W. test statistics obtained by substituting repatriated banknotes for $i_{EU} - i_T$ in the determination of the $t$ ratio. The result is explained by the fact that the Eurodollar rate differential is only one of the explanatory variables of EC. As mentioned above, a major factor underlying the currency outflow is the discriminatory tax treatment, reinstated early in 1967, in favor of nonresident owners of securities and bonds. Since there is some evidence that expend- ditures of Italian tourists going abroad affect EC only to a minor degree,\(^1\) it can be asserted that the improvement in the explanatory

\(^1\)See Fausto Vicarelli, "Le Rimesse di banconote."
power of regression 17 over 15 of Table 10 is largely attributable to the discriminatory tax treatment.

It is useful at this point to suggest a general interpretation of the regression results concerning the t ratio. These capture both demand and supply effects. Wealth and income distribution represent the principal factors in the public's demand for the time to demand deposits ratio, while the rate paid on time deposits expresses the banks' supply of t in the form of a price-setting function. In Chapter 2 I discussed at some length the nature and properties of the price-setting function which basically is derived from the profit-maximizing behavior of the banks subject to the additional constraint of maximum rates banks are allowed to pay on deposit liabilities.

An illustration of the interaction of demand and supply effects on the t ratio can be better appreciated by analyzing the causes underlying the dramatic decline in the t ratio since 1965, a drop of about one-third (cf. Figure 7). First, the banks' failure to appreciably raise rates on time deposits (I am referring to market rates which had been higher than the prescribed ceilings) induced time deposit holders, especially the larger ones, to move their funds into higher yielding assets which did not possess a higher risk element. Two such typical assets have been government bonds whose price had remained virtually constant during the 1966.II - 1969.I pegging policy period and short-term foreign-denominated assets (restricted to large deposit holders). The latter became
particularly attractive as the spread between Eurodollar market rates and market time deposit rates was moving from a low of 1.73 percent in 1965.II to a high of 7.84 percent in 1969.II. The negative elasticity of \( t \) with respect to \( i_{EU} - i_T \) supports this proposition.

Second, demand deposits in Italy have increasingly assumed the role usually played by money market instruments, such as Treasury bills and commercial paper. Firms, which comprise the largest class of demand deposit holders, also use their checking accounts for purposes of short-term investment. The negative elasticity of \( t \) with respect to \( W \) supports this notion.

Third, a differential tax treatment in favor of demand deposit has made it possible for banks to raise rates on demand deposits more rapidly than those on time deposits (in 1969, "market" rates on the former were higher than rates on the latter). Interest on deposits are subject to an approximate tax rate of 70 percent (the so-called Tassa di Ricchezza Mobile) which has traditionally been borne by banks, even though it is imputable to deposit holders. To avoid double taxation, the Treasury attempts to distinguish deposit holders into families and business firms. Only the former are subject to the tax. Since the matter is under the jurisdiction of local taxing authorities, there are no precise data for the nation concerning the proportion of deposit holders considered to be families. The best unpublished information indicates that the
following can be taken as a good approximation: 1

(i) all interest on time deposits are subject to the 40 percent tax rate on the presumption that time deposit holders are exclusively families;

(ii) 40 percent of demand deposits are subject to the above tax on the presumption that the ratio of families to total deposit holders is about two to five.

The tax treatment in favor of demand deposits would induce banks, ceteris paribus, to offer less time deposits relative to demand deposits. Substantial changes in the composition of the banks' liabilities can occur by raising rates paid on demand deposits relative to those paid on time deposits.2

Before terminating the analysis of the public related proximate determinants of the money supply, it should be pointed out that their volatility could be largely reduced if rates on postal and bank deposits were allowed to respond to market forces, both internal and external. Furthermore, rate ceilings on deposits have allocative effects which are not dissimilar to the effects of in-

1Discussion seminar conducted by the members of the Research Department of the Banca d'Italia under the chairmanship of Professor Franco Modigliani (Rome, September 25 - October 25, 1970).

2Part of the effect attributable to the tax treatment is offset by the different rates of return which apply to required reserves in the form of monetary base and long-term bonds. In Chapter 2 it was noted that changes in time deposits since September 1965 are exempt from compulsory reserves in the form of base money, whose yield is lower than the yield on required reserves in the form of long-term bonds.
direct taxation: they discriminate against the small saver.  

With this section I have concluded the empirical analysis of the seven proximate determinants of the money supply which are embodied in the multipliers. The analysis of the multipliers will be taken up again in Section 3.5 where the impact of the multiplier \( m^2 \) on the growth of the money stock will be quantified, and in Section 3.6 where the relationship between the Eurodollar market and \( m^2 \) will be explored. But first I shall discuss the determination of the rate of interest and the supply of money.

3.4 REGRESSION ESTIMATES OF THE REduced-FoRM EQUATIONS FOR INTEREST RATES AND THE SUPPLY OF MONEY

The number of instrumental and exogenous variables of the reduced-form equations for the credit market rate of interest and the money supply, respectively equations (12) and (13) of Chapter 2, is very high relative to the sample size of forty-eight observations. The selection of a limited number of independent variables was made on the following considerations.

First, a substantial number of policy and exogenous variables, which appear in the above-mentioned equations (12) and (13) can be eliminated on the ground that their variability, during the twelve-

---

1 The reader is invited to consult James Tobin, "Deposit Interest Ceilings as a Monetary Control," Journal of Money, Credit and Banking, February 1970, for a similar case of discrimination in the U.S. in the second half of the 1960s.
year period under consideration, was either zero or negligible.
This is true for the ceiling rates on both bank and postal deposits
\(\{\bar{I}_D, \bar{I}_T, \bar{I}_{PT}, \bar{I}_{PD}\}\), the discount rate \(\rho\), the reserve requirement
ratios \(r^d\) and \(r^t\), and the distribution of deposits between savings
and nonsavings banks \(d^1, d^2\).\(^1\) Second, the real rate of return \(\beta\)
was not available in a suitable form. The empirical analysis, con-
sequently, had to be limited to the effects of the adjusted base
\(13^a\), nonhuman wealth \(W\), the price level \(p_y\), income distrib-
ution \(\text{distr.}\), and the pegging policy. As stated above, income
distribution is a significant variable in the explanation of the
public's behavior. The effect of the pegging policy is considered
because of the substantial interest this topic has attracted in
Italian literature. The effect of the expected price level \(p^E\)
and the stock of government securities \(S_G\) on the rate of interest
will be examined in separate sections.

Additionally, the empirical analysis of equations (12) and
(13) differs from the idealized conditions of these expressions
because of the necessity of using surrogate variables. Thus, non-
human wealth has been approximated by the totality of domestic
financial assets owned by the public and deflated by the consumer
price index. So measured, such a magnitude represents only a por-
tion of \(W\) to the extent that it excludes the stock of the unavail-
able physical capital. Furthermore, since the proxy for \(W\) contains

\(^1\)The reader is referred to Chapter 2 for a complete discussion of
these parameters.
currency and bank deposits, it has been lagged by one quarter with respect to the dependent variable to eliminate any implicit correlation between it and the money stock. Similarly, the consumer price index was chosen as the appropriate surrogate for the unavailable (on a quarterly basis) income price deflator $p_y$. This proxy also was lagged by one quarter with respect to the dependent variable so that a comparison of the effects of the surrogates for $W$ and $p_y$ would be based on the same time period.

It is assumed that in the short run interest rate determination follows a gradual adjustment process of the type

$$\ln i_{GL} - \ln i_{GL-1} = \gamma (\ln \hat{i}_{GL} - \ln i_{GL-1})$$

where $\gamma$ is the adjustment coefficient, $\ln i_{GL}$ the long-run relationship given by (12) of Chapter 2, and $\ln \hat{i}_{GL}$ and $\ln i_{GL-1}$ the observed values of $i_{GL}$ in period $t$ and $t-1$, respectively.

The behavior underlying the above equation implies that in the short run some economic operator in the system cushions the impact on interest rates produced by changes in instrumental or exogenous changes. In the U.S. this function can be attributed to government bond dealers who, for example, in expectation of lower interest rates in the future, buy bonds with the intention of selling them later at a capital gain. In so doing, however, the dealers retard the adjustment process of interest rates towards a lower equilibrium level. In Italy this role is played by the banks which are also bond dealers. The importance of a gradual process of adjustment
is furthermore accentuated by the fact that the bond rate \( i_B \) is used in this study as a proxy for the credit market rate index.

Regression 18 in Table 11 shows that 38 percent of the adjustment occurs during the first quarter (column 5). Long-run elasticities of \( i_B \) with respect to \( B^a \), wealth, income distribution, and the price level are given in columns 12 through 15. Note the high value of the base interest elasticity. Regression 19 differs from 18 by the introduction of a parameter (DSTAB) which is intended to capture the effects of the pegging policy on government securities from the second quarter of 1966 to the first quarter of 1969. The effect of DSTAB has already been discussed in connection with \( r_E \); it should be remembered that to the extent that DSTAB tends to lower the excess reserve ratio, it will raise the asset multiplier \( a \). Formally, the effect of DSTAB can be incorporated in the hypothesis by virtue of the following relationship:

\[
E(i_B, DSTAB) = E(i_B, B^a) E(a, DSTAB) < 0
\]

In regression 19 its long-run elasticity is about -.06. However, as was the case for the excess reserve ratio, this effect is not significantly different from zero at the .05 level.

Regression 20 provides an estimate of the inclusive supply of money \( M^2 \). From both 19 and 20, and the use of the relevant formulas developed in Tables 4 and 7 of Chapter 2, the following elasticity values of the credit market and monetary multipliers
Table 11

Regression Estimates of the Reduced-form Equations for Interest Rate and Supply of Money

<table>
<thead>
<tr>
<th>Regr. No.</th>
<th>Dependent Variable</th>
<th>Func. Form</th>
<th>Constant</th>
<th>(i_{B-1})</th>
<th>(B^a)</th>
<th>(W_D) ((-\frac{\cdot}{P}))-1</th>
<th>Distr.</th>
<th>(P-1)</th>
<th>(\lambda)</th>
<th>DSTAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>(i_B)</td>
<td>LOG</td>
<td>-1.389</td>
<td>.624</td>
<td>-.539</td>
<td>.247</td>
<td>-.091*</td>
<td>.914</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.118)</td>
<td>(.131)</td>
<td>(.091)</td>
<td>(.095)</td>
<td>(.320)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>(i_B)</td>
<td>LOG</td>
<td>-1.698</td>
<td>.584</td>
<td>-.518</td>
<td>.218</td>
<td>-.107*</td>
<td>1.014</td>
<td>-.025*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.119)</td>
<td>(.129)</td>
<td>(.091)</td>
<td>(.094)</td>
<td>(.320)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>(m^2)</td>
<td>LOG</td>
<td>-4.755</td>
<td>.215</td>
<td>.798</td>
<td>-.108*</td>
<td>.976</td>
<td>-.014*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.073)</td>
<td>(.053)</td>
<td>(.059)</td>
<td>(.108)</td>
<td>(.009)</td>
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</tr>
<tr>
<td>21</td>
<td>(D)</td>
<td>LOG</td>
<td>-8.640</td>
<td>.542</td>
<td>.923</td>
<td>-.305</td>
<td>.617*</td>
<td>-.026*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.181)</td>
<td>(.160)</td>
<td>(.094)</td>
<td>(.347)</td>
<td>(.025)</td>
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<td></td>
</tr>
<tr>
<td>22</td>
<td>(i_B)</td>
<td>LOG</td>
<td>-1.969</td>
<td>.506</td>
<td>-.519</td>
<td>.220</td>
<td>-.104*</td>
<td>.703</td>
<td>.36</td>
<td>-.036</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.129)</td>
<td>(.137)</td>
<td>(.089)</td>
<td>(.092)</td>
<td>(.212)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

Col. 7: total domestic financial assets deflated by the consumer price index. The ratio is lagged by one quarter.

Col. 9: consumer price index lagged by one quarter.

Col. 10: one minus the constant coefficient of expectations.
Table 11 (cont.)

<table>
<thead>
<tr>
<th>Regr. No.</th>
<th>$E(i_{B}B^{e})$</th>
<th>$E(i_{B},\frac{W_{B}}{P_{-1}})$</th>
<th>$E(i_{B},\text{Distr.})$</th>
<th>$E(i_{B},P_{-1})$</th>
<th>$E(i_{B},p^{e})$</th>
<th>$E(i_{B},\text{DSTAB})$</th>
<th>$\rho$</th>
<th>$R^{2}$</th>
<th>$\sigma_{u}$</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>-1.432</td>
<td>.657</td>
<td>-.241</td>
<td>2.429</td>
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<td></td>
<td></td>
<td>.876</td>
<td>.034</td>
<td>2.28</td>
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<tr>
<td>19</td>
<td>-1.248</td>
<td>.524</td>
<td>-.259</td>
<td>2.44</td>
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<td></td>
<td></td>
<td>.881</td>
<td>.033</td>
<td>2.39</td>
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<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.998</td>
<td>.022</td>
<td>2.33</td>
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<td>.970</td>
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<tr>
<td>22</td>
<td>-1.05</td>
<td>.446</td>
<td>-.211</td>
<td>2.305</td>
<td></td>
<td></td>
<td></td>
<td>.884</td>
<td>.033</td>
<td>2.32</td>
</tr>
</tbody>
</table>

Note: Col. 18: parameter which measures the degree of serial correlation in the error term, following a first-order autoregressive transformation.

For other symbols consult previous tables.
can be derived:

\[ E(a, i_{GL}) - E(s, i_{GL}) = .801 \text{ (the short-run = 1.93)} \]
\[ E(s, W) - E(a, W) = .42 \]
\[ E(a, Distr.) = .207 \]
\[ E(s, p_y) - E(a, p_y) = 1.95 \]
\[ E(m^2, i_{GL}) = .629 \text{ (the short-run = 1.51)} \]
\[ E(m^2, W) = .469 \]
\[ E(m^2, Distr.) = .054 \]
\[ E(m^2, p_y) = -.558 \]

---

1 The reader may find it useful to compare the above results with those obtained for the U.S. by Karl Brunner and A.H. Meltzer in their "Liquidity Traps," Appendix III. Using data for 1919-41 and 1952-58, their regression estimates suggest that:

\[ E(i_{GL}, B^a) = -.510 \]
\[ E(i_{GL}, W) = .908 \]
\[ E(i_{GL}, p_y) = .744 \]

from which \[ E(a, i_{GL}) - E(s, i_{GL}) = 1.96 \]
\[ E(s, W) - E(a, W) = 1.78 \]
\[ E(s, p_y) - E(a, p_y) = 1.46 \]

and

\[ E(M^1, B^a) = .347 \]
\[ E(M^1, W) = .501 \]
\[ E(M^1, p_y) = .926 \]

from which \[ E(m^1, i_{GL}) = .94 \]
\[ E(m^1, W) = -.023 \]
\[ E(m^1, p_y) = .23 \]

The results obtained in Italy during the 1958-1969 period are strikingly similar to the Brunner-Meltzer long-run evidence for the U.S. Whatever differences emerge, they are more the result of different measurement procedures than differences in underlying behavior. Thus, my lower value for \( E(i_{GL}, W) \) must be attributed in part to having approximated real nonhuman wealth by the totality of domestic financial assets deflated by the consumer price index, rather
The pegging policy which has lasted almost three years does not appear to have altered money supply processes. Contrary to expectations, the policy of stabilizing yields on government securities has had a contractive effect on money supply, if anything. (Note that the coefficient of DSTAB in regressions 20 and 21 is negative and not significant at the 5 percent level.)

I have estimated separately the supply function for demand deposits (regression 21), the most dynamic component of \( M^2 \). Since there was evidence of significant serial correlation in the error term, I have imposed on the \( u \) term, the first-order autoregressive transformation

\[
u_t = \rho u_{t-1} + \varepsilon
\]

Provided that the \( \varepsilon \)'s are serially independent, it is readily demonstrated that\(^1\)

\[
\sigma_{\varepsilon} = \sigma_u \sqrt{1 - \rho^2}
\]

The values of \( \rho \) and \( \sigma_u \) are shown in columns 18 and 20 of Table 11. Not unexpectedly, the results show that \( E(D, B^8) > E(M^2, B^8) \) and a pronounced and significant reduction in \( D \) as a result of an increase in distr., a result which is consistent with the hypothe-

sis.¹ That the value of the wealth elasticity of demand deposits is larger than the corresponding M² elasticity is consistent with the ascending order of wealth elasticities found in the analysis of the public's allocative parameters [i.e., E(D, W) > E(T, W) > E(CP, W)]. Finally, the contribution of prices is not significantly different from zero at the .05 level. The hypothesis, as formulated, does not discriminate among the different effects of the price level on the various components of M².

Quite generally, I consider the evidence presented in Table 11 as supporting the nonlinear money supply hypothesis. The hypothesis is relevant to many issues. Its richness stems from the inclusion of a large number of parameters and appropriate order constraints. In the interest of brevity, I limit myself to the analysis of a few key problems.

¹In fact, a rise in distr. raises all the public's allocative parameters and, consequently, lowers the demand deposit multiplier, provided the effect via t is numerically smaller than the effect via the k's parameters.

Since E(D, distr.) = E(d, distr.) + E(d, iGL) E(iGL, distr.)

\[ d = \text{demand deposit multiplier} \]
\[ E(d, i_{GL}) > 0, \ E(i_{GL}, \text{distr.}) < 0 \]

E(D, distr.) can be negative even though E(d, distr.) > 0. The sufficient condition is that

\[ |E(d, i_{GL}) E(i_{GL}, \text{distr.})| > E(d, \text{distr.}) \]
3.4.1 The Price Level as an Expectative Effect

Following Cagan,\(^1\) one way to incorporate price expectations in the hypothesis is to assume that expected price changes are adapted in proportion to the difference between the observed and the expected value of prices (indicated with a superscript e).

\[
\ln p^e - \ln p_{-1}^e = \beta (\ln p - \ln p_{-1})
\]

\[\beta = \text{constant coefficient of expectations measuring the speed of adaptation}\]

The above formulation implies that the weights decline steadily at an exponential rate as one goes backwards in time. In other words, more recent observations enter the formation of price expectations with a larger weight than remote observations of price changes.

\[
\ln p^e = \beta \sum_{i=0}^{\infty} \lambda^i \ln p_{t-i}^e
\]

\[\lambda = 1 - \beta\]

Incorporating now both the expectations and the interest-rate gradual adjustment process,\(^2\) I obtain


\(^2\) See Johnston, Econometric Methods, pp. 219-20, for an example which treats simultaneously adjustment and expectations processes.
\[ \ln i_{GL} = A + \gamma \cdot a_4 \cdot \beta \sum_{i=0}^{\infty} \lambda^i \ln p_{t-i} + (1 - \gamma) \ln i_{GL-1} \]

+ error term

where \( \ln i_{GL} = A + a_4 \ln p^e \gamma \)

\[ A = a_0 - a_1 \ln B^a + a_2 \ln W - a_2 \ln Distr. \]

A direct estimate of \( \lambda \) was obtained following the procedures outlined by L.R. Klein.\(^1\) The result is reported in column 10 of regression 22.

---

\(^1\) "The Estimation of Distributed Lags," *Econometrica* (Oct. 1958). I rewrite (IV.2) as:

\[ \ln i_{GL} = (1 - \gamma) \ln i_{GL-1} + A + \gamma \cdot a_4 \left[ \beta \sum_{i=0}^{t-1} \lambda^i \ln p_{t-i} + \beta \sum_{i=t}^{\infty} \lambda^i \ln p_{t-i} \right] \]

+ error term

where \( \beta \sum_{i=t}^{\infty} \lambda^i \ln p_{t-i} = \lambda^t \beta \sum_{i=0}^{\infty} \lambda^i \ln p_{0-i} = \lambda^t \cdot C \)

and \( C \) represents the initial conditions of the equation.

The elasticity of the interest rate with respect to $p^e$ can be derived as follows:

$$E(i_{GL}, p^e) = a_4 = \frac{\gamma \cdot a_4^\beta}{\gamma^\beta} = \frac{.703}{(.50)(.64)} = 2.3$$

since $\gamma = .50$, $\lambda = 1 - \beta = .36$

The implied weighting structure is

$$0.64 [p_{-1} + (0.36) p_{-2} + (0.129) p_{-3} + (0.016) p_{-4} + (0.0002) p_{-5}$$

$$+ (0.00000006) p_{-6}]$$

which suggests that the public looks at the movement of the price level during the last six quarters to form expectations of its likely future level.

A different weighting scheme was estimated by relying on the Almon technique. Partly based on the information obtained from the estimates of the geometrically decaying lags, the Almon lag structure considered was interpolated by a second-degree polynomial over the period $t-1$ to $t-7$, constrained to zero at $t-7$. The results are:

$$(23) \ln i_B = -1.942 + .499\ln(i_{B-1}) - .482 (\ln B^a) + .215 [\ln \left(\frac{W}{p-1}\right)_{-t}^{W}]$$

$$(.143) \quad (.165) \quad (.098)$$

---

\[-.123 (\ln \text{Distr.}) - .033 (\ln \text{DSTAB}) + .702 (\ln p_{-1})
\]
\[\text{(.113)} \quad \text{(.019)} \quad \text{(.299)}\]
\[+ .381 (\ln p_{-2}) + .141 (\ln p_{-3}) - .016 (\ln p_{-4})
\]
\[\text{(.128)} \quad \text{(.080)} \quad \text{(.124)}\]
\[-.092 (\ln p_{-5}) - .087 (\ln p_{-6})
\]
\[\text{(.136)} \quad \text{(.095)}\]

Sum of price coefficients = 1.028.

Average t-value of the six price coefficients = 1.642

\[R^2 = .878, \sigma_u = .035, \text{D.W.} = 2.26\]

The sum of the price coefficients is virtually equal to the coefficient of \(p_{-1}\) in regression 19 (Table 11). The first three lags have large positive weights, while the second three have small negative weights. Indications of a possible "regressive effect" of price changes on changes in the long-term rate in the tail of the distribution (i.e., price changes temporarily generate expectations of changes in the interest rate toward a previously achieved "normal" level) should be dismissed on the ground that the negative weights, being small numerically and having large standard errors, are not significantly different from zero.

Both equations (22) in Table 11, the geometrically decaying lag structure, and (23) above, the Almon lag structure, are alternative test procedures to measure the effect of expected percent price changes (with expectations formed according to an "adaptive" behavior) on the percent change in the bond rate \(i_B\) within a general framework of interest-rate determination. In both cases, expected
price changes have added very little, if any, to the basic hypothesis. The evidence, which is to be judged preliminary, points out that the time within which price expectations are formed is 9 to 15 months. These results are in agreement with some recent work which has attempted to demonstrate that the effect of price changes on both the short and the long-term rate in the U.S. occurs with much shorter mean lags than the seven to thirty-year mean lags found in earlier studies.\footnote{W.P. Yohe and D.S. Karnosky, "Interest Rates and Price Level Changes, 1952-59," \textit{Federal Reserve Bank of St. Louis Review}, December 1969. The authors found mean lags—defined as weighted average lag with the coefficients of the lagged variable used as weights—of less than a year. Equations (22) and (23) above imply mean lags of less than two quarters.}

3.4.2 The Behavior of the Interest Rate Over the Business Cycle

Even though there was no formal discussion in Chapter 2 about the implications of the nonlinear money supply hypothesis with respect to the cyclical behavior of the rate of interest, it is quite clear from equation (12) of Chapter 2 that the credit market rate will tend to rise whenever the growth rate of the so-called "real" variables (e.g., nonhuman wealth, the real rate of return, the price level and the expected price level multiplied by their respective elasticities) dominates the growth rate of the adjusted base multiplied by its relevant elasticity. The reason for differentiating real variables from policy variables is to ascertain whether the cyclical behavior of the rate of interest is dominated
by the former or the latter. I have isolated the adjusted base
as the only policy instrument which the Italian monetary authorities
have continuously manipulated during the twelve-year sample period
(the reader is referred to Section 3.4 for a discussion of the non-
variability of the other policy parameters).

Two hypotheses can be advanced as alternative explanations
for the cyclical movement of the rate of interest. These hypotheses
will be formulated according to the following stylized sentences.

H.1: Changes in the "real" variables, including the price level,
     have a dominant effect on the rate of interest.

0.1: Changes in "real" variables, including the price level, have
     a procyclical pattern (a statement of fact).

Implication from H.1 · 0.1: the rate of interest rises in periods
     of economic expansions and falls in periods of economic con-
     tractions.

H.2: Changes in the base have a dominant effect on the rate of
     interest.

0.2: Changes in the base have a procyclical pattern (see Section
     3.1 above).

Implication from H.2 · 0.2: the rate of interest falls in periods
     of economic expansions and rises in periods of economic con-
     tractions.

It should be noted that both H.1 and H.2 are consistent with the
nonlinear money supply hypothesis. The two sentence structures can
easily be assessed by actually looking at the behavior of the bond
rate $i_B$ over the cycle.

As depicted in Figure 8, $i_B$ has a basic countercyclical pattern. Out of five complete half-cycles covered in the twelve-year sample period, three of them are characterized by an inverse association between the business cycle and $i_B$ (1958.I - 1960.II, 1963.III - 1964.IV, and 1965.I - 1966.I), one by a positive association (expansion phase 1961.I - 1963.II), and for the remaining one there are too few observations to pass judgment (contraction phase 1960.II - 1960.IV). In addition, there are many indications that the last expansion phase had worked itself out by the second quarter of 1969. Hence, the last two observations of 1969 conform to the anticyclical behavior if $i_B$. Finally, observations from 1966.II through 1969.I have not been considered because, as mentioned earlier, the monetary authorities were adjusting the monetary base by such an amount to keep interest rates at a virtually fixed level.

I conclude that there is substantial evidence that changes in the base have had a dominant effect on the rate of interest and have been largely responsible for its countercyclical behavior.

3.4.3 The Influence of Open Market Operations, Government-Generated Wealth, and Income on the Rate of Interest

In an open economy the period's saving ($S$) minus net investment ($I$) is equal to the budget deficit ($G - T$) plus net exports of goods and services ($X - M$):

$$S - I = (G - T) + (X - M)$$
Figure 8
Italy 1960.I - 1969.IV
Actual and Estimated Long-Term Rate (R)

--- Actual
--- Estimated (eq.19)

Shaded areas represent business contractions; unshaded areas, business expansions.
where all the variables are expressed as nominal values. This expression can be considered an increment to the public's net worth. More specifically, the government contribution to the addition (or subtraction) of the public's net worth is directly obtainable from the budget constraint of the Treasury:

$$G - T = \Delta B^{Tr} + \Delta S_G$$

$B^{Tr}$ is the monetary base created as a result of operations involving the Treasury (e.g., securities held by the Bank of Italy, postal deposits, borrowings from the central bank, coins and currency); $S_G$ is the interest-bearing public debt net of the central bank holdings.

Among the test implications of the nonlinear money supply hypothesis, it should be recalled that

(a) the elasticity of interest rates with respect to wealth is positive, provided $E(s, W) - E(s, W) > 0$ -- a condition which is most likely to be satisfied;

(b) the income elasticity of the rate of interest is positive to the extent that income enters as an argument with a positive partial derivative in the public's supply of earning assets to the banking system; that is,

$$E(i_{GL}, Y) = - E(i_{GL}, B^a) E(s, Y) > 0$$

and

(c) open market operations, while they don't create or destroy any wealth but merely change its form, affect interest rates in opposite directions and by a magnitude which exceeds the effect produced by an equivalent change in
any other source component of the base. The same is true if a change occurs in the composition of the two classes of government liabilities which serve to finance a given deficit (cf. Section 2.3.4). A suitable test procedure relevant for test implications (a), (b), and (c) is offered by the following equation:

\[
\ln i_{GL} = \gamma(a_0 + a_1 \ln \frac{B^a}{B^a + S_G} + a_2 \ln \frac{B^a + S_G}{Y}) + (1 - \gamma) \ln i_{B-1} + \text{error term}
\]

Open market operations, or a change in the composition of the two broad classes of government liabilities which serve to finance a given deficit, alter only the numerator of \( \ln \frac{B^a}{B^a + S_G} \) (\( B^a \) being an approximation of \( B^T \)). Changes in \( B^a + S_G \) and, thus, changes in the public's net worth can occur only if the size of the government deficit is altered. It is useful to distinguish between the effects of an increase in government deficit financed entirely via an increase in base money versus one financed entirely via an increase in interest-bearing debt. In the first instance, the total long-run impact on \( i_{GL} \) is given by

\[
\frac{d i_{GL}}{i_{GL}} = a_1 \frac{d B^a}{B^a} + (a_2 - a_1) \frac{d (B^a + S_G)}{B^a + S_G} < 0
\]

where \( a_1 = E(i_{GL}, B^a) \)

\[
a_2 - a_1 = E(i_{GL}, B^a + S_G)
\]
The percent change in $i_{GL}$ must be negative for two reasons. First, an increase in the base has a net negative impact on $i_{GL}$, regardless of whether it creates wealth or not. In other words, the following conditions must be satisfied

$$a_1 < 0$$

$$|a_2| < |a_1|$$

Second, $\frac{d B^a}{B^a} > \frac{d(B^a + S_G)}{B^a + S_G}$

Conversely, an interest-bearing debt-financed government deficit will raise the denominator of $\ln \frac{B^a}{B^a+S_G}$ and the numerator of $\ln \frac{B^a+S_G}{Y}$. Since the income elasticity of the rate of interest is positive, the additional constraint of $a_2 < 0$ must be added. Hence, the test procedure equation (24) must be supplemented by imposing the following sign and order constraints on its coefficients:

$$a_1 < 0$$

$$a_2 < 0$$

$$|a_1| > |a_2|$$

In case $|a_1| = |a_2|$, wealth contributes nothing to the formation of interest rates. An O.L.S. regression of (24) using the bond rate $i_B$ as a proxy for $i_{GL}$ yielded:

$$\ln i_B = -.153 + .855 \ln i_B - .494 \ln \frac{B^a}{B^a+S_G} - .312 \ln \frac{B^a+S_G}{Y}$$

$R^2 = .863, \sigma_u = .0361, D.W. = 2.33$
Y was approximated in this case by the industrial production index. The long-run interest elasticities implied by (27) are:

\[ E(i_B, B^a) = 3.29 \]

\[ E(i_B, B^a + S_G) = 1.20 \]

\[ E(i_B, Y) = 2.06 \]

The results, which conform quite well to the test implications of the hypothesis, reinforce the notion that the monetary base plays a dominant role in the determination of the rate of interest (cf. Section 3.4.2). Just to offer some order of magnitude, a reduction in \( B^a \) of 300 billion, about 2 percent of the stock of \( B^a \) at the end of 1969, would imply in the long run an increase in \( i_B \) from 7.90 to 8.41 percent.

In this section I have presented estimates of the reduced-form equations for the credit market rate of interest and the supply of money. In addition, the nonlinear money supply hypothesis has been utilized to examine issues such as the effect of the pegging policy pursued from 1966 through 1968 on the supply of money, the effect of the expected price level on the determination of the rate of interest, the factors dominating the cyclical movement of the rate of interest, and the joint effect of open market operations, government generated wealth, and aggregate income on the rate of interest. So far in the present Chapter I have analyzed empirically all of the major components and most of the implications of the hypothesis
developed in Chapter 2. Two topics of interest remain to be discussed: the growth path of the money stock $M^2$ in terms of the relative contributions of the multiplier and the adjusted base and the pull of the Eurodollar market on the money supply via the seven ratios. This is done in Sections 3.5 and 3.6, respectively.

3.5 THE CONTRIBUTION OF THE ADJUSTED BASE AND THE MONETARY MULTIPLIER TO THE GROWTH OF THE MONEY STOCK.

The synthetic expression for the money stock in the nonlinear hypothesis is given by

$$M = m B^a$$

which in logarithmic form becomes

$$\ln M = \ln m + \ln B^a$$

The growth rate of the money stock is equal to the sum of the growth rate of the multiplier and the adjusted base:

$$\frac{1}{M} \frac{dM}{dt} = \frac{1}{m} \frac{dm}{dt} + \frac{1}{B^a} \frac{dB^a}{dt}$$

A simplified analysis of this kind has its own merits in terms of the basic information it provides about the relative strength of monetary policy (largely summarized by the movement in $B^a$) vis-a-vis the combined behavior of the banks and the public, (which, in turn, is indicated by the changes in $m$, in influencing movement of the money stock).

I have included in Table 12 the relevant information bearing on the Italian inclusive money supply from 1958 to 1969. The growth rate of $M^2$ (column 2) has been on the average well above 10 percent
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<td>III Q</td>
<td>34410</td>
<td>12.95</td>
<td>12991</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>IV Q</td>
<td>37146</td>
<td>13.46</td>
<td>13057</td>
<td>3.4</td>
</tr>
<tr>
<td>1968</td>
<td>I Q</td>
<td>36664</td>
<td>12.03</td>
<td>13165</td>
<td>8.9</td>
</tr>
<tr>
<td></td>
<td>II Q</td>
<td>37693</td>
<td>12.41</td>
<td>13249</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>III Q</td>
<td>38676</td>
<td>12.40</td>
<td>14087</td>
<td>8.4</td>
</tr>
<tr>
<td></td>
<td>IV Q</td>
<td>41335</td>
<td>11.28</td>
<td>14272</td>
<td>9.3</td>
</tr>
<tr>
<td>1969</td>
<td>I Q</td>
<td>41341</td>
<td>12.75</td>
<td>14156</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>II Q</td>
<td>42108</td>
<td>11.71</td>
<td>13777</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>III Q</td>
<td>43175</td>
<td>11.63</td>
<td>14365</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>IV Q</td>
<td>46099</td>
<td>11.52</td>
<td>14767</td>
<td>3.5</td>
</tr>
<tr>
<td>1958 I Q - 1969 IV Q</td>
<td>346.78</td>
<td></td>
<td>185.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Percent growth rates are computed on the first differences of corresponding quarters of adjacent years.
per annum throughout the entire period, with decelerations occurring in 1964 and in 1969. I have noted elsewhere the procyclical behavior of $B^a$. Here I want to draw particular attention to the strong association between the recession of 1963.III - 1964.IV and the dramatic deceleration in the growth rate of the base. The growth pattern of the base reversed abruptly to a sharp acceleration by the end of 1964, leading the business cycle trough by two quarters. Another sustained deceleration in the growth rate of $B^a$ took place in the last three quarters of 1969, as the monetary authorities decided to "cool an overheated" economy.

Both the adjusted base and the monetary multiplier are characterized by a positive trend. Even so, it can be seen from the table that the long-run behavior of $M^2$ is predominantly reflected in the growth of $B^a$. However, this is not true of the short-run behavior. In 13 out of 44 observations, the percentage change in $m^2$ exceeds numerically the corresponding change in $B^a$, while in 9 other observations $B^a$ and $m^2$ move in opposite directions. More important, 7 out of the 13 cases in question occurred when the monetary authorities were confronted with an ebullient economy. Look in this respect at the 1963.II - 1964.I and 1969.II - 1969.IV

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periods when the pronounced deceleration in the growth rate of the base was matched with an equally pronounced acceleration in the growth rate of the multiplier. Several events make the two periods similar. In both cases a discriminatory fiscal treatment lowered net market yields to Italian investors for whom additional uncertainty as to the future course of the economy was caused by extensive and intensive labor strikes and social unrest. In both cases large outflows of capital occurred, especially in the form of currency: $1.58 billion from 1963.I to 1964.I and about $2 billion in 1969. However, the drastic rise in the differential between Eurodollar and domestic rates in 1969 distinguishes the second from the first period.

The nonlinear money supply hypothesis provides an interpretation of this differential pattern of short and long-run behavior. Variations in the monetary multiplier are closely connected with the movement in the rate of interest via its effect on the reallocation of financial assets. In Chapter 2 conditions were stated for a positive response in m to a change in credit market rates, which was confirmed by the empirical evidence presented in this chapter. Since interest rates behave basically countercyclically (and especially did so during the two periods under consideration), the monetary multiplier is expected to rise during business contractions and fall during business expansions. For a more precise view of the forces at work, the contribution of the proximate determinants of the money supply to the change in the multiplier for the seven
observations in question are presented in Table 13.

It is noteworthy that the acceleration in the growth rate of \( m^2 \) comes almost totally from the banks' parameters in the first period, while in the second period the contributions are split fifty-fifty between the public and the banking system. While the central bank has no direct control on the public's allocative parameters, this is not so with respect to the banks' borrowing ratios. The 100 percent drop in the contribution of \( b_F \) in 1963.IV is to be attributed to the reintroduction of the regulation which forces banks to maintain a zero net position vis-a-vis the rest of the world. Similarly, the Bank of Italy could have reduced the contribution of \( b_H \) to the growth of \( m^2 \) by placing a lower ceiling on total banks' borrowing. These considerations must be borne in mind before concluding that a more pronounced growth rate in the multiplier than in the base is evidence that the central bank cannot pursue an effective short-term monetary policy. The fact remains that the authorities have the ability to control a good deal of the variation in the multiplier through their control of \( r, b_H, \) and \( b_F \). What escapes the authorities' reach is the mechanism of reallocation of financial assets on the part of the public. The knowledge of this mechanism becomes less clear when rate ceilings become substitutes for market-determined rates. The result is that the public, in search of higher yielding assets, will look for an opening. One opening has been the Eurodollar market in recent years. In the following section I assess the contribution of this market to changes in the multiplier.
Table 13


<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$K = K_1 + K_2 + K_3$</td>
<td>8.01</td>
<td>5.34</td>
<td>4.18</td>
<td>-5.81</td>
<td>105.77</td>
<td>76.55</td>
<td>122.38</td>
</tr>
<tr>
<td>$t$</td>
<td>-7.13</td>
<td>-8.98</td>
<td>-2.95</td>
<td>6.09</td>
<td>-59.03</td>
<td>-38.45</td>
<td>-40.42</td>
</tr>
<tr>
<td>$r_R$</td>
<td>-13.38</td>
<td>-.85</td>
<td>1.79</td>
<td>15.18</td>
<td>5.48</td>
<td>-2.19</td>
<td>-16.67</td>
</tr>
<tr>
<td>$r_E$</td>
<td>-28.43</td>
<td>.11</td>
<td>54.88</td>
<td>58.57</td>
<td>21.60</td>
<td>43.98</td>
<td>40.47</td>
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<tr>
<td>$b_H$</td>
<td>13.92</td>
<td>5.08</td>
<td>41.93</td>
<td>35.84</td>
<td>34.73</td>
<td>19.45</td>
<td>18.39</td>
</tr>
<tr>
<td>$b_F$</td>
<td>127.01</td>
<td>99.30</td>
<td>.17</td>
<td>-9.87</td>
<td>-8.55</td>
<td>.66</td>
<td>-24.15</td>
</tr>
</tbody>
</table>
3.6 THE EURODOLLAR MARKET AND THE MONEY MULTIPLIER

In this section I measure the overall contribution of the Eurodollar market to money supply processes in Italy. The analysis is limited to the second half of 1968 and 1969, a period which, because of dramatic rises in Eurodollar interest rates (from 6.8% in 1968.II to 11.2% in 1969.IV), is particularly suitable for assessing the influence of the external forces on the domestic monetary system. The former transmit their impulses on the seven proximate determinants of the money supply (as seen in Sections 3.2 and 3.3) which, in turn, impart impulses to the money multiplier. For an inclusive definition of the money stock, the pull of the Eurodollar market on $m^2$ is given by:

$$\frac{dm^2}{m^2} \text{ due to } [E(m^2, i_{EU} - i_D)] \frac{d(i_{EU} - i_D)}{i_{EU} - i_D} + [E(m^2, i_{EU} - i_T)].$$

$$\cdot \frac{d(i_{EU} - i_T)}{i_{EU} - i_T} + [E(m^2, AIF)] \frac{d AIF}{AIF} + [E(m^2, i_{EU})] \frac{d i_{EU}}{i_{EU}}$$

where

(a) $E(m^2, i_{EU} - i_D) \frac{d(i_{EU} - i_D)}{i_{EU} - i_D} = E(m^2, K_1) E(K_1, i_{EU} - i_D)$

$$+ E(m^2, K_2) E(K_2, i_{EU} - i_D) + E(m^2, K_3) E(K_3, i_{EU} - i_D)$$

$$\frac{d(i_{EU} - i_D)}{i_{EU} - i_D}$$
\[(b) \quad E(m^2, i_{EU} - i_T) \frac{d(i_{EU} - i_T)}{i_{EU} - i_T} = [E(m^2, t) E(t, i_{EU} - i_m)] \]

\[\frac{d(i_{EU} - i_T)}{i_{EU} - i_T}\]

\[(c) \quad E(m^2, AIF) \frac{d AIF}{AIF} = [E(m^2, r_E) E(r_E, AIF)] \frac{d AIF}{AIF} \]

\[(d) \quad E(m^2, i_{EU}) \frac{d i_{EU}}{i_{EU}} = [E(m^2, b_H) E(b_H, i_{EU}) + E(m^2, b_F)] \]

\[E(b_F, i_{EU})] \frac{d i_{EU}}{i_{EU}}\]

(a) + (b) = percentage change in \(m^2\) attributable to the effect of the EDM on the public-related proximate determinants of the money supply.

(c) + (d) = percentage change in \(m^2\) attributable to the effect of the EDM on the bank-related proximate determinants of the money supply.

\[E(m^2, K_1) = - \frac{1}{\Delta} k_1 a_{2m} = -.254\]

\[E(m^2, K_2) = - \frac{1}{\Delta} k_2 a_{2m} = -.026\]

\[E(m^2, K_3) = - \frac{1}{\Delta} K_3 a_{2m} = -.234\]

\[E(m^2, t) = (K_1 + K_2 + K_3) \frac{t}{1+t} \frac{1}{\Delta} a_{2m} = .282\]

\[E(m^2, r_E) = - \frac{1+t}{\Delta} r_E = -.087\]
\[ E(m^2, b_H) = \frac{1+t}{\Delta} b_H = .125 \]
\[ E(m^2, b_F) = \frac{1+t}{\Delta} b_F = -.0051 \]
\[ \Delta = (1+t)(r - b_H - b_F) + K_1 + K_2 + K_3 \]

The numbers after the \( \approx \) sign represent the mean values of the elasticities for the period of 1968.111 - 1969.111. In addition, the evidence put forth in Sections 3.2 and 3.3 of this chapter suggests that

\[ E(K_1, i_{EU} - i_D) \approx .013, E(K_2, i_{EU} - i_D) \approx .006, E(K_3, i_{EU} - i_D) \approx .019, \]
\[ E(t, i_{EU} - i_D) \approx -.099, E(r_E, AIF) = -.232, E(b_H, i_{EU}) = .298, \]
\[ E(b_F, i_{EU}) \approx -2.958 \] as mean values for the 1965-69 period.

From the above information I can state that the effect of the Eurodollar market on \( m^2 \) is negative via its influence on the public's allocative ratios and positive via its influence on the banks' ratios, with the result that the two effects tend to offset each other. In the specific period under examination, (a) + (b) amounted to \(-6.1\) percent and (c) + (d) to 10.9 percent, with a net contribution of \( 4.8 \) percent to the growth in \( m^2 \). The multiplier increased by 13.9 percent during the interval; hence, the Eurodollar market contributed about one-third the growth of \( m^2 \).

The contribution of the Eurodollar market to money supply processes goes beyond its impact on the money multiplier. In the nonlinear hypothesis, the total effect is given by equation \((13K^1)\) of Table 7 (Chapter 2), which is repeated here for convenience:
\[ E(M^2, i_{EU}) = E(m^2, i_{EU}) E(EA, B^a) - E(m^2, i_{GL}) E(i_{GL}, B^a) E(s, i_{EU}) \]

At this point I want to submit a rough estimate of \( E(M^2, i_{EU}) \), largely based on the empirical work done so far in the thesis. Tentative as these results may be, they will provide useful indications as to the proximate pull the Eurodollar market exercises on the Italian money supply.

From the foregoing analysis of the multiplier it follows that \( E(m^2, i_{EU}) \) is about .036. Since I have no direct estimate for the elasticity of bank credit with respect to the adjusted base, I take the value of \( E(M^2, B^a) \) as its closest substitute. The values of \( E(M^2, B^a) \), \( E(m^2, i_{GL}) \), and \( E(i_{GL}, B^a) \) were presented and discussed in Section 3.4. They are .215, .629, and -1.25, respectively. No direct estimates of \( E(s, i_{EU}) \) were presented in the thesis, however, preliminary work done by research economists of the Bank of Italy suggests \( E(s, i_{EU}) \) is about .02. Given the above, \( E(M^2, i_{EU}) \) is estimated to be approximately .023. In other words, the Eurodollar rate would have to double in order to induce an increase of about 2 percent in the money stock \( M^2 \). This result may be an overestimate of the pull of the Eurodollar market on the Italian money supply if it is considered that the value of \( E(m^2, i_{GL}) \) was obtained by a log linear regression for the period 1958–69. According to the implications of the nonlinear hypothesis (see especially the discussion of \( E(m^2, i_{GL}) \) in Chapter 2), the value of \( E(m^2, i_{GL}) \) is not independent of the level of interest rates. During high interest rate regimes one would expect this elasticity to approach zero.
(or even become negative), thus reducing the algebraic value of the Eurodollar rate elasticity of the domestic money supply.

3.7 SUMMARY OF MAJOR FINDINGS

The objectives of Italian monetary policy have been achieved mainly through the control of the monetary base, with the exception of the 1966-68 period during which the quantity of base money was continuously adjusted to maintain interest rates at virtually fixed levels. The base, net of the banks' borrowings from the central bank and the rest of the world, has a negative (and strong) impact on the long-term rate, the only nonadministered rate of interest in Italy. "Real" variables such as nonhuman wealth and prices have a significant direct impact on the rate of interest. However, changes in the adjusted base, which is characterized by a strong procyclical pattern, have produced the dominant impact on the rate of interest and, thus, have been largely responsible for its countercyclical behavior.

Expected price changes—with expectations formed according to an "adaptive" behavior—add very little to the basic reduced-form equation of the rate of interest.

Suitable test procedures were developed to assess the separate effect of open market operations, government-generated wealth, and income on the rate of interest. Again, the results confirmed the dominant role played by the base in the determination of the rate of interest.

While the long-run behavior of the money stock is predominantly
reflected in the growth of the adjusted monetary base, for periods as short as a year or a quarter, changes in the monetary multiplier play a significant role. In thirteen out of forty-four quarters the growth of the multiplier has overshadowed the growth in the base. The hypothesis under consideration provides an interpretation for this differential pattern of short and long-run behavior through the connection between the multiplier and the interest rate mechanism, with the latter motivating reallocation among financial assets. Since the multiplier responds in a positive direction to changes in interest rates and since the latter behave basically countercyclically, the countercyclical behavior of the multiplier belongs to the set of test implications of the hypothesis.

The standard argument that the short-run behavior of the multiplier is evidence that the central bank cannot pursue an effective monetary policy is controverted by the ability of the Bank of Italy to control a great deal of the variation in the multiplier through the control of \( r^R \), \( b^H \), and \( b^F \).

The forces external to the domestic monetary system transmit their impulses to the seven proximate determinants of the money supply which, in turn, impart impulses to the monetary multiplier. In 1968 and/1969, a period of dramatic increases in Eurodollar rates, the Eurodollar market was responsible for about one-third of the growth of the inclusive monetary multiplier.

The impact of such a market on the domestic money supply is not
substantial. In fact, the value of the elasticity of the money stock with respect to the Eurodollar rate is approximately 2 percent.

Finally, there are good indications that rate ceilings imposed on postal and bank deposits, in addition to contributing to the volatility of the public's allocative parameters, discriminate heavily against the small saver.
PART II

Fiscal and Monetary Policies in an Open Economy:

The Italian Experience from 1958 to 1969
The impact of fiscal and monetary policies on international reserves, income, and prices in classical and Keynesian worlds.

4.1 Introduction

In Part I of the study the stock of international reserves was considered a given in the system. This approach is satisfactory both for the present and in the long run, but not in the short run. In their day to day operations the monetary authorities can do little or nothing to influence the course of the country's economic relations with the rest of the world. The balance of payments acts on the economy as a constraint not dissimilar in nature to the Treasury's budget.

The long-run constraint on monetary policy imposed by fixed exchange rates is sufficiently established and clearly understood. The classical economists, beginning with Hume, stressed the self-equilibrating nature of balance-of-payments adjustments under a gold standard arrangement. Disequilibria in the balance, characterized by initial gold flows, would alter the stock of money at home and abroad which, in turn, through changes in relative prices, would eventually bring about such changes in the volume of exports and imports as to prevent further gold flows and, thus reestablish equi-
In the context of the money supply hypothesis presented in Part I of the study, the long-run constraints on monetary policy implied by a system of fixed exchange rates can be stated in the following manner. A policy which generates, through appropriate changes in the domestic source component of the base, interest rates appreciably below foreign rates, or prices much above foreign prices, will produce a deficit in capital or current account, or both. Such a policy cannot be pursued indefinitely, for the maximum sustainable losses in international reserves—the foreign source component of the base—are limited by the country's stock of them.

Over a shorter period of time, however, the monetary authorities can strive for desired levels of international reserves. It follows that, in addition to the stock of international reserves, the total base, of which the stock of international reserves is a component, becomes a target variable for the policy makers. For the purpose at hand, I shall rewrite the analytic statement of base money of Chapter 2 as

\[ B = \bar{R} + \delta \cdot \text{Ir} \]

---


2 The statement must be qualified to introduce the possibility that the rest of the world is willing to finance the country's deficit by accepting its base money or interest-bearing obligations. The analysis of a given country's base money which also functions as international base money is beyond the scope of this study. The interested reader may consult M. Fratianni and P. Savona, "The International Monetary Base and the Eurodollar Market," in Konstanz Symposium on Monetary Theory and Policy, ed. Karl Brunner (Göttingen:Vandenhoeck Ruprecht Verlay, 1971, vol. 1).
where $\bar{B}$ is the domestic source component of base money which responds immediately to the actions taken by the authorities. The value of the foreign source component of the base, $\delta$,$\text{Ir}$, is determined by changes in the stock of international reserves, $\text{Ir}$, in response to changes in $\bar{B}$, in the policy parameter $\delta$ which summarizes the authorities attitude towards sterilizing the flows of $\text{Ir}$ (note that $\delta = 0$ implies complete sterilization and $\delta = 1$ no sterilization) and in factors which are outside the control of the authorities.

The failure to distinguish between the long and short-run effects of fixed exchange rates is the central theme of a great deal of the discussion on the effectiveness of monetary policy in an open economy.¹ Unlike the long-run constraints, the nature and order of magnitude of the short-run constraints remain unclear and

¹ In an address in Frankfurt, West Germany, Milton Friedman maintained that the system of fixed exchange rates is forcing the Bundesbank to use all its weapons on solving balance-of-payments disequilibria and, given fixed exchange rates, no country can opt at the same time for both free trade and independent monetary policy (N.Y. Journal of Commerce, September 30, 1970). This is true in the long run, but not in the short run.

disputed. The short-run constraints apparently emerge from the interdependence of national credit markets. It has been asserted by central bankers and economists that this interdependence generates capital flows which tend to offset any actions of the monetary authorities designed to exert a contractive or expansive effect on the economy. Any move by the authorities to lower the domestic source component of the base raises interest rates and rapidly induces an inflow of foreign capital (for example, through the operation of the Eurodollar market in the second half of the 1960s). This capital flow raises international reserves and thus tends to restore the monetary base. Policy actions thus seem to have no power over the total volume of base money and can only affect the composition of the sources of the base. Under these conditions, variations in the base are dominated by the balance of payments and, just as in the long run, monetary policy loses all leverage with respect to economic stabilization.

On the other hand, some proponents of budgetary policy assert that fiscal expenditures generate desired movements in international reserves because of the direct link existing between budget deficits and the level of interest rates.

The model I shall advance in this chapter will generate test implications which bear directly on the following issues:

(a) to what extent, if any, the present international monetary arrangement implies an emasculation of short-run domestic monetary policy;
(b) what impact fiscal and monetary instruments have on
    crucial ultimate target variables such as income, prices,
    and international reserves; and
(c) what instrument or set of instruments is likely to be
    most effective and reliable for stabilization purposes.

In broad lines, the model consists of the following components:
1) the demand for aggregate output
2) the money market
3) the bank credit market
4) the balance-of-payments relation
5) an analytic statement of the source components of base
    money
6) an aggregate supply function
7) the Treasury's budget restraint

The introduction of this relatively large number of highly
aggregated markets synthesizes the economy's structure and thus
creates a multiplicity of transmission mechanisms through which
economic policy affects key variables.

At one stage of the analysis (when the system will be solved
in the absence of the Treasury's budget constraint), the policy
makers will be assumed to maneuver the level of government expendi-
tures, G, and the domestic source component of the base, \( \bar{E} \), in addi-
tion to the sterilization parameter, \( \delta \). At a later stage, when the
analysis will be complicated by the introduction of the Treasury's
budget deficit, two additional instruments will be added: tax rates
and interest-bearing government debt, $S_G$. However, the policy makers can maneuver independently only three out of the four instruments, the fourth one becoming a linear combination of the other three.\(^1\) Thus, the following four alternatives are open to policy makers,

<table>
<thead>
<tr>
<th></th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
</tr>
</thead>
<tbody>
<tr>
<td>$G$</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>D</td>
</tr>
<tr>
<td>tax rates</td>
<td>I</td>
<td>I</td>
<td>D</td>
<td>I</td>
</tr>
<tr>
<td>$\beta$</td>
<td>I</td>
<td>D</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>$S_G$</td>
<td>D</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
</tbody>
</table>

where $I$ and $D$ indicate respectively that the instrument is maneuvered independently or determined endogenously in the model. Other possible mixes can be visualized. For example, it may be conceived that the government can exercise independent control of expenditures minus tax revenues, even though neither can be singly considered a policy instrument. Under these circumstances, the

\(^1\)The incorporation of the government's budget constraint in macro-
possible policy mixes are reduced to the following three:

<table>
<thead>
<tr>
<th></th>
<th>Case E</th>
<th>Case F</th>
<th>Case G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government deficit</td>
<td>I</td>
<td>I</td>
<td>D</td>
</tr>
<tr>
<td>($G - \text{tax revenues}$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\bar{\beta}$</td>
<td>I</td>
<td>D</td>
<td>I</td>
</tr>
<tr>
<td>$S_g$</td>
<td>D</td>
<td>I</td>
<td>I</td>
</tr>
</tbody>
</table>

The model will be solved both assuming complete price rigidity—the extreme Keynesian world—and full employment of resources—the classical world. Given the extremity of the two cases, it makes more economic sense to interpret the analysis in terms of steady states. The classical world, thus, should not be literally interpreted to describe a situation in which output is constant, but rather one in which real output per man-hour grows at a constant rate. As a consequence of this reinterpretation, the method of analysis I follow is one of comparing steady states rather than static equilibrium points.

Finally, the proposed model differs from the main body of the literature which has dealt with the incorporation of the foreign

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1Finally, seven other bases result from an interest-rate pegging policy which "downgrades" $\bar{\beta}$ to the role of an endogenous variable, while the rate of interest becomes the policy instrument.
sector into "closed-economy" models in two respects. First, a clear distinction is made between long and short-run analyses. In the latter case, the criterion to assess the effectiveness of monetary policy under a system of fixed exchange rates is given by the value of the foreign exchange elasticity of the domestic source component of the monetary base. Second, an effort is made to incorporate the government budget restraint into the model and to examine the effects of a wide variety of policy mixes on key variables.


4.2 THE FORMAL MODEL

Using Walras's law of the markets, I have chosen to eliminate the bank credit market whose equilibrium will be assured so long as equilibrium conditions are satisfied for all other markets which are described analytically below.

The demand for aggregate output

\[ y = z + \frac{T}{P} + \frac{G}{P} \]

- \( y \) = output
- \( Z \) = domestic absorption in real terms
- \( T \) = exports minus imports in nominal terms
- \( G \) = government expenditures in nominal terms
- \( p \) = domestic price level

\[ z = z(y, i) \]

- \( i \) = the rate of interest

\( z_i < 0 < z_y \)  

Subscripts indicate partial derivatives with respect to the indicated variable.

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...and similar references are cited.
(3) \( T = T(p, y) \)
\( T_p, T_y < 0 \)

The market for money

(4) \( \frac{M^D}{P} = 1(i, y) \) \( 1_i < 0 < 1_y \)

(5) \( M^g = m(i) B \)

(6) \( M^D = M^g \)

The balance of payments relation

(7) \( T + K = \Delta Ir \)

\( K = \) balance on the capital account

\( \Delta = \) first difference sign

\( \text{Ir} = \) international reserves \( (= \text{POS}^{BI}_{RW} + \text{FR of Chapter 2}) \)

(8) \( K = K(i, y) \)

\( K_i, K_y > 0 \)

The analytic statement of base money

(9) \( B = \bar{B} + \delta \cdot \text{Ir} \)

see introduction for a discussion of the meaning of (9)

The aggregate supply function

(10) \( y = y(p) \)

\( y_p \geq 0 \)
Relation (10) holds when the following three equations are satisfied.¹

(10.1) \( y = f(N) \) production function where \( N \) stands for the level of employment

(10.2) \( \frac{W}{p} = f_N(N) \) demand for labor where \( W \) is the nominal wage rate

and either

(10.3a) \( N = g \left( \frac{W}{p} \right) \) "classical" labor supply function

or

(10.3b) \( W = \bar{W} \) Keynesian price (wage rate) rigidity condition

Differentiating totally (10.1) and (10.2), the following two expressions are obtained:

(10.4) \( dy = f_N dN \)

(10.5) \( f_{NN} dN = \frac{1}{p} dW - \frac{W}{p} \frac{dp}{dW} - \frac{W}{p} \frac{dp}{dW} \frac{dp}{f_{NN}} \)

or \( dN = \frac{1}{p} dW - \frac{W}{p} \frac{dp}{dW} = \frac{pdW - Wdp}{f_{NN}} \)

Substituting 10.5 into 10.4 and setting \( dW = 0 \),

(10.6) \( \frac{dy}{dp} = - \frac{f_N W}{p^2 f_{NN}} \geq 0 \)

Under conditions of full employment of resources (classical world),
y is a constant and, consequently, \( \frac{dy}{dN} = 0 \); in the Keynesian world
an increase in prices implies a reduction in real wages and consequently an increase in \( N \) and \( y \). The extreme form of Keynesian economics visualizes \( \frac{dy}{dp} \) approaching infinity.

The Treasury's budget constraint

\[
(11) \quad \frac{G}{p} = t_0 + t_1 y \quad \frac{S_G}{p} + \frac{E}{p}
\]

Government expenditures are financed by taxation \( = t_0 + t_1 y \),
\( t_0 \) = the tax base which is independent of real income, \( t_1 \) = the
marginal tax rate out of real income), sale of government securities to the public and the banking system \( (S_G) \), and creation of
domestic base money \( (E) \).

Assuming that \( p = 1 \) and that first differences in the variables
in period \( t - 1 \) are equal to zero, \(^1\) by the use of equations \( (1) \)
through \( (11) \), I obtain the following system of equations for the
differences in variables (denoted by \( \Delta \)'s) as between the initial
equilibrium and the new one:

\[
(12) \quad (1 - Z_y - T_y) \Delta y - Z_1 \Delta i + (G + T - T_p) \Delta p = \Delta G
\]

\(^1\) First differences of lagged variables occur in the balance-of-pay-
ments relation \( (\Delta I_{r-1}) \) and in the government's budget restraint
\( (\Delta S_{G-1} \ \text{and} \ \Delta E_{-1}) \). It is assumed that the system is enjoying a sta-
tionary state from period \( t - 2 \) to period \( t - 1 \) which assures that
\( \Delta I_r = \Delta S_{G-1} = \Delta E_{-1} = 0 \).
(13) \[ y \Delta y + (1 - Bm_1) \Delta i + mB \Delta p - m\delta \Delta Ir = m\Delta B \]

(14) \[ (y + K_y) \Delta y + K_i \Delta i + T_p \Delta p - \Delta Ir = 0 \]

(15) \[ ay - yp \Delta p = 0 \]

subject to

(16) \[ \Delta G = t_1 \Delta y + (\Delta t_0 + y \Delta t_1) + \Delta S_G + \Delta B + G\Delta^1 \]

The endogenous variables of the model are \( \Delta y, \Delta i, \Delta p, \) and \( \Delta Ir, \)
given the initial values of \( G, T, m \) (the money multiplier), and \( B. \)
Economic policy manifests itself through \( \delta, \Delta B, \Delta G, \Delta t_0 + y \Delta t_1, \)
and \( \Delta S_G. \) One of the last four policy parameters becomes endogenous
when (16) is added to the system (12) through (15). To simplify
the analysis I have assumed \( \delta \) to be constant.

---

1The first difference form of the Treasury's budget restraint is
actually equal to

\[ \Delta G - \frac{G}{p^2} \Delta p = t_1 \Delta y + (\Delta t_0 + y \Delta t_1) \]

\[ + \frac{\Delta S_G}{p} - \frac{\Delta S_G-1}{p} + \frac{p\Delta(\Delta S_G)}{p^2} - \frac{\Delta S_G \Delta p}{p^2} \]

\[ + \frac{\Delta B}{p} - \frac{\Delta B-1}{p} + \frac{p\Delta(\Delta B)}{p^2} - \frac{\Delta B \Delta p}{p^2} \]

Since (a) \( p = 1, \) (b) first differences of variables at time \( t-1 \) are
zero, and (c) variables such as \( p\Delta(\Delta S_G) \) and \( \Delta S_G \Delta p \) can be ignored
because they are relatively small quantitatively, the complete first
difference form of the Treasury's budget deficit reduces to (16).
4.3 THE "CLASSICAL" SOLUTION TO THE MODEL

4.3.1 Solution Ignoring the Budget Constraint

Since resources are fully employed in the classical world, \( \Delta y = 0 \) and, consequently, the system (12) through (15) can be reduced conveniently in the following form:

\[
\begin{bmatrix}
 a_{12} & a_{13} & 0 \\
 a_{22} & a_{23} & a_{24} \\
 a_{32} & a_{33} & -1 \\
\end{bmatrix}
\begin{bmatrix}
 \Delta i \\
 \Delta p \\
 \Delta Ir \\
\end{bmatrix}
= 
\begin{bmatrix}
 \Delta G \\
 m\Delta B \\
 0 \\
\end{bmatrix}
\]

where \( a_{12} = -Z_1 > 0 \)

\[ a_{13} = G + T - T_p > 0 \text{ provided } G - T_p > |T| \]

since \( T \) may be negative. Such a condition prevailed in Italy from 1958 to 1969.

\[ a_{22} = 1 - \delta m_i < 0 \]

\[ a_{23} = mB > 0 \]

\[ a_{24} = -m_0 < 0, \text{ where } 0 < \delta \leq 1 \]

\[ a_{32} = K_i > 0 \]

\[ a_{33} = T_p < 0 \]

The impact of a change in monetary policy (\( \Delta B \)) and/or fiscal policy (\( \Delta G \)) on interest rates, the price level, and the stock of international reserves is summarized in the reduced-form equations of Table 14. An expansionist monetary policy—e.g., a purchase of
### Table 14

Impact Multipliers Under Classical Assumptions and Ignoring the Government Budget Constraint  
(for different values of \( \delta \))

<table>
<thead>
<tr>
<th>Exog.+</th>
<th>( \Delta \bar{B} )</th>
<th>( \Delta G )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \delta = 0 )</td>
<td>( \Delta i )</td>
<td>( \Delta p )</td>
</tr>
<tr>
<td>( \frac{m_{a_{13}}}{D^{1}_{\delta=0}} &lt; 0 )</td>
<td>( \frac{-m_{a_{12}}}{D^{1}_{\delta=0}} &gt; 0 )</td>
<td>( \frac{m(a_{13}a_{32} - a_{12}a_{33})}{D^{1}_{\delta=0}} &lt; 0 )</td>
</tr>
<tr>
<td>( \frac{m_{a_{13}}}{D^{1}_{\delta=0}} &lt; 0 )</td>
<td>( \frac{-m_{a_{12}}}{D^{1}_{\delta=0}} &gt; 0 )</td>
<td>( \frac{m(a_{13}a_{32} - a_{12}a_{33})}{D^{1}_{\delta=0}} &lt; 0 )</td>
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<tr>
<td>( \frac{m_{a_{13}}}{D^{1}_{\delta=0}} &lt; 0 )</td>
<td>( \frac{-m_{a_{12}}}{D^{1}_{\delta=0}} &gt; 0 )</td>
<td>( \frac{m(a_{13}a_{32} - a_{12}a_{33})}{D^{1}_{\delta=0}} &lt; 0 )</td>
</tr>
<tr>
<td>( \frac{-a_{23}}{D^{1}_{\delta=0}} &gt; 0 )</td>
<td>( \frac{a_{22}}{D^{1}_{\delta=0}} &gt; 0 )</td>
<td>( \frac{a_{22}a_{33} - a_{32}a_{23}}{D^{1}_{\delta=0}} &gt; 0 )</td>
</tr>
<tr>
<td>Exog.</td>
<td>End.†</td>
<td>(1&lt;\delta&lt;0)</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>-----------------</td>
</tr>
<tr>
<td>(\Delta_i)</td>
<td>[-\frac{a_{23} + a_{33} a_{24}}{D^1} &gt; 0]</td>
<td>[-\frac{a_{23} - m \ a_{33}}{D^1_{\delta=1}} &gt; 0]</td>
</tr>
<tr>
<td>(\Delta_p)</td>
<td>[\frac{a_{22} + a_{32} a_{24}}{D^1} &gt; 0]</td>
<td>[\frac{a_{22} - m \ a_{32}}{D^1_{\delta=1}} &gt; 0]</td>
</tr>
<tr>
<td>(\Delta_{IR})</td>
<td>[\frac{a_{22} a_{33} - a_{32} a_{23}}{D^1} &gt; 0]</td>
<td>[\frac{a_{22} a_{33} - a_{32} a_{23}}{D^1_{\delta=1}} &gt; 0]</td>
</tr>
</tbody>
</table>

\[D^1_{\delta=0} = a_{13} a_{22} - a_{12} a_{23} < 0;\]
\[D^1_{1<\delta<0} = a_{13} (a_{22} + a_{32} a_{24}) - a_{12} (a_{23} + a_{24} a_{33}) < 0;\]
\[D^1_{\delta=1} = a_{13} (a_{22} - m \ a_{32}) - a_{12} (a_{23} - m \ a_{33}) < 0;\]
\[|D^1_{\delta=1}| > |D^1_{1<\delta<0}| > |D^1_{\delta=0}|.\]

\(a_{12} = Z_i - Z > 0; a_{13} = G + T - T_p > 0\) provided \(G - T_p > |T_i|\); \(a_{22} = l_i - Bm_i < 0; a_{23} = mB > 0;\)
\(a_{24} = - m\delta < 0; a_{32} = K_i > 0; a_{33} = T_p < 0.\)
government securities on the open market—reduces the level of interest rates and the stock of international reserves, while it causes a rise in the price level. A shift in fiscal policy produces positive impulses on both \( p \) and \( i \), while its impact on \( Ir \) is ambiguous. An outflow of international reserves becomes more likely, the higher the interest sensitivity of the money market (LM for short) and the price sensitivity of the market for foreign exchange (FM for short) relative to the interest sensitivity of the FM and the initial stock of the money. The ambiguity of the sign of the multiplier \( \frac{\Delta Ir}{\Delta G} \), in other words, stems from the fact that both \( i \) and \( p \) affect the balance of payments in opposite directions, while they both respond positively to variations in \( G \). To analyze what order constraint will assure an unambiguous response, I rewrite the numerator of the multiplier under discussion in (arc) elasticity form, keeping in mind that its denominator is negative:

\[
[E(1, i) \frac{1}{T} - B \cdot E(m, i) \frac{1}{T}] E(T, p) \frac{T}{p} - mB \cdot E(K, i) \frac{K}{1}
\]

\[
= \frac{mB}{I} \{[E(1, i) - E(m, i)] E(T, p) T - E(K, i) K\}
\]

For \( E(K, i) = 0 \) the multiplier is negative, while for \( E(K, i) \rightarrow \infty \) the multiplier is positive. Apart from these two extreme cases, a discussion about the value of \( E(K, i) \) which will assure the positiveness (or negativeness) of the multiplier of \( Ir \) with respect to \( G \) requires an assessment of the approximate values of \( E(1, i) \), \( E(m, i) \), and \( E(T, p) \). The study of the demand for money in Italy
by Franco Cotula\textsuperscript{1} indicates that $E(1, t)$ is about $-0.25$. Adding to this information the empirical results obtained in Chapter 3, I can cause the interest elasticity of the money market to approximate unity. Some indication of the order of magnitude of $E(T, p)$ is supplied in Professor Rey's work on the Italian trade balance, where he shows that an increase of one percent in the prices of Italian manufactured goods will decrease Italian exports from 1.15 to 2.04 percent, at the same time raising imports by .6 percent.\textsuperscript{2} In order for $T$ to approximately equal $K$, a positive value of $\Delta r/\Delta G$ requires that the interest elasticity of the capital account be above two.

The numerical value of the fiscal and monetary multipliers depends crucially on the degree of sterilization policy exercised by the monetary authorities. The larger the value of $\delta$---i.e., the less pronounced the interference of the authorities in impending the "natural" course of the workings of the gold exchange standard---the smaller the numerical value of the base multipliers (compare column 1 with columns 2 and 3 in Table 4). Similarly, the numerical value of the fiscal multiplier, $\Delta r/\Delta G$, increases as $\delta$ approaches zero. The economic interpretation of this last finding stems from

\textsuperscript{1}La Domanda di Moneta, fasc. 7 (Rome: Banca d'Italia, 1970).

\textsuperscript{2}Guido M. Rey, Relazioni tra il Commercio Esercio dell' Italia e la Domanda Interna ed Internazionale, Roma, Ente Per Gli Studi Monetari, Bancari e Finanziari Luigi Finaudi, Quaderni di Ricerca no. 1, 1967, Tables 2 and 3.
the basic proposition that fiscal policy involves a certain mixture of fiscal and monetary policies, so long as the monetary authorities react passively to changes in the foreign source component of base money induced by fiscal actions. The effectiveness of fiscal policy, however, increases provided the monetary authorities counteract completely the effect of a change in Ir by an appropriate opposite movement in \( \delta \) and/or \( \bar{B} \). The appropriate neutralizing policy action is defined as that which satisfies the following equality \( \Delta(\delta Ir) = -\Delta\bar{B} \), which in turn implies that \( \Delta\bar{B} = 0 \). Analytically, the situation can be examined by solving system (17) when \( a_{24} \) and \( m\Delta\bar{B} \) equal zero. The resulting multipliers are

\[
\frac{\Delta Ir}{\Delta G} \bigg|_{\Delta\bar{B} = 0} = \frac{a_{22}a_{32}a_{23} - a_{32}a_{23}}{a_{13}a_{22} - a_{12}a_{23}} = \frac{\Delta Ir}{\Delta G} \bigg|_{\Delta\bar{B} = 0}, \quad \frac{\Delta\bar{B}}{\delta} = 0
\]

\[
\frac{\Delta P}{\Delta G} \bigg|_{\Delta\bar{B} = 0} = \frac{\Delta P}{\Delta G} \bigg|_{\Delta\bar{B} = 0}, \quad \frac{\Delta\bar{B}}{\delta} = 0
\]

\[
\frac{\Delta I}{\Delta G} \bigg|_{\Delta\bar{B} = 0} = \frac{\Delta I}{\Delta G} \bigg|_{\Delta\bar{B} = 0}, \quad \frac{\Delta\bar{B}}{\delta} = 0
\]

The total monetary base can also be kept unchanged by letting \( \Delta\bar{B} \) and \( \delta \) equal zero. These results are shown in column 4 of Table 14.

The power of fiscal policy, to repeat, is not independent of the actions taken by the monetary authorities. In particular, the impact multiplier of Ir with respect to G increases in the case of
a neutral monetary policy—defined as $\Delta B = 0$—relative to a situation in which the central bank reacts passively to variations in base money induced by fiscal actions.¹

The relative power of monetary vs. fiscal policy in affecting the interest rate, the price level, and the stock of international reserves can be assessed by analyzing whether the ratio

$$\frac{\Delta x_i}{\Delta B} \frac{\Delta G}{\Delta B} = 0$$

$$\frac{\Delta x_i}{\Delta G} \frac{\Delta B}{\Delta B} = 0$$

is numerically larger than, equal to, or smaller than one. It is more important (for an empirically useful hypothesis) to identify those forces which tend to raise the comparative advantage of one instrument relative to that of the other instrument. I do so for each individual case. First, equation (18) concerning the rate of interest $i$ can be simplified to

$$\frac{G + T - T_p}{T_p \delta - B} = \frac{\Delta i}{\Delta B} \frac{\Delta G}{\Delta B} = 0$$

$$\frac{\Delta i}{\Delta G} \frac{\Delta B}{\Delta B} = 0$$

The comparative advantage of monetary policy in its effects on the rate of interest rises

(i) the lower the value of the sterilization parameter $\delta$;

(ii) the higher the initial value of government expenditures and the balance in the trade account;

(iii) the lower the initial value of the total base;

(iv) the higher the price sensitivity of the FM.¹

Second, (18) for the price level is given by

\[
\frac{mZ_1}{1 - \beta m_1 - m_0 K_1} = \frac{\Delta P}{\Delta B} \bigg| \Delta G = 0 = \frac{\Delta P}{\Delta G} \bigg| \Delta B = 0
\]

The comparative advantage of monetary policy in influencing the price level is enhanced

(i) the more pronounced the interest sensitivity of the commodity market;

(ii) the lower the interest sensitivity of the LM and FM²;

¹To be precise, the derivative of (18a) with respect to \( T_p \) is

\[
B - (G + T) + T_p (1 - \delta) \frac{1}{(T_p \delta - B)^2}
\]

which is positive if \( B \) is numerically larger than the remaining terms of the numerator.

² These results are consistent with the theoretical findings of E. Sohmen, "Fiscal and Monetary Policies" where the comparative strength of fiscal and monetary policies are measured in terms of their effects on real national income. However, as will be seen later, the comparative strength formulas for the price level and real income are identical. With respect to Sohmen's, my model is richer in information value. In fact, Sohmen's corresponding formula to (18b) is

\[
\frac{Z_1}{1 - K_1}
\]

which reflects the absence of information regarding the interest elasticity of the money supply and the authorities' attitude towards sterilizing flows of international reserves.
(iii) for smaller values of the multiplier \( m \) and the sterilization parameter \( \delta \).

Finally, (18) with reference to international reserves:

\[
(18c) \quad \frac{m \left[ (G+T-T_p)^{\cdot} T_p + Z_i^{\cdot} T_p \right]}{(1 - Bm_i)^{\cdot} T_p - mB_i} = \frac{\Delta Ir}{\Delta B} \bigg| \Delta G = 0 \\
= \frac{\Delta Ir}{\Delta G} \bigg| \Delta B = 0
\]

The comparative advantage of monetary policy is stronger:

(i) the higher the interest sensitivity of the commodity market;

(ii) the lower the interest sensitivity of the money market;

(iii) for higher initial values of \( G, T, \) and \( m \) and smaller initial value of \( B \).

(iv) the larger the response of the capital account to changes in interest rates. This result holds irrespective of the sign of the multiplier \( \Delta Ir/\Delta G \).\(^1\)

To summarize, the basic findings of the analysis of the comparative strength of policy parameters are that the effectiveness of the monetary instrument depends directly on the interest sensitivity of the commodity market and inversely on the interest sensitivity of the money market. Neither result should appear astonishing. In fact, the first one represents the link through which the "Keynesian"

\(^1\)The finding is consistent with the Mundellian "principle of effective market classification." See R.A. Mundell, "The Monetary Dynamics."
transmission mechanism from money to the real section takes place.
The second is a restatement of the general proposition that the
interest sensitivity of the money market detracts from the impact
monetary instruments have on the stock of money and hence on the
variables of the real sectors.\(^1\)

4.3.2 The Effectiveness of Monetary Policy in a Regime of
Fixed Exchange

As noted above, the monetary authorities control only part
of the monetary base, namely \(\bar{B}\). Changes in \(\bar{B}\) express policy deci-
sions which affect \(I_{r}\) and, ultimately, \(B\). Both \(I_{r}\) and \(B\) are target
variables to the authorities.\(^2\)

The growth of the monetary base can be expressed as

\[
\Delta \bar{B} = \Delta \bar{B} + \delta \Delta I_{r} + I_{r} \Delta \delta
\]

Since policy makers are likely to set given values of \(\delta\) for rela-
tively long periods of time, I shall consider \(\Delta \delta = 0\). Substituting
for \(\Delta I_{r}\) its reduced form (see Table 14) and ignoring the fiscal
multiplier, (19) becomes

1This proposition was discussed at great length in Chapter 2.
Briefly, \(E(M, \bar{B}) = 1 + E(m, i) \cdot E(i, \bar{B})\) and this elasticity is
closer to unity the smaller \(E(m, i)\), provided of course that the
initial conditions of the model are such as to warrant attachment
of a positive value to the interest elasticity of the multiplier.

2The proposed model could also be solved for flexible exchange rates.
It would suffice to let \(\Delta I_{r}\) equal zero and to introduce the exchange
rate as an explicit argument in the function of the trade account surplus.
(19a) \[ \Delta B = \Delta \bar{B} \left( 1 + \delta \left[ \frac{m(a_{13}a_{32} - a_{12}a_{33})}{p^1} \right] \right) \]

Alternatively, it may be convenient to put (19a) in the form of (arc) elasticity; this can be done by first dividing both sides of the equation by \( \Delta \bar{B} \) and then multiplying again both sides by \( \frac{\bar{B}}{B} \). The result is

(19b) \[ E(B, \bar{B}) = \frac{1}{\bar{B}} \left[ \bar{E} + \delta \cdot Ir \cdot E(Ir, \bar{B}) \right] \]

Since equation (19b) is directly derived from (19a), and since (19a) is a reduced-form equation of the model, (19b) should be considered one of the implications of the theoretical framework. In the following discussion I refer primarily to (19b) rather than (19a) for purely expository reasons. However, passing references to (19a) is made to highlight the one-to-one correspondence existing between the two expressions.

Quite generally, the effectiveness of monetary policy in an open economy depends crucially on the value of the multiplier \( \frac{\Delta Ir}{\Delta M} \) (or alternatively, of the corresponding elasticity). Emasculation of monetary policy occurs only when this multiplier times the sterilization parameter is equal to -1. Under such circumstances, the growth of total base money cannot exceed the growth of international reserves. Purchases of securities by the monetary authorities will, in fact, create an inflationary process whereby international reserves will diminish by an amount equal to the dollar value of the securities purchased. In other words, monetary policy is at the
complete mercy of the rules governing a regime of fixed exchange rates.

To better appreciate what empirical relationship among $\bar{B}$, Ir, and $\delta$ must hold to satisfy the requirement of a powerless monetary policy in a regime of fixed exchange rates I simply let (19b) equal zero and solve the resulting equation for the elasticity of Ir with respect to $\bar{B}$. The result is

$$E(Ir, \bar{B}) = -\frac{\bar{B}}{\delta Ir}$$

which expresses the condition for a neutral monetary policy. The larger the proportion of the policy-controlled base to the total base, the larger the numerical value of $E(Ir, \bar{B})$ must be before policy will produce no effect. One would expect a neutral policy to require that $E(Ir, \bar{B})$ be numerically much larger in the U.S. than in Italy where the stock of international reserves has been from 20 percent (1958 I) to 33 percent (1962 I) of total base money. In a country like Switzerland, on the other hand, where the largest component of the base by far is Ir, a neutral monetary policy requires that the elasticity of international reserves with respect to the policy-controlled base be slightly less than zero. Furthermore, for given stocks of Ir and $\bar{B}$, the more pronounced the sterilization policy pursued by the authorities, the larger the value of $E(Ir, \bar{B})$ must be before policy is emasculated. However, as noted above, a stricter sterilization policy carries with it more pro-
nounced responses of Ir to changes in $\bar{B}$ in future periods.¹

In terms of equation (19a), emasculation of monetary policy implies that the expression enclosed in squared brackets is equal to $-\frac{1}{6}$. For the reader's convenience the multiplier of Ir with respect to $\bar{B}$ is rewritten as:

$$\frac{m(a_{13}a_{32}-a_{12}a_{33})}{D^1} = \frac{m[(G+T-T_p)K_i + Z_i T_p]}{(G+T-T_p)(1 - B_{m1} - m\delta K_1) + Z_i (mB - m\delta T_p)}$$

$$= \frac{m}{-m\delta + \frac{(G+T-T_p)(1 - B_{m1}) + mBZ_i}{(G+T-T_p)K_i + Z_i T_p}}$$

The last expression is particularly suitable for a discussion of the order constraints which guarantee the emasculation of monetary policy. As the interest sensitivity of the capital account approaches infinity, the ratio appearing in the denominator of the last expression approaches zero. It will also approach zero as the interest sensitivity of the money market and the interest sensitivity of the aggregate demand function approach zero. Either condition holding, the multiplier of international reserves with respect to the domestic source component of the base will be equal to $-\frac{1}{6}$. In a more general sense, this is the solution for the long-run equilibrium of the model: changes in the domestic source component of the base transmit impulses to the rate of interest, output, and the price

¹Compare the three multipliers shown in row 2 of Table 14,
level which in turn affect the balance of payments in such a way as to make their combined effects on it neutral. The reader is referred to section 4.5 for a more complete discussion of the long-run properties of the model.

Policy is effective for any value of $E(\text{Ir}, \bar{B})$ different from \( \frac{-\bar{B}}{\delta \text{Ir}} \). If larger (algebraically) than this ratio, monetary policy works in the "normal" direction with the usual assignment of brakes and gas pedal, but it becomes less effective the closer the elasticity is to \( \frac{-\bar{B}}{\delta \text{Ir}} \).

Unlike a closed economy in which the growth of the base is restrained only by the willful action of the authorities, in an open economy the growth in the total base depends on the value of the ratio of $\bar{B}$ to B. In fact, letting c denote any value of the elasticity of the total base with respect to $\bar{B}$, (19b) can be solved as

\[
E(\text{Ir}, \bar{B}) = \frac{cB - \bar{B}}{\delta \text{Ir}}
\]

from which it is readily seen that the condition $c < \frac{\bar{B}}{B}$ must hold. For example, if $c = 1$, $E(\text{Ir}, \bar{B}) = \frac{1}{\delta}$ which, being positive, violates the sign constraint of the reduced-form equation (see row 2 in Table 14). The maximum achievable growth in the total base, for a given growth rate of $\bar{B}$, is expected to be higher in the U.S. than in Italy, and higher in Italy than in Switzerland.

Finally, monetary contractions may be brought about by expanding $\bar{B}$, whenever the value of $E(\text{Ir}, \bar{B})$ is smaller (algebraically) than
\(- \frac{\bar{B}}{\delta lr}\). It is paramount to stress that a hypersensitive response of international reserves (via international flows of goods, services and capital) to changes in the domestic source component of the base does not emasculate monetary policy. It only reverses the working of brakes and gas pedal to the extent that policy is effective in the direction opposite to the one intended by the authorities.

To summarize, the major test implications of the model concerning the effectiveness of monetary policy in an open economy are that:

(a) the foreign source component of the base responds in an inverse direction to policy-induced changes in the domestic source component;

(b) policy progressively loses its effectiveness as the value of the elasticity of international reserves with respect to the domestic source component of the base approaches the value of \(- \frac{\bar{B}}{\delta lr}\) and

(c) the maximum growth rate of the total base is limited upwardly by the ratio \(\bar{B}\) to \(B\) times the growth rate of \(\bar{B}\).

4.3.3 Solution with the Budget Constraint

The Treasury's budget constraint (16) under classical assumptions becomes

\[
\Delta G = (\Delta t_0 + y\Delta t_1) + \Delta s_G + \Delta \bar{E} + G\Delta p
\]
The solution of the equation system (12) through (15) plus (16a), to repeat, necessitates that one of the four policy instruments—\( \Delta B_0 \), \( \Delta t_0 + y_t \), \( \Delta S_C \), or \( \Delta B \)—be endogenized. Since the sterilization parameter again is assumed to be constant for relatively long periods of time, it has been excluded from the class of policy instruments which are manipulated on a short-term basis.

To simplify the formal presentation I have restricted the analysis to two policy mixes. The first one visualizes changes in government expenditures, taxes, and government securities as the three independently manipulated instruments. Consequently, changes in the domestic source component of the base, \( \bar{B} \), are endogenously determined in the system. An extreme form of this policy mix is a program of interest-rate stabilization which can result from the Treasury's desire to minimize its outright cost of servicing new debt. This case was discussed formally in Chapter 2. In a few words, the main idea is to use expansive open market operations to counteract completely the upward movements in interest rates generated by the government's sales of securities to the public and banks. The Italian monetary authorities have followed a rate-pegging policy from the second quarter of 1966 to the first quarter of 1969, with the avowed aim to promote a "general climate of confidence" among investors. In economic terms the "general climate of confidence" goal is an attempt to offer the public price stability in exchange for lower yields. The reader is referred to Chapter 3 for a discussion of the empirical import of the effect of
the pegging policy on the domestic rate of interest.

The second policy mix considers, on the other hand, new issues of government securities as a linear combination of changes in $\bar{B}$, $G$, and the autonomous tax parameters.

The reduced-form equations in terms of the two policy mixes are presented in Table 15. The first observation to make is that the second policy mix yields monetary and fiscal multipliers identical to those obtained by ignoring the Treasury's budget restraint. This is so because a change in the autonomous component of the tax function affects only the amount of government bonds issued via the operation of the Treasury's budget restraint. In turn, changes in government bonds have no effect whatsoever on the rate of interest, the price level, and the stock of international reserves. It is this last feature, rather than the absence of the tax variable in the $Z$ function, which makes it possible for the model to generate identical reduced-form equations for $i$, $p$, and $Ir$ with or without the budget equation when policy mix 2 is in effect.² One way to make the

²The introduction of the tax variable in the $Z$ function, of course, enlarges the model to the extent that it generates multipliers of $i$, $p$, and $Ir$ with respect to $\Delta t_0 + y \Delta t_1$. More formally, I modify the theoretical framework only by making $Z$ depend on real disposable income rather than real income, that is $Z = Z(y^D, i)$, where $y^D = y - t_0 - t_1y$. The tax multipliers of the modified model, solved with and without the budget restraint, become

$$\frac{\Delta x}{\Delta t_0 + y \Delta t_1} = -\frac{\Delta x}{\Delta G} Z_{y^D y}, \quad x = i, p, Ir$$

where $Z_{y^D y}$ denotes the marginal propensity to spend with respect to a real disposable income.
Table 15

Impact Multipliers Under Classical Assumptions with the Incorporation of the Budget Constraint

\[ \Delta i = \frac{m a_{13}}{d^2} \left[ a_{23} + a_{24} a_{33} + mG \right] \Delta G - \frac{m a_{13}}{d^2} \left[ \Delta t_0 + y \Delta t_1 \right] - \frac{m a_{13}}{d^2} \Delta S_G \]

Policy Mix i. \( \Delta G \),
\[ \Delta t_0 + y \Delta t_1, \Delta S_G: \]
\[ \Delta p = \frac{a_{22} + a_{32} a_{24} - m a_{12}}{d^2} \Delta G + \frac{m a_{12}}{d^2} \left[ \Delta t_0 + y \Delta t_1 \right] + \frac{m a_{12}}{d^2} \Delta S_G \]
independently chosen.

\( \Delta B \): linear combination of other

\[ \Delta I_r = \frac{a_{22} a_{33} - a_{23} a_{24} - m a_{32}}{d^2} \Delta G + \frac{m a_{23} a_{33} - a_{13} a_{24}}{d^2} \Delta S_G \]
three independently chosen policy instruments.

\[ \Delta B = \frac{a_{13} (a_{22} + a_{24} a_{33}) - a_{12} (a_{23} + a_{24} a_{33}) - C (a_{23} + a_{24} a_{33})}{d^2} \Delta G \]
\[ + \frac{-a_{13} a_{22} + a_{24} a_{33}}{d^2} \Delta t_0 + y \Delta t_1 \]
\[ + \frac{a_{12} a_{23} + a_{24} a_{33} - a_{13} a_{24}}{d^2} \Delta S_G \]

\[ \frac{\Delta i}{\Delta G} > 0, \frac{\Delta i}{\Delta S_G} > 0, \frac{\Delta i}{\Delta t_0 + y \Delta t_1} > 0, \frac{\Delta p}{\Delta G} > 0, \frac{\Delta p}{\Delta t_0 + y \Delta t_1} < 0, \frac{\Delta p}{\Delta S_G} < 0, \frac{\Delta I_r}{\Delta G} < 0, \frac{\Delta I_r}{\Delta t_0 + y \Delta t_1} > 0 \]
\[ \frac{\Delta I_r}{\Delta S_G} > 0 \]
\[ d^2 = d^1 - m a_{12} G \]
Policy Mix 2.

\[ \Delta i = \frac{\mathbf{ma}_{13}}{\mathbf{b}^1} \Delta \mathbf{b} - \frac{a_{23} + a_{24} a_{33}}{\mathbf{b}^1} \Delta G \]

\[ \Delta t_0 + y \Delta t_1, \]
\[ \Delta \mathbf{b}: \text{ independently chosen.} \]

\[ \Delta p = -\frac{\mathbf{ma}_{12}}{\mathbf{b}^1} \Delta \mathbf{b} + \frac{a_{22} + a_{32} a_{24}}{\mathbf{b}^1} \Delta G \]

\[ \Delta \mathbf{r} = \frac{m (a_{13} a_{32} - a_{12} a_{33})}{\mathbf{b}^1} \Delta \mathbf{b} + \frac{a_{22} a_{33} - a_{24} a_{23}}{\mathbf{b}^1} \Delta G \]

\[ \Delta g = \frac{a_{12} (a_{23} + a_{24} a_{33} + m G) - a_{13} (a_{22} + a_{24} a_{32})}{\mathbf{b}^1} \Delta \mathbf{b} \]

\[ \Delta g = \frac{a_{12} (a_{23} + a_{24} a_{33}) - a_{13} (a_{22} + a_{24} a_{32})}{\mathbf{b}^1} \Delta \mathbf{b} + \frac{a_{13} (a_{22} + a_{24} a_{32}) - a_{12} (a_{23} + a_{24} a_{33})}{\mathbf{b}^1} \Delta G \]

Multipliers are identical to those of Table 14.

\[ a_{12} = -Z_1 > 0; \ a_{13} = G + T - T_p > 0 \text{ provided } G - T_p > |T|; \ a_{22} = 1 - B_{\mathbf{m}_1} < 0; \ a_{23} = m B > 0; \]

\[ a_{24} = -m \delta < 0; \ a_{32} = K_1 > 0; \ a_{33} = T_p < 0. \]
system respond to changes in the outstanding stock of government bonds would be to make the aggregate demand function \( Z \) and the demand for money \( m \) depend on wealth, of which the stock of government bonds is a component.\(^1\)

All of this goes beyond the objectives of the dissertation. Future work will require that the model be expanded in a number of ways, along the suggestions made in the preceding paragraph. The model in its present form, however, generates interesting propositions. For example, returning to a discussion of the implications of the second policy mix 1, it is worth mentioning how the introduction of the Treasury's budget restraint gives additional insight into a third avenue through which budget deficits can be financed, namely inflation. To better appreciate the implications of the statement, I give the independently chosen instruments arbitrary values; for example let \( \Delta G = 6 \), \((\Delta t_0 + y\Delta t_1) = 2\), \( \Delta B = 2 \). The resulting net increase in the public debt is

\[
\Delta S_G = 2 \left[ 1 + G \left( \frac{a_{12} - 3 (a_{22} + a_{32})}{a_{12}} \right) \right]
\]

Being the second component inside the bracketed parenthesis less than zero, the budget constraint is satisfied by the sale of less

---

than two additional units of government securities. The result should not be surprising, since the government also finances its deficit through inflation. In the example the exact contribution of price increases to the budget financing is equal to

\[
(22) \quad G \frac{6(a_{21} + a_{22} a_{24}) - 2m a_{25}}{D^1}
\]

which is the amount by which \( \Delta S_G \) diverges from 2.

Returning to policy mix 1 (\( \Delta \bar{B} \) endogenous), the public debt and tax multipliers are identical, highlighting the fact that, insofar as the effects on the final targets are concerned, financing a deficit via taxation or by inducing the public and the banking system to hold more interest-bearing government liabilities amounts to the same thing. (The result is attributable to the form of the \( Z \) function, whose special characteristics have already been discussed.) A particularly interesting result of policy mix 1 is that additional information concerning the magnitude of the economy's structural parameters is invariably required to assess the direction of impact of the government expenditures multipliers. Thus, the positiveness of \( \frac{\Delta I}{\Delta G} \) depends on \( [T-T_p(1-q)-B] \) being less than zero, a condition which probably obtained in Italy during the period under considera-

\(^1\)Inflation during World War II and in the immediate postwar period was the reason for the almost complete disappearance of the public debt by 1947. Cf. Paolo Baffi, Studi Sulla Moneta (Milan: Giuffrè, 1965).
tion: \( \frac{\Delta P}{\Delta G} \) is positive provided \([l_1 - Bm_{1} - K_{1} m_{1}] > -mZ_{1} \) (a condition which probably was satisfied during the period studied). Furthermore, the effectiveness of fiscal actions is reduced by endogenizing the domestic source component of the monetary base. The government expenditures multipliers under policy mix 1 are numerically smaller than the corresponding multipliers under policy mix 2.\(^{1}\)

The inflationary contribution to the financing of the Treasury's budget is smaller under the policy mix which implies an endogenous domestic source component of the monetary base. To prove the statement, I use the previous numerical example of \( \Delta G = 6 \), \( \Delta t_{0} + y_{1} \Delta t_{1} = 2 \), and \( S_{G} = 2 \). The solution for the endogenous base is

\[
\frac{\Delta l_{1}}{\Delta G} | \text{Policy is numerically smaller than } \frac{\Delta l_{1}}{\Delta G} | \text{Policy Mix 1} \\
\because (1) \ |D^{2}| > |D^{1}| \ 	ext{and (2) the additional two terms which appear in the numerator } \frac{\Delta l_{1}}{\Delta G} | \text{Policy with respect to the numerator of } \frac{\Delta l_{1}}{\Delta G} | \text{Policy Mix 1} \\
\hspace{1cm} --m(T-T_{p})-- \text{tend to make the first multiplier even smaller (both algebraically and numerically). Similarly,} \\
\frac{\Delta P}{\Delta G} | \text{Policy Mix 1} < \frac{\Delta P}{\Delta G} | \text{Policy Mix 2} \\
\because \text{the numerical increase in the numerator } (-m_{1}a_{12}) \text{ is accompanied by a larger increase in the denominator } (-Gm_{1}a_{12}).
\]

Much more ambiguous is the comparison of \( \frac{\Delta l_{1} \Delta r}{\Delta G} \) under the two types of policy mix. With respect to policy mix 2, the multiplier under policy mix 1 gains in the numerator \( m[K_{1}(T-T_{p})+Z_{1}T_{p}] \) which can be positive or negative depending on the initial level of the trade balance, while its denominator tends to be lower numerically.
\[ \Delta \bar{B} = 2 \left[ \frac{D^1 - J G (a_{22} + a_{24} a_{32})}{D^1 - G m a_{12}} \right] \]

from which the resulting contribution of price increases to budget financing is

\[ (23) \quad G \left[ \frac{6(a_{22} + a_{32} a_{24}) - 2 ma_{12}}{D^1 - G ma_{12}} \right] \]

Dividing (23) into (22) I obtain

\[ (24) \quad 1 - \frac{G ma_{12}}{D^1} > 1 \]

which proves that more taxation via inflation occurs when the base is manipulated independently than when it is adjusted to the other policy instruments.

Concluding, a case can be made for an independently chosen level of the domestic source component of the base for two major reasons. One, less information is required to assess the direction of impact on the ultimate target variables due to changes in policy instruments. Second, the size of the impact is larger than in the case of an endogenously determined \( \bar{B} \). On the other hand, taxation via inflation is lower in the latter case. To the extent that government expenditures minus taxes (including price inflation) create wealth, an independent monetary policy may, under "classical conditions," generate less wealth than in a situation where central bankers issue enough base money to "clear" the markets.
4.4 THE KEYNESIAN SOLUTION TO THE MODEL

I replace $\Delta p$ with $\frac{\Delta y}{y_p}$ in (12) through (14) and in (16); the resulting system under conditions of price rigidity is given by:

\[(12k) \quad [(1 - Z_y - T_y) + (G + T - T_p) \frac{1}{y_p}] \Delta y - Z_1 \Delta 1 = \Delta G \]

\[(13k) \quad \left[1 + \frac{mB}{y_p} \right] \Delta y + (1 - \beta m_1) \Delta i - m \delta \Delta Ir = m \Delta \bar{E} \]

\[(14k) \quad \left[\left(T_y + K_y\right) + \frac{T_p}{y_p}\right] \Delta y + K \Delta i - \Delta Ir = 0 \]

subject to

\[(16k) \quad \Delta G = (\Delta t_0 + y \Delta t_1) + \Delta S_G + \Delta \bar{B} + \left(t_1 + \frac{G}{y_p}\right) \Delta y \]

4.4.1 Solution Ignoring the Treasury's Budget Constraint

In matrix form the system (12k) - (14k) can be represented by:

\[(17k) \quad \begin{bmatrix}
    a_{12} & a_{11} + a_{13} \\
    a_{22} & a_{21} + a_{23} \\
    a_{32} & a_{31} + a_{33}
\end{bmatrix}
\begin{bmatrix}
    \Delta i \\
    \Delta y \\
    \Delta Ir
\end{bmatrix}
= 
\begin{bmatrix}
    0 \\
    m \Delta \bar{B} \\
    0
\end{bmatrix} \]

All the elements of the coefficient matrix have been defined in (17) except for
\[ a_{11} = 1 - Z_y - T_y > 0 \]
\[ a_{21} = 1_y > 0 \]
\[ a_{31} = T_y + K_y < 0 \quad \text{for } |T_y| > K_y \]

A table similar to Table 14 can be constructed by simply substituting \( a_{13} \) with \( (a_{11} + \frac{a_{13}}{y_p}) \) for \( i = 1, 2, 3 \) and \( D^1 \) with

\[ D^3 = \sum_{y_p} (a_{11} + \frac{a_{13}}{y_p}) [a_{22} + a_{24}a_{32}] - a_{12} \left[ a_{21} + a_{23} + a_{24}(a_{31} + a_{33}) \right] < 0 \]

Since \( D^3 \) like \( D^1 \) is negative because the term \( a_{11} + \frac{a_{13}}{y_p} \) maintains the same sign as \( a_{13} \) \((i = 1, 2, 3)\), qualitatively the results obtained under classical assumptions apply also to the Keynesian world. It would be redundant to derive multipliers corresponding to those reported in Table 14.

Instead, it is particularly interesting to compare

\[ \Delta_y = -\frac{m \ a_{12}}{D^3} \Delta \bar{e} + \frac{a_{22} + a_{24} a_{32}}{D^3} \Delta G \]

with \( \Delta p \) (see Table 14). The impact of changes in the base and in government expenditures on key aggregate magnitudes is larger in the Keynesian than in the classical world as \( y_p \) approaches infinity. However, the comparative advantage of monetary versus fiscal policy in affecting real income (Keynesian world) is identical to the
corresponding effect on the price level (classical world). In fact,

\[
\begin{bmatrix}
\frac{\Delta y}{\Delta B|\Delta G = 0} \\
\frac{\Delta y}{\Delta G|\Delta B = 0}
\end{bmatrix}_{\text{Keynesian System}} = \begin{bmatrix}
\frac{\Delta p}{\Delta B|\Delta G = 0} \\
\frac{\Delta p}{\Delta G|\Delta B = 0}
\end{bmatrix}_{\text{Classical System}} = \frac{Z_1^m}{1 - Bm_1 - m\delta K_1}
\]

The symmetry of findings, insofar as the comparison of the relative effectiveness on \( y \) and \( p \) of alternative policy instruments is concerned, between the classical and Keynesian worlds give theoretical support to empirical analyses in which changes in nominal income are regressed against changes in the monetary base and government expenditures. In a world which is neither completely classical nor Keynesian, the relative efficacy of policy variables can be assessed through their impact on nominal income. To put it differently, the proposed model gives structural content and empirical import to the much popularized (Federal Reserve Bank) St. Louis reduced-form equation.\(^1\)

4.4.2 Solution with the Budget Constraint

Multiplier solutions under policy mixes 1 and 2 can be easily obtained by using the reduced-form equations of Table 15, if the following substitutions are made:

(i) \[ a_{i3} \text{ with } a_{i1} + \frac{a_{i3}}{y_p} \quad (i = 1, 2, 3) \]

(ii) \[ G \text{ with } \frac{t_1}{y_p} \]

(iii) \[ \Delta p \text{ with } \Delta y \]

Qualitatively, all the results discussed in connection with the presentation of Table 15 also hold for the Keynesian solution to the model. Of course, the assumption of \( y_p \rightarrow \infty \) eliminates any contribution of inflation to the financing of the government deficits. The residual component which causes government expenditures to equal revenues are tax receipts induced by an expansion of real income (which, in turn, is brought about by changes in the independently maneuvered policy instruments).

4.5 LONG-RUN EQUILIBRIUM AND DYNAMIC PROPERTIES OF THE MODEL

I have discussed in the Introduction the long-run constraint a system of fixed exchange rates imposes on monetary policy. To recapitulate briefly, the international reserves function as a temporary buffer to easy balance-of-payments adjustments in the short run. The long-run constraints of the system are such that the growth of the monetary base is dominated by the growth of Ir. Thus, any change in the domestic source component of the base is offset by an equivalent and opposite change of the foreign source component of the base. But in a stationary world economy, it is impossible to preserve a rate of change in Ir different from zero.
The long-run multipliers of the model—denoted by superscript $E$—under classical conditions and ignoring the budget restraint of the government can be obtained by solving the following system

$$
\begin{bmatrix}
    a_{12} & a_{13} & 0 \\
    a_{22} & a_{23} & a_{24} \\
    a_{32} & a_{33} & 0
\end{bmatrix}
\begin{bmatrix}
    \Delta T^E \\
    \Delta p^E \\
    \Delta i^E
\end{bmatrix}
= 
\begin{bmatrix}
    \Delta G \\
    m\Delta B \\
    0
\end{bmatrix}
$$

from which

$$D^5 = a_{13}a_{24}a_{32} - a_{12}a_{24}a_{32} < 0$$

$$\frac{\Delta p^E}{\Delta B} \bigg|_{\Delta G = 0} = 0$$

$$\frac{\Delta p^E}{\Delta G} \bigg|_{\Delta B = 0} = \frac{a_{32}a_{24}}{D^5} > 0$$

$$\frac{\Delta i^E}{\Delta B} \bigg|_{\Delta G = 0} = 0$$

$$\frac{\Delta i^E}{\Delta G} \bigg|_{\Delta B = 0} = -\frac{a_{33}a_{24}}{D^5} > 0$$

The emasculated of monetary policy stems directly from the effect of the domestic source component of the base on the flows of international reserves

$$\frac{\Delta i^E}{\Delta B} \bigg|_{\Delta G = 0} = -\frac{1}{5}$$

which implies that $\Delta B = 0$. Similar results hold under Keynesian conditions. A rise in the domestic source component of the base
causes a decline in the rate of interest and a rise in income and the price level which in turn induce a net outflow of capital and a deterioration in the trade balance. The consequent outflow of Ir transmits impulses to i, y, and p in a direction opposite to the effects of the increase in $\bar{B}$. In the long run, the outflow of Ir matches the increase in $\bar{B}$, forcing i, y, and p to go back to the previous equilibrium position.\footnote{This problem is discussed also in E. Sohmen and H. Schneeweiss, "Fiscal and Monetary Policies."}

Below, I examine the dynamic properties of the model assuming, again, classical conditions and ignoring the government's budget constraint. The relevant equations are

\begin{align}
(27a) \quad \bar{y} - Z(\bar{y}, i) - \frac{T}{p} (p, \bar{y}) &= \frac{G}{p} \\
(27b) \quad p \lambda(i, \bar{y}) - m(i) \delta Ir &= m(i) \bar{B} \\
(27c) \quad T(p, \bar{y}) + K(i) &= \Delta Ir
\end{align}

(27 a, b, c) is a difference equation system in i, p, and Ir of the first order involving the difference in Ir. The exogenous variable is $\bar{y}$ and the policy instruments are $\delta$, $\bar{B}$, and $G$. Following the procedure outlined in Sohmen and Schneeweiss,\footnote{Ibid.} to complete system (27 a, b, c) I must take first differences of equations (27a) and
(27b), assuming of course that no change of economic policy occurs.

(27d) \(-Z_1 \Delta i + (G + T - T_p) \Delta p = 0\)

(27e) \((1_i - Bm_i) \Delta i + mB\Delta p - m\delta \Delta Ir = 0\)

The next step is to transform the model in such a manner as to have the endogenous variables \(i\), \(p\), and \(Ir\) appear both in the form of first differences and as deviations from their equilibrium values (denoted by superscript \(E\)):

\[
a_{12} (i - i^E) + a_{13} (p - p^E) = 0
\]

(28) \[
a_{22} (i - i^E) + a_{23} (p - p^E) + a_{24} (Ir - Ir^E) = 0
\]

\[
a_{32} (i - i^E) + a_{33} (p - p^E) = 0
\]

\[
a_{12} \Delta i + a_{13} \Delta p = 0
\]

\[
a_{22} \Delta i + a_{23} \Delta p + a_{24} \Delta Ir = 0
\]

where \(a_{12} = -Z_1 > 0\)

\(a_{13} = G + T - T_p > 0\)

\(a_{22} = 1_i - Bm_i < 0\)

\(a_{23} = mB > 0\)

\(a_{24} = -m\delta \leq 0\)
\[ a_{32} = K_1 > 0 \]
\[ a_{33} = T_p < 0 \]

Since system (28) has five equations and six unknowns, one column vector involving deviations of the unknown from its equilibrium value becomes the constant vector of (28). Solving the latter for \( \Delta i, \Delta p, \) and \( \Delta Ir \) I obtain difference equations of the general form

\[ \Delta \mu = b (\mu - \mu^E) \]
\[ \mu = i, p, Ir \]

whose solution is

\[ \mu(t) = \mu^E + (\mu_0 - \mu^E) \left(\frac{1}{1 - b}\right)^t \]
\[ \mu_0 = \mu \text{ at time zero} \]
\[ t = \text{time} \]

The system is stable and approaches \( \mu^E \) asymptotically for \( b < 0 \) (as \( t \to \infty \)). It turns out that

\[ b = \frac{m\delta[Z_i \cdot T_p + K_1 (G + T - T_p)]}{(G + T - T_p)(1 - B_{m_i}) + mBZ_i} < 0 \]

and is equal for all three equations. Hence, the model is dynamically stable and \( i, p, \) and \( Ir \) approach equilibrium with the same speed.

4.6 SUMMARY OF MAJOR THEORETICAL FINDINGS

In this chapter monetary policy has been defined so as to deal only with the effect of changes in the domestic source component of the monetary base on ultimate target variables. An expansionist monetary policy reduces the level of interest rates and the country's stock of international reserves, while it causes a rise in prices and real income. A shift in fiscal policy, on the other hand,
produces positive impulses on real income, prices, and the rate of interest, while its impact on international reserves depends on the relative magnitudes of the interest elasticity of the capital account vis-à-vis the domestic price elasticity of the trade account times the interest elasticity of the money market. If the former is numerically larger than the latter, an expansive fiscal policy will generate an inflow of international reserves.

The effectiveness of both fiscal and monetary policies is related to the sterilization policy pursued by the monetary authorities. The more pronounced the authorities' effort to isolate the economy from the effects of its interaction with the rest of the world, the larger the numerical values of the policy-controlled base and government expenditures multipliers. In particular, the impact multiplier of international reserves with respect to government expenditures is numerically larger when the monetary authorities keep the total base constant than when they react passively to variations in the base induced by fiscal actions.

In terms of comparative strength, monetary policy becomes more effective relative to fiscal policy the stronger the interest sensitivity of the commodity market and the weaker the interest sensitivity of the money market, suggesting that the relative efficacy of monetary policy is neither independent of the Keynesian (Fiscalist) interest rate transmission mechanism nor of the Monetarist linkage between an exogenous money variable and the real sector.

Quite generally, the short-term effectiveness of monetary policy
in a regime of fixed exchange rates depends essentially on the value of the elasticity of Ir with respect to $\bar{B}$. Emasculation of policy requires that this elasticity be

$$ - \frac{\bar{B}}{\delta Ir} $$

The larger the proportion of the policy-controlled base to the total base, the larger must be the numerical value of $E(Ir, \bar{B})$ before policy becomes neutral. If the elasticity is larger (algebraically) than $-\frac{\bar{B}}{\delta Ir}$, monetary policy works in the normal direction with the usual assignment of brakes and gas pedal; if smaller (algebraically), policy is still effective but in a perverse manner: monetary contractions are brought about by expanding $\bar{B}$, and vice versa.

The case for an independent monetary policy rests on the finding that a policy mix which prescribes an independently chosen level of $\bar{B}$ (a) requires less information to assess the direction of impact of government expenditures multipliers and (b) that these multipliers are numerically larger than the corresponding ones implicit in a policy mix in which the level of $\bar{B}$ is endogenously determined.

For purposes of comparing the relative strength of monetary and fiscal policies in affecting real income and prices, the classical and Keynesian worlds yield identical results. Such a symmetry of findings justifies empirical analyses in which changes in nominal income are regressed against changes in the monetary base and government expenditures.

The long-run emasculation of monetary policy stems from the
basic proposition that it is impossible to preserve \textit{ad infinitum} net flows of international reserves different from zero.

Finally, the model was shown to be dynamically stable with the endogenous variables approaching equilibrium asymptotically with equal speed.
Chapter 5

EMPIRICAL ANALYSIS

5.1 INTRODUCTION

This chapter is divided into two major parts. The first part deals with the relation between the stock of international reserves and the domestic source component of the base. The results obtained for Italy from 1958 to 1969, which indicate that the conditions for a powerless monetary policy were never met, are then compared with earlier empirical studies which have investigated whether central banks have followed the "rules of the game" prescribed by a gold exchange standard system. As supplemental evidence in support of the short-run effectiveness of monetary policy in an open economy, a detailed analysis is made of the sterilization policy pursued by the Bank of Italy, and of swap operations between the Italian Exchange Office and commercial banks.

The second part of the chapter is concerned primarily with the estimation of the reduced-form equations of the model developed in Chapter 4. However, since the regression results cannot be considered simultaneously a test of the model and an indication of the policy mix adopted by the authorities, it is necessary to search for information which is independent of the estimates of the model's reduced-form equations to ascertain the "right" policy combination.
which was used in Italy. This is done by studying the way the
Italian budget system operates. The chapter ends with a comparison
of the stabilization quality of fiscal and monetary actions. The
impact of policy impulses on nominal GNP and on international re-
serves is assessed both for the quarter during which the impulse
occurred and over a period of approximately one year. The re-
gression analysis is supplemented by a review of events during which
monetary and fiscal policy moved in opposite directions.
5.2 MONETARY POLICY IN AN OPEN ECONOMY: THE ITALIAN EXPERIENCE
SINCE THE RETURN TO CURRENCY CONVERTIBILITY.

The time period covered by this study (1958-69) is particu-
larly suitable for an empirical analysis of the short-run efficacy of
monetary policy. To begin with, the twelve years under considera-
tion are characterized by an absence of exchange controls, govern-
ment subsidies to Italian exporters, requirement of import licences,
and restrictions on capital movements.¹ Second, Italy experienced
two complete business cycles during the test period. One downswing
was particularly pronounced and prolonged (October 1963-January 1965),
while the sample period terminated in the middle of a business slump
whose features appeared quite similar to those of the preceding down-
turn. Last but not least, the course of the balance-of-payments

¹In the immediate post-war period Italy signed a series of bilateral
trade agreements with twenty-nine countries and used multiple ex-
change rates. The discriminatory feature of the latter manifested
itself chiefly in allowing exporters to trade foreign exchange for
U.S. dollars, English pounds, and Swiss francs at market rates, thus
encouraging exports to "hard-currency" countries. Importers, who were
disequilibria closely followed the path of the business cycle. Following five years of surpluses (1958 to 1962), the balance sharply reversed to a large deficit in 1963. Inflation and increased uncertainty as to the future level of domestic market yields caused both a drastic deterioration in the trade account and a net outflow of private capital. The credit squeeze of October 1963 through June 1964 effectively and rapidly cured the balance-of-payments problems. Again, Italy enjoyed sizable surpluses for an additional five years. By the first quarter of 1969, however, the expansion phase of the business cycle had worked itself out. The economy was approaching complete utilization of resources; union leaders, preparing to renew the majority of labor contracts, managed an impressive campaign which promised to (and actually did) deliver—'one of the "hottest" autumns in the history of labor-management relations. These two events made paying the official rate of exchange, were buying goods from countries which had signed a trade agreement with Italy. In this manner, also importers were receiving a government subsidy.

In August, 1955, exporters were permitted to exchange all their proceeds on the free market. The subsequent year marks the beginning of what some experts call "transferability": that is, controlled convertibility with the lira not yet convertible into other currencies but with foreign trade operators able to engage in most trade transactions without a government license. It was not until December, 1968, that Italy, together with other European countries, signed the European Monetary Agreement which marked the beginning of de facto currency convertibility.

For more details, see K. Holbik, Italy in International Coopera-
the two recessions similar. In Chapter 3 I discussed how in both periods a discriminatory fiscal treatment lowered net market yields to Italian investors; in both periods the net outflow of capital was dominated by flights of currency ($1.58 billion from 1963.I to 1964.I and $2 billion in 1969). However, the drastic rise in the differential between Eurodollar and domestic rates in 1969 distinguishes 1969 from the 1963-64 recession.

5.2.1 The Relation Between the Stock of International Reserves and the Domestic Source Component of the Monetary Base

The analysis of the effectiveness of monetary policy in an open economy is crucially dependent on the value of the multiplier \( \frac{\Delta Ir}{\Delta B} \). The basic information bearing on the relationship existing between the foreign and domestic source components of the monetary base is presented in Table 16. As noted above, the stock of Ir enters in its entirety into the base relation; provided the monetary authorities pursue no sterilization policy (i.e., \( \delta = 1 \)). Inflows and outflows of Ir in a given period are reflected lira for lira in increases and decreases of \( B \), respectively. For a comparison of growth rates of Ir and \( \bar{B} \), the reader is referred to columns 2 and 7 of the table. Accelerations in the rate of growth of the domestic component of the base are associated with decelerations or negative growth rates of Ir. The periods 1963.IV - 1964.III and 1968.IV - 1969.IV, during which negative rates of Ir occurred, are particularly informative. In both instances, strong accelerations of the domestic source component of the base preceded and accompanied the decrease in the level of Ir.
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Annual percentage changes are computed on first differences of corresponding quarters of adjacent years.

Ir = stock of international reserves defined as $POS_{RW}^{BI} + FR$ (see Table 3 in Chapter 2)

$\delta =$ sterilization parameter defined as $\frac{POS_{RW}^{BI} + FR}{POS_{RW}^{BI} + FR}$

$\delta \cdot Ir =$ foreign source component of the monetary base

$\bar{B} =$ domestic source component of the monetary base

$B =$ total monetary base = $\delta \cdot Ir + \bar{B}$
Additional evidence bearing on the relationship existing between \( \Delta \text{Ir} \) and \( \text{\bar{B}} \) is provided by the results of the following regression analysis. Flows of \( \text{Ir} \) were first regressed against changes in the current value of \( \text{\bar{B}} \); subsequently, the effects on \( \Delta \text{Ir} \) of changes in both the current and past values of \( \text{\bar{B}} \) were examined by using an Almon lag structure from period \( t \) to period \( t-6 \) constrained to zero at \( t-6 \) and interpolated by a second-degree polynomial.

\[
(1) \quad \Delta \text{Ir} = 699.85 - .625\Delta \text{\bar{B}} \quad R^2 = .412 \\
(8.04) \quad (5.61) \quad (t-values)
\]

and \( (2) \Delta \text{Ir} = 640.61 - .529 \Delta \text{\bar{B}}_t \)
\[
(5.99) \quad (4.59)
\]

\[
- .252 \Delta \text{\bar{B}}_{t-1} \\
(5.32)
\]

\[
- .051 \Delta \text{\bar{B}}_{t-2} \\
(1.59)
\]

\[
.074 \Delta \text{\bar{B}}_{t-3} \\
(1.46)
\]

\[
.125 \Delta \text{\bar{B}}_{t-4} \\
(2.25)
\]

\[
.100 \Delta \text{\bar{B}}_{t-5} \\
(2.58)
\]

(t-values in parenthesis)

Sum of coefficients = -.532 \quad R^2 = .410
Both equations (1) and (2) provide evidence in support of the short-run effectiveness of monetary policy in an open economy. In fact, emasculation of policy occurs when $\Delta B = 0$ which is implied by the condition $\Delta Ir = - (1) \Delta B$. If the value of the coefficient of $\Delta B$ is numerically less than one, monetary policy is effective in the usual sense. For values of the $\Delta B$ coefficient larger than one (numerically), monetary policy is still effective, but in a perverse manner.

The weighting structure of (2) suggests that the negative impact of $\Delta B$ on $\Delta Ir$ exhausts itself in six months; after such a period, the stock of international reserves tends to return to its initial level. Naturally, the long-run value of $\frac{\Delta Ir}{\Delta B}$ will have to be minus one.

The large (and statistically very significant) value of the constant term in both (1) and (2) provides indirect evidence of the importance of (i) the excluded policy variables and (ii) nonpolicy variables in the determination of $\Delta Ir$. More accurately, the value of the constant term can be interpreted as a measure of the average effect of both (i) and (ii) in $\Delta Ir$.

In the theoretical framework of Chapter 4 the relationship between changes in $Ir$ and changes in $\bar{H}$ was postulated strictly as a causal phenomenon running from the latter to the former. However, a broader view of how the flows of international reserves are formed recognizes also the importance of exogenous factors (e.g., productivity changes at home, movements in world prices, changes in tastes of the foreign touring public, weather conditions, etc.)
and past policy actions. Such an enlarged view of the determination of ΔIr is consistent with the theoretical framework of Chapter 4. In a general sense, it is useful to visualize the central authorities attempting to counteract the effects on the flows of international reserves of factors which are outside their controls and the inherited economic policy by taking suitable current policy actions (where a suitable policy action is defined in terms of its success in reestablishing a desired growth rate in Ir). In the remaining part of this section I attempt to demonstrate that the Italian monetary authorities have looked upon Ir as a target variable and that when the growth rate of Ir has diverged from the desired growth rate, the Italian authorities have taken corrective policy actions.

More precisely, the evidence indicates quite strongly that the Italian monetary authorities have not adhered to the so-called "rules of the game" which prescribe that domestic and foreign source components of the monetary base move in the same direction, thus assuring that the effects on the domestic money supply of balance-of-payments disequilibria are reinforced by a similar action of the authorities. According to the principles of the gold standard (or of fixed exchange rates for that matter), the one-to-one correspondence between balance disequilibria and policy actions enhances the adjustment process towards reestablishing equilibrium in the balance of payments.

Gold standard rules were disregarded even during the heyday of the system. In an analysis of 26 countries covering the 1922-38 period, R. Nurkse found that in about 60 percent of the cases changes
in the domestic assets of central banks were compensated for by opposite movements in foreign assets. Following Nurkse's lead, A.I. Bloomfield did a similar study covering 11 central banks between 1880 and 1913. Bloomfield's results are strikingly similar to Nurkse's: in about 60 percent of the cases changes in domestic and foreign assets held by central banks moved in opposite directions. In a more recent research, P. Baffi and A. Occhiuto refined the statistical analysis of Nurkse and Bloomfield, obtaining a correlation coefficient of −.49 for a sample which included 29 central banks during the 1950-59 period.

5.2.2 Sterilization Policy and Swap Operations: Monetary Policy "Italian Style"

Besides influencing the stock of international reserves through changes in the domestic source component of the monetary base, the Italian monetary authorities have limited the effect of Ir on the total base by exercising their extensive discretionary power over commercial bank activity in two main directions. First, frequent instructions have been issued to the effect that the banks' net foreign position should be zero or should not exceed certain

---


levels. In Chapter 2 of the dissertation I have shown that the control of the banks’ foreign position implies a sterilization policy. More precisely, a part of bank-held foreign reserves becomes ineligible for lire conversion whenever the zero balance rule is in force. This is tantamount to sterilizing some international reserves, or to saying that $\delta$ is less than one. The parameter $\delta$ is unity, on the other hand, when the rule is relaxed (the actual value of $\delta$ has been computed in column 3 of Table 16). By comparing columns 2 and 5 it can be seen that the different rates of growth of $Ir$ and the foreign component of the base are due to changes in the sterilization parameter.

Furthermore, the monetary authorities have engaged in foreign exchange/lire swap operations with commercial banks with the definite intention of directly modifying the composition of the banks’ balance sheet. On several occasions, U.I.C. (the Italian Exchange Office) has made foreign exchange available to the banking system at subsidized terms. Within the context of the theoretical framework advanced in Chapter 4, a sale of foreign exchange against lire by the authorities to a bank (with an opposite operation planned for the future at agreed-upon exchange rates) lowers the domestic source component of the base ($\bar{B}$), while its foreign source component ($\delta \cdot Ir$) is left unaltered. The forward operation will produce opposite results: an increase in $\bar{B}$ and no change in $\delta \cdot Ir$. Thus, swap operations are but another tool in the hands of the authorities to maneuver $\bar{B}$. 
The ultimate effects on bank-held base money of a swap operation depend on the final use banks make of the foreign exchange so acquired. If it is used to lower foreign liabilities (such as re-paying loans), bank-held base money will decrease. If, instead, the foreign exchange is deposited with foreign banks—and thus reduces the amount of the banks' net foreign liabilities—no change in bank-held base money will occur; merely a redistribution from the domestic to the foreign component of the monetary base.

The combined use of sterilization policy and swap operations within the total strategy pursued by the Italian monetary authorities can be best appreciated by a historical survey of all monetary actions taken from 1958 to 1969 to counteract the effects of balance-of-payments disequilibria on the base, money supply, and ultimately on general economic activity. Again, it should be recalled that the policy parameters are maneuvered with the specific objective of promoting a desirable (from the authorities' viewpoint) rate of growth in the total base. The chain of causality, in terms of the model of Chapter 4, still runs from the domestic to the foreign component of the base; the existence of an inherited economic policy, however, makes it difficult at times to determine whether the authorities are reacting to an undesired movement in Ir or are simply reversing a policy action taken in the past.

Periods are differentiated according to whether the balance of payments showed surpluses or deficits. A summary of statistics pertaining to the Italian balance of payments is presented in Table 17.
## Table 17

**Italy**

The Balance of Payments, 1958 to 1969

**U.S. $, millions**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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<td>Balance on Current Account</td>
<td>Balance on Capital Account</td>
<td>Net Errors + Omissions</td>
<td>Changes in Official Reserves</td>
<td>Changes in Banks’ Net Foreign Position</td>
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<td>577.4</td>
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</tr>
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<td>-430.3</td>
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<td>1,023.4</td>
<td>252.1</td>
<td>323.6</td>
<td>519.1</td>
<td>-195.5</td>
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<td>-38.8</td>
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<td>627.3</td>
<td>-60.8</td>
<td>688.1</td>
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<td>-117.7</td>
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<td>-532.3</td>
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<tr>
<td>year</td>
<td>2,368.5</td>
<td>-3,432.0</td>
<td>-327.7</td>
<td>-1,391.2</td>
<td>-704.6</td>
<td>-686.6</td>
</tr>
</tbody>
</table>

*Source: Banca d'Italia, Relazioni*
a) Balance-of-payments surpluses and business economic expansion, 1958 - October 1962

Until August, 1960, the monetary authorities left the Italian banking system completely free in its relation with the rest of the world. Consequently, the sterilization parameter $\delta$ assumed a value of unity.

The accumulation of large surpluses in the balance of payments motivated the monetary authorities in August, 1960, to issue regulations to the effect that the banks' net foreign liabilities would have to be reduced to zero by the end of 1960. As a result, only the portion of foreign exchange which, when added to all other bank foreign assets, exceeded foreign liabilities was made eligible for lire conversion (i.e., counted as base money). The impact of the regulation sterilized, on the average, eight percent of Ir (cf. column 3 of Table 16).

To induce banks to reduce their foreign indebtedness, U.I.C. sold foreign exchange to banks against lire at particularly favorable terms. Considering the final use of the foreign exchange, these transactions reduced bank-held base money. The reduction was so pronounced that U.I.C. halted the swap operations in the first quarter of 1961 and eventually injected additional base money into the banking system by depositing some of its foreign exchange with large banks.¹

¹P. Baffi, Studi sulla Moneta, pp. 349-351.
b) Balance-of-payments deficits during the final leg of the expansion phase of the cycle, November 1962 – September 1963.

The year 1962 ended with an ebullient economy. Compared to the 2–3 percent annual growth rate of the January, 1961 – November, 1962, period, the consumer price index now registered increases in excess of 7 percent per year. From a $50.4 million surplus in 1962 Italy's balance of payments reversed to a whopping $1,251 million deficit in 1963 (cf. Table 17). More indicatively, the drastic reversal in the balance of payments was largely attributable to the deterioration in the current account which customarily showed large surpluses. In an earlier study I have shown that the deterioration of the trade account was responsible for the 1963 deficit in the current account. I found that a rapidly expanding aggregate demand, a substantial worsening of the ratio of domestic to foreign prices, and wage increases in excess of productivity improvements were the factors underlying the movements in the trade account.¹

To prevent the drain on official reserves which would have been caused by the deficit, the zero balance rule on banks' net foreign liabilities was lifted (i.e., δ = 1). Note that this policy variable was maneuvered so as to directly offset the foreign source component of the base. The policy action was so successful that from November, 1962, to September, 1963, holdings of official re-

serves increased from 2815 to 2862 billion lire. Similarly, no significant change occurred in the foreign source component of the base from 1962.IV to 1963.III (see column 4 of Table 16). On the other hand, banks' net foreign liabilities increased by 747 billion lire which virtually covered the entire balance-of-payments deficit.¹

Again, the evidence of this period bears crucially on the implications of the model in Chapter 4. The Italian monetary authorities were not willing to subject the economy to a deflationary process which would have followed had the foreign source component of the base fallen by an amount equal to the balance-of-payments deficit. Nor was there an attempt to follow "the rules of the game" which imply that the growth rate of the total monetary base moves in the same direction of the balance-of-payments disequilibria. Instead, an examination of column 9 of Table 16 reveals that B rose more rapidly during this period than in the preceding one.

Of course, the policy of the central bank was merely buying time. Eventually, treatment had to be administered to the inflation-caused ailments. In the following section, I analyze the "cure."

c) The great credit crunch: October, 1963 - June, 1964

By autumn of 1963, the policy aimed at protecting international reserves began to show its costs in terms of the basic

¹Column 6 of Table 17 provides information for the entire year. However, as will be seen later, the drain on official reserves for 1963 took place almost totally in the fourth quarter.
targets of price stability and external equilibrium. In August, 1963, banks were directed not to increase their net foreign liabilities beyond the end-August level and, in fact, were encouraged to reduce them. Since none of the commercial banks showed a net credit foreign balance, all bank-held foreign reserves were sterilized—or alternatively, base money was destroyed in an amount equal to the lire counterpart of bank-held foreign reserves. From column 3 of Table 16 it can be seen that sterilization involved about 14 percent of Ir (or alternatively, 392 billion lire of base were destroyed). In January, 1966, new regulations were issued to the effect that net foreign liabilities could not exceed the end-November or end-December 1963 level, whichever was lower. Depending on whether the difference between the existing and the maximum allowable level were negative or positive, bank-held foreign reserves would be counted or not counted as part of the monetary base. Of course, the amount of bank-held foreign reserves eligible for lire conversion would be limited by the extent of the difference between existing and maximum balances. Thus, for example, if a bank's maximum negative balance were 100 lire (because that was the balance at the end of November or December, whichever was lower) and the existing balance were 80 lire, then a maximum of 20 lire in foreign reserves would be eligible as base money. Having a knowledge of the regulation, a bank could sterilize some base money by keeping more than 20 lire in foreign reserves.

As less reliance was placed on bank capital to finance the
balance-of-payments deficit, the drain on official reserves, which had been contained up to the end of the third quarter of 1963, began. From the September level of 2862 billion lire, official reserves dropped to 2164 billion lire by June, 1964; banks' net foreign indebtedness, on the other hand, was reduced by 271 billion lire during the same period. When the decline in Ir (column 1 of Table 16) is combined with the effects of the aforementioned sterilization policy (column 3), the outcome is a reduction of about one-third in the foreign source component of the monetary base (column 4). All of this happened in six months.

The contractive actions taken by the authorities, even though delayed, proved to be very effective (too effective, for that matter). As the total base moved from 15 to 18 percent annual growth rates for the November, 1962 - September, 1963, period to the 2 to 5 percent rates for the period under consideration (column 9 of Table 16), the economy experienced the harsh pains of deflation. The accompanying Table 18 reveals the impact on leading target variables of the drastic deceleration in the growth rate of the total monetary base.\textsuperscript{1} Interest rates rose sharply in concomitance with the deceleration in the growth rate of the base. The index of industrial production shows four consecutive quarters of negative growth rates. Inflation was slowed down considerably, even though yearly growth

\textsuperscript{1}Due consideration should be given to the quality of fiscal policy during this period. However, as will be seen later, fiscal policy became contractive when the monetary authorities had already switched from a restrictive to an expansive policy.
Table 18

Italy: 1962.I - 1965.II
Changes in Leading Target Variables
during the Great Credit Crunch

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<thead>
<tr>
<th></th>
<th>1</th>
<th>2% Annual</th>
<th>3% Annual</th>
<th>4% Annual</th>
<th>5% Annual</th>
<th>6% Annual</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Index of</td>
<td>Change of 1</td>
<td>Consumer Price Index</td>
<td>of 3</td>
<td>Long-term Rate of 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial Production</td>
<td>1953-100</td>
<td></td>
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<td>5.74</td>
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<td>7.4</td>
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<td>6.94</td>
<td>-15.2</td>
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</table>

Source: Bance d'Italia, Relazioni.

Note: Percentage annual changes have been computed on first differences of corresponding quarters of adjacent years. The rate $i_B$ is the yield on bonds issued by Special Credit Institutions.
rates of 2 percent and below in the consumer price index were registered only in 1966. The strength of monetary policy is also indicated by the balance-of-payments statistics: the $1.25 billion deficit of 1963 was followed by a $0.77 billion surplus in 1964.

Briefly, the actions taken by the Italian monetary authorities to halt inflation and re-establish external equilibrium, even though delayed throughout most of 1963, deeply affected economic activity. However, the issues of whether these actions were timely and/or too powerful in terms of the problems which they were intended to rectify are irrelevant to the purpose at hand. The foregoing discussion, to repeat, bears on the hypothesis of Chapter 4 in the sense that the monetary authorities did not adhere to the "rules of the game" and, moreover, the evidence presented does not support the notion that monetary policy is powerless in an economy which heavily interacts with the rest of the world. On the contrary, monetary policy was demonstrated to be decisive in affecting the basic ultimate targets.

d) From a tight to a mildly expansive monetary policy: July, 1964 - October, 1965

Even though there was a shift towards an expansive policy after June, 1964, the monetary authorities continued to take actions to neutralize the effects of the balance-of-payments surpluses. In July, 1964, the central bank told banks that their net foreign indebtedness was not to exceed the June 15 or June 30 levels, whichever was lower. The intent of the measure was quite clear. Net
lending activity of the Italian banking system in the Eurodollar market was encouraged to prevent the balance-of-payments surpluses from reflecting equivalent increases in the foreign source component of the base. An examination of columns 5 and 6 of Table 17 reveals that for both 1964 and 1965 the increase in the banks' net foreign position (i.e., net lending activity) accounted for well over one-third of the surplus in the balance of payments.

e) The interest rate pegging policy: 1966 - first quarter of 1969

During this period monetary and economic growth coincided with relative price stability. The monetary base kept growing at an average annual rate of 7 to 9 percent and without being subjected to erratic movements. The period was characterized by uninterrupted balance-of-payments surpluses. Substantial accumulation of international reserves was associated with a lower than average rate of growth in B, with the net result of producing a smooth growth path for the total base.

A sterilization policy was pursued by subjecting banks to the zero net foreign position rule. Consequently, the amount of bank-held foreign reserves which became eligible as base money was limited to the excess of foreign assets over liabilities.

In 1966, after seven years as a net user of funds, Italian banks as a group became a net lender in the international money market. The reversal in position proved to be a characteristic of the late sixties. While the reader is referred to Chapters 2 and 3 for a gen-
eral discussion of the factors underlying the behavior of Italian banks with respect to net foreign indebtedness, it is relevant to this section that the role played by the Italian Exchange Office in influencing the composition of the balance sheet of Italian banks be examined. This has been done with foreign exchange/lire swaps which have had the double purpose of encouraging individual banks to reduce their net foreign indebtedness and of stimulating the supply of loans in foreign currency to residents, primarily Italian exporters. The terms of the swaps were made particularly advantageous to banks which, in most of the cases, were guaranteed on the forward transaction the same exchange rate applied to the spot transaction. In other words, the Italian Exchange Office was making foreign exchange available to banks at subsidized terms.

Beginning in 1966, U.I.C. restricted dollar/lire swaps with guaranteed rates to those banks which would use the dollars to reduce their net foreign indebtedness. In addition, the availability of swaps was further restrained by "massimali" or quantitative ceilings. Banks which were net lenders in the international money market could resort to foreign exchange/lire swaps with U.I.C., but were discriminated against with respect to those banks which were net borrowers of foreign funds (their swaps were subject to a premium which could either be a market equilibrium price or could be determined unilaterally by U.I.C.). Even though this aspect of Italian monetary policy is enshrouded in a veil of secrecy, U.I.C. has been known to raise the forward premium appreciably higher than
the equilibrium premium (primarily determined in the London market) in order to curtail the demand for swaps.

The forward resale of foreign exchange against lire by the banks to U.I.C. was originally intended to occur three months after the spot purchase. Customarily, U.I.C. has extended the three-month period. The outstanding amount of swaps rose from $1.6 billion at the beginning of 1966 to $2.0 billion at the end of 1968, with swaps at guaranteed rates representing the largest share of total swaps.

f) Balance-of-payments deficit and rising Eurodollar rates: 1969

The increasing divergence between Eurodollar and domestic rates stimulated the lending activity of Italian banks in the late sixties. In the first quarter of 1969, the monetary authorities, confronted with massive outflows of private capital (cf. column 2 of Table 17), invited banks to reduce their net lending activity in the Eurodollar market and to bring it down to zero by June, 1969. In this manner the authorities hoped to reduce the expected drain on official reserves. Again, I must emphasize the role of the foreign source component of the base as the crucial target variable for the Italian monetary authorities. In addition, the achieved growth rate of the domestic component of the base is not consistent with a process of "automatic" adjustments implied by a system of fixed exchange rates. By the end of the year the deficit in the balance of payments totalled $1.39 billion which was financed by a net outflow of $.704 billion
of official reserves and an inflow of $0.686 billion of bank capital.

The Italian Exchange Office, on its part, first raised the forward premium on its swap operations at nonguaranteed rates to 5 percent, and later flatly refused to accommodate banks which were net exporters of capital in their requests of foreign exchange/lire swaps. These actions, which supplemented the zero balance rule on banks' net foreign assets, were intended to discourage foreign exchange obtained from the monetary authorities from leaving Italy through the net lending activity of the Italian banking system. As a consequence of the U.I.C. policy, the outstanding amount of swaps with guaranteed rates fell by year end to $1.59 billion from a high of $2.14 billion in January, 1969.

g) Summary

The above historical digression should be considered as supplementary evidence to the discussion of regression estimates presented in connection with the analysis of the relation between the stock of international reserves and the domestic source component of the monetary base. The first conclusion to be drawn is that the Italian monetary authorities have strived for target levels of international reserves through (i) changes in the domestic source component of the base, (ii) discretionary controls on the banks' foreign position, and (iii) foreign exchange/lire swap operations with the banks. Second, the growth rate of the domestic source component of the base over the business cycle has not been generally consistent with the growth rate which would be required to strictly
adhere to the so-called "rules of the game" of a system of fixed exchange rates. Finally, monetary policy has been demonstrated to be very effective for purposes of short-run stabilization.

5.3 THE IMPACT ON INCOME AND INTERNATIONAL RESERVES OF VARIOUS POLICY COMBINATIONS

Let me state at the outset the objectives of this section. First, I present and discuss the estimates of the reduced-form equations for income and international reserves both ignoring and then incorporating in the model the Treasury's budget restraint. The regression analysis provides a proximate knowledge of the impact fiscal and monetary actions have exerted on crucial variables such as income and international reserves. Second, since the regression results cannot be considered simultaneously as a test of the model and an indication of what policy combination the Italian central authorities have predominantly used from 1958 to 1969, the selection of the "right" policy mix must be obtained from evidence which is independent of the estimates of the model's reduced-form equations. Next, I analyze statistically in more detail the regression which corresponds to the policy mix selected according to the independent information. Ideally, one would expect that the policy mix which is known to be true (via independent evidence) should also correspond to the "best" regression result (where the criteria for best are based on whether the regression results conform to [a] the implications of the proposed hypothesis (sign constraint) and [b] standard statistical tests of goodness of fit and significance of the coeffi-
To meet the proposed objectives I first present the results relative to changes in \( Y \) (nominal GNP) and international reserves regressed on current changes in the policy variables. Because of the unavailability of seasonally adjusted data, changes in all variables were computed by subtracting from the value of the current quarter the value of the corresponding quarter of the previous year. An institutional analysis of the Italian budget system provides the "independent" information concerning the policy mix adopted by the Italian central authorities. The lag structure of the "right" policy mix is estimated by relying, as was done in Part I of the dissertation, on the Almon lag technique. Because of the substantial interest shown in economic literature in reduced-form equations in the absence of a budget restraint, I also present the estimate of the effects of both current and past changes in the domestic source component of the base and government expenditures on \( \Delta Y \) and \( \Delta Ir. \) The section ends with a brief review of events when monetary and fiscal actions moved in opposite directions. This is intended to supplement the regression analysis for an assessment of the stabilization quality of monetary and fiscal policies.

The regression results for concomitant changes in all variables are found in Tables 19 and 20. As discussed in the introduction of the theoretical chapter there are seven possible policy combinations which correspond to equations (2) through (8) of the tables. Equation (1) is an estimate of the reduced-form equation of the
Table 19

Italy: 1959.I - 1969.II
Estimates of reduced-form equations under various policy mixes.
Dependent variable: changes in national income at current prices.
First differences of corresponding quarters of adjacent years (billions of lire)

<table>
<thead>
<tr>
<th>Regression No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant ΔB  ΔG  YΔt₁ ΔDeficit ΔSG R  D.W.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1Y</td>
<td>352.02 (.529) .052*</td>
<td>0.545</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(58.69) (.072) (.088)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Y</td>
<td>351.22 (.531) .046* .024*</td>
<td>0.533</td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(60.43) (.077) (.117) (.339)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Y</td>
<td>355.11 (.525) .057*</td>
<td>0.544</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(57.80) (.073) (.107)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4Y</td>
<td>601.26 (.196* -.934) .248</td>
<td>0.163</td>
<td>0.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(54.03) (.154) (.441) (.080)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5Y</td>
<td>331.66 (.492) .024*</td>
<td>.117*</td>
<td>0.573</td>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(57.86) (.073) (.087) (.061)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6Y</td>
<td>337.93 (.486) -.056*</td>
<td>.118*</td>
<td>0.573</td>
<td>0.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(58.18) (.077) (.263) (.061)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7Y</td>
<td>335.04 (.491)</td>
<td>.113</td>
<td>0.583</td>
<td>0.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(55.85) (.072)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8Y</td>
<td>616.62 (.097* .211 .097 .35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(55.53) (.151) (.081)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*not significant at the .05 level
Table 19 (cont.)

Beta coefficients

<table>
<thead>
<tr>
<th>Regression No.</th>
<th>$\Delta B$</th>
<th>$\Delta G$</th>
<th>$Y_{t-1}$</th>
<th>$\Delta$ Deficit</th>
<th>$\Delta S_G$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y</td>
<td>0.7577</td>
<td>0.0611</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Y</td>
<td>0.7606</td>
<td>0.0541</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Y</td>
<td>0.7520</td>
<td></td>
<td></td>
<td>0.0553</td>
<td></td>
</tr>
<tr>
<td>4Y</td>
<td></td>
<td>0.2305</td>
<td>-0.3905</td>
<td></td>
<td>0.4493</td>
</tr>
<tr>
<td>5Y</td>
<td>0.7047</td>
<td>0.0282</td>
<td>-0.0234</td>
<td></td>
<td>0.2119</td>
</tr>
<tr>
<td>6Y</td>
<td>0.6961</td>
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<td></td>
<td></td>
<td>0.2138</td>
</tr>
<tr>
<td>7Y</td>
<td>0.7033</td>
<td></td>
<td></td>
<td></td>
<td>0.2047</td>
</tr>
<tr>
<td>8Y</td>
<td></td>
<td></td>
<td></td>
<td>0.0941</td>
<td>0.3823</td>
</tr>
</tbody>
</table>

Note: Beta coefficients have been calculated by multiplying the regression coefficients by the ratio of the standard deviation of the change in the policy variable to the standard deviation of the change in GNP.

Y: GNP at current prices. Estimates of the Research Department of the Bank of Italy.
$B$: domestic source component of the base.
G: expenditures of the central government at current prices.
$t_1$: total tax revenues divided by GNP at current prices. Tax revenues are those of the central government at current prices.
$\Delta$ Deficit: $\Delta G - Y_{t-1}$.
$S_G$: government securities held by the public and banking system at current market values. Standard errors of the coefficients are shown in parentheses.
Table 20

Italy: 1959.I - 1969.II
Estimates of reduced-form equations under various policy mixes
Dependent variable: flows of international reserves
First differences of corresponding quarters of adjacent years (billions of lire)

<table>
<thead>
<tr>
<th>Regression No.</th>
<th>Constant</th>
<th>$\Delta R$</th>
<th>$\Delta G$</th>
<th>$Y\Delta t_1$</th>
<th>$\Delta$Deficit</th>
<th>$\Delta S_G$</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Ir</td>
<td>669.47</td>
<td>-.625</td>
<td>.180*</td>
<td></td>
<td></td>
<td>.424</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(89.14)</td>
<td>(.110)</td>
<td>(.134)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Ir</td>
<td>683.16</td>
<td>-.654</td>
<td>.275*</td>
<td>-.427*</td>
<td></td>
<td>.419</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(90.96)</td>
<td>(.116)</td>
<td>(.176)</td>
<td>(.510)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ir</td>
<td>674.89</td>
<td>-.642</td>
<td></td>
<td></td>
<td>.252*</td>
<td>.432</td>
<td>.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(87.07)</td>
<td>(.110)</td>
<td></td>
<td></td>
<td>(.162)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4Ir</td>
<td>279.87</td>
<td></td>
<td>.085*</td>
<td>.528*</td>
<td></td>
<td>-.086*</td>
<td>-.051</td>
<td>.39</td>
</tr>
<tr>
<td></td>
<td>(81.69)</td>
<td></td>
<td>(.233)</td>
<td>(.667)</td>
<td></td>
<td>(.122)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5Ir</td>
<td>656.34</td>
<td>-.649</td>
<td>.162*</td>
<td></td>
<td></td>
<td>.071*</td>
<td>.418</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td>(91.19)</td>
<td>(.115)</td>
<td>(.137)</td>
<td></td>
<td></td>
<td>(.092)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6Ir</td>
<td>681.77</td>
<td>-.660</td>
<td></td>
<td>-.047*</td>
<td></td>
<td>.094*</td>
<td>.397</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>(93.31)</td>
<td>(.123)</td>
<td></td>
<td>(.421)</td>
<td></td>
<td>(.098)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7Ir</td>
<td>679.32</td>
<td>-.655</td>
<td></td>
<td></td>
<td></td>
<td>.090*</td>
<td>.412</td>
<td>.51</td>
</tr>
<tr>
<td></td>
<td>(89.54)</td>
<td>(.115)</td>
<td></td>
<td></td>
<td></td>
<td>(.091)</td>
<td></td>
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<tr>
<td>8Ir</td>
<td>267.10</td>
<td></td>
<td></td>
<td></td>
<td>.167*</td>
<td>-.055*</td>
<td>-.057</td>
<td>.31</td>
</tr>
<tr>
<td></td>
<td>(81.10)</td>
<td></td>
<td></td>
<td></td>
<td>(.221)</td>
<td>(.119)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*not significant at the .05 level
Table 20 (cont.)

<table>
<thead>
<tr>
<th>Regression No.</th>
<th>$\Delta B$</th>
<th>$\Delta G$</th>
<th>$Y \Delta t_1$</th>
<th>$\Delta \text{Deficit}$</th>
<th>$\Delta S_G$</th>
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</thead>
<tbody>
<tr>
<td>1Ir</td>
<td>.6635</td>
<td>.1568</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2Ir</td>
<td>.6942</td>
<td>.2396</td>
<td>-.1322</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ir</td>
<td>.6815</td>
<td></td>
<td>.1811</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4Ir</td>
<td></td>
<td>.0740</td>
<td>.1635</td>
<td>-.1154</td>
<td></td>
</tr>
<tr>
<td>5Ir</td>
<td>.6889</td>
<td>.1411</td>
<td></td>
<td>.0953</td>
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</tr>
<tr>
<td>6Ir</td>
<td>.7006</td>
<td></td>
<td>-.0145</td>
<td>.1262</td>
<td></td>
</tr>
<tr>
<td>7Ir</td>
<td>.6953</td>
<td></td>
<td></td>
<td>.1208</td>
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</tr>
<tr>
<td>8Ir</td>
<td></td>
<td></td>
<td>.1200</td>
<td>-.0738</td>
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</tr>
</tbody>
</table>

Note: Beta coefficients have been calculated by multiplying the regression coefficients by the ratio of the standard deviation of the change in the policy variable to the standard deviation of the flows of international reserves.
model in the absence of the government's budget.

All equations have been estimated with a constant term which embodies all forces that influence the ultimate target variables other than those considered in the model. In all instances the constant term was found to be large and statistically significant, thus providing indirect evidence of the importance of nonpolicy variables in the determination of ΔY and ΔIr. More precisely, the value of the constant term can be taken as a measure of the average effect of these other forces on ΔY and on ΔIr.

The coefficients of the domestic source component of the base always appears with a sign which conforms to the implications of the model; moreover, their statistical significance is very high. The fiscal instruments, on the other hand, either have the unexpected effect—the tax variable in equations (2Y), (2Ir), (6Ir) and the long-term public debt in equations (4Y) through (8Y), (4Ir), and (8Ir)—or the effect, even though it conforms to the implications of the hypothesis, is not statistically significant at .05 level (all regressions except the tax variable in [4Y]).

An assessment of the relative importance of monetary and fiscal actions in affecting ΔY and ΔIr requires that the stock and flow variables be reduced to a homogeneous time dimension. This is

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1 The reader is referred to Exhibit 1 and the Appendix of L.C. Anderson and J.L. Jordan, "Monetary and Fiscal Actions," for a detailed formulation and extensive discussion of the meaning of the constant term.
accomplished by transforming the regression coefficients into "beta coefficients" which take into consideration the past variation of changes in the various policy parameters—whether it be a stock or a flow—relative to the past variation of changes in the GNP and Ir.\footnote{A.S. Goldberger, Econometric Theory (New York: John Wiley and Sons, Inc., 1966), pp. 197-200.} Following the test procedure introduced by Anderson and Jordan,\footnote{"Monetary and Fiscal Actions," p. 19.} the relative contribution of each policy variable to changes in income can be determined by comparing the size of the beta coefficients which are shown in the second part of Tables 19 and 20. From such a comparison I conclude quite generally that in the test period current monetary actions (measured by $\Delta B$) had a clear comparative advantage over current fiscal actions (measured by $\Delta G$, $Y_{t-1}$, $\Delta$deficit, and $\Delta S_G$) in affecting the GNP and international reserves.

The response of changes in income and in international reserves to monetary actions is more reliable or predictable than the response to fiscal actions. This assertion is based on a comparison of the size of the standard errors of the coefficients of $\Delta B$ with those of the coefficients of $\Delta G$, $Y_{t-1}$, $\Delta$deficit, and $\Delta S_G$. The smaller the standard errors, the more reliable the estimated regression coefficients and, hence, the greater the reliability of the estimated change in $Y$ and $Ir$ resulting from a change in the policy
variable.

5.3.1 The Selection of the "Right" Policy Combination: An Institutional Analysis of the Italian Budget System

The Italian Parliament has complete jurisdiction over the appropriation or administrative budget (bilancio di competenza). The Treasury, the chief fiscal authority in Italy, has little a priori knowledge of the size of the administrative budget, since Parliament revises it several times during the course of the fiscal year.¹ Concomitantly, a separate account of the arrears of expenditures and receipts (conto dei residui) is submitted to Parliament. Officially, no direct forecast of actual receipts and expenditures is made for the current fiscal year. It would appear on the surface that the cash budget deficit, which is the one I am concerned with in this study, is beyond the control of the Treasury. The cash deficit is equal to (i) the deficit of the administrative budget minus (ii) the year's unspent appropriations plus (iii) the year's uncollected receipts plus (iv) expenditures on previous years' unspent appropriations minus (v) collected receipts which were due in previous years. The truth of the matter is that the Treasury mani-

¹For more details, the reader is referred to Chapter III of the important government document White Book on Government Expenditures (Libro Bianco sulla spesa pubblica) presented by Secretary of the Treasury Mario Ferrari-Aggradi to Parliament on January 26, 1971.
pulates (ii) through (iv) to attain desired levels of cash budget deficits. To illustrate, consider Table 21 where, for the period 1965-69, the administrative budget deficit is compared to the cash budget deficit, shown respectively in the second and third row of the table. The difference, which is shown in the fourth row of Table 21 represents (ii) minus (iii) minus (iv) plus (v). This is the sum which the Treasury maneuvers to obtain the deficits shown in the third row of Table 21. Table 21 clearly shows that the Treasury substantially modified the deficits which were the result of the legislative process. In 1967, for example, an increase in the administrative budget deficit corresponded to a decrease in the cash budget deficit with respect to 1966. In 1969, a 906 billion lire increase in the administrative budget deficit corresponded only to a 336 billion lire increase in the cash budget deficit with respect to the previous year.

The inflexibility inherent in the administrative budget does not appear to impair the Treasury's ability to control the difference between actual cash payments and tax collections. On the contrary, it can be said that the larger the administrative budget deficit, the more control the Treasury exercises over the cash budget deficit. This is so because the Italian constitution requires that any law providing for new expenditures must specify the sources of funds which will finance such expenditures (Article 81, Paragraph 4). This feature applies in particular to the financing of long-term
Table 21

Italy: 1965-69
Administrative and Cash Budget Deficits of the Central Government and Autonomous State Corporations (Billions of Lire at Current Prices)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Budget Deficit</td>
<td>1,660</td>
<td>1,640</td>
<td>1,759</td>
<td>2,433</td>
<td>3,339</td>
</tr>
<tr>
<td>Cash Budget Deficit</td>
<td>1,325</td>
<td>1,103</td>
<td>810</td>
<td>1,493</td>
<td>1,829</td>
</tr>
<tr>
<td>Difference between Administra-</td>
<td>335</td>
<td>537</td>
<td>949</td>
<td>940</td>
<td>1,510</td>
</tr>
<tr>
<td>tive and Cash Budget Deficit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash Budget Deficit as a percent of the Administrative Budget Deficit</td>
<td>79.8</td>
<td>67.3</td>
<td>46.0</td>
<td>61.4</td>
<td>54.8</td>
</tr>
</tbody>
</table>

Source: Libro Bianco, Table 12.
programs such as the Green Plans for agricultural development, and the construction of highways, hospitals, and universities.¹ This institutional factor provides the Treasury with receipts which, even though they are earmarked for specific programs, are actually utilized to meet other expenditures. Thus, by delaying the execution of programs for which the money has already been appropriated and collected, the Treasury is able to reduce the cash budget deficit. In essence, the higher the volume of expenditures financed through the allocation of specific funds, the greater the Treasury's ability to reduce cash deficits.²

Having demonstrated that the Italian Treasury enjoys a certain degree of control over the cash budget deficit, it remains to ascertaın which one of the two methods of deficit financing (new issues of governments bonds and base money) has been used as an autonomous instrumental variable. A reading of official documents reveals that the Bank of Italy aims at a desired change in total base money by setting $\Delta B$ equal to an amount which is consistent (subject to a margin of error) to the desired $\Delta B$ during the control period.³

¹For more details, see Libro Bianco, Chapter 21.

²This argument is carefully presented in Chapter 3 of Osservazioni al Libro Bianco sulla spesa pubblica (March 26, 1971), an extensive document prepared by a group of economists of the Italian Republican Party (P.R.I.) in reply to the Treasury's Libro Bianco.

³It follows that a compositional problem faces the Bank of Italy: how to allocate $\Delta B$ between financing the Treasury's deficit, on the one hand, and lending to the commercial banks, on the other hand.
New issues of government securities, on the other hand, depend very much on the type of monetary policy which is pursued at the moment. In other words, $\Delta S_c$ must be consistent with the "general market conditions" as the authorities interpret them and thus is determined endogenously in the system.

Concluding, the above institutional analysis of the Italian budget system has provided the necessary "independent" evidence to isolate one policy mix out of the seven combinations considered in Tables 19 and 20. Namely, the central authorities control the deficit and the domestic source component of the base, while new issues of government securities depend linearly on the two policy instruments.

5.3.2 The Stabilization Quality of Fiscal and Monetary Actions

The policy mix which was identified in Section 5.3.1 is now considered for additional empirical analysis. This is done in Tables 22 and 23 where the reduced-form equation for $\Delta Y$ and $\Delta Ir$ in the absence of the Treasury's budget constraint is also shown. Lag structures are estimated by resorting to the Almon lag technique.

The group of economists which has drafted the report mentioned in the previous footnote has advanced the hypothesis that both the absolute change of $\Delta B$ and its distribution are crucial in explaining the recent recession in Italy. During that period the allocation of $\Delta B$ decisively favored the Treasury at the expense of the commercial banks. The subsequent leftward shifting supply of loans affected in particular the formation of new capital and hence halted the expansion phase of the cycle. This study does not analyze this particular period which is beyond its sample period.
Table 22

Italy: 1959.I - 1969.II

Regressions of Changes in GNP on Changes in Monetary and Fiscal Actions According to Selected Policy Combinations (Billions of Lire)

<table>
<thead>
<tr>
<th>First Differences</th>
<th>Equation A1Y</th>
<th>Equation A3Y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\Delta\bar{B}$</td>
<td>$\Delta G$</td>
</tr>
<tr>
<td>$t$</td>
<td>.424</td>
<td>.156</td>
</tr>
<tr>
<td></td>
<td>(5.79)</td>
<td>(2.34)</td>
</tr>
<tr>
<td>$t-1$</td>
<td>.151</td>
<td>.171</td>
</tr>
<tr>
<td></td>
<td>(6.79)</td>
<td>(3.34)</td>
</tr>
<tr>
<td>$t-2$</td>
<td>-.028*</td>
<td>.163</td>
</tr>
<tr>
<td></td>
<td>(.956)</td>
<td>(3.10)</td>
</tr>
<tr>
<td>$t-3$</td>
<td>-.113</td>
<td>.132</td>
</tr>
<tr>
<td></td>
<td>(2.79)</td>
<td>(2.67)</td>
</tr>
<tr>
<td>$t-4$</td>
<td>-.103</td>
<td>.078</td>
</tr>
<tr>
<td></td>
<td>(3.33)</td>
<td>(2.37)</td>
</tr>
<tr>
<td>Sum</td>
<td>.331</td>
<td>.701</td>
</tr>
<tr>
<td></td>
<td>(4.18)</td>
<td>(2.77)</td>
</tr>
<tr>
<td>Constant</td>
<td>389.69</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.82)</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.621</td>
<td></td>
</tr>
<tr>
<td>D.W.</td>
<td>1.21</td>
<td></td>
</tr>
</tbody>
</table>

*not significant at the .05 confidence level.

Note: Almon lag structure was interpolated by a second-degree polynomial over the period $t$ to $t-4$, constrained to zero at $t-4$. Regression coefficients are the top figures, and their "t" values appear below each coefficient in parenthesis. D.W. is the Durbin-Watson test statistic. First differences are taken between corresponding quarters of adjacent years.
<table>
<thead>
<tr>
<th>First Differences</th>
<th>Equation A1Y</th>
<th>Equation A3Y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \Delta \bar{B} )</td>
<td>( \Delta G )</td>
</tr>
<tr>
<td>( t )</td>
<td>.6073</td>
<td>.1834</td>
</tr>
<tr>
<td>( t-1 )</td>
<td>.2163</td>
<td>.2011</td>
</tr>
<tr>
<td>( t-2 )</td>
<td>-.0401</td>
<td>.1917</td>
</tr>
<tr>
<td>( t-3 )</td>
<td>-.1618</td>
<td>.1552</td>
</tr>
<tr>
<td>( t-4 )</td>
<td>-.1475</td>
<td>.0917</td>
</tr>
<tr>
<td>Sum</td>
<td>.4741</td>
<td>.8245</td>
</tr>
</tbody>
</table>

Note: Beta coefficients have been computed by multiplying the regression coefficients by the ratio of the standard deviation of the change in the policy variable to the standard deviation of the change in GNP.
Table 23
Italy: 1959.I - 1969.II
Regressions of Changes in International Reserves on Changes in Monetary and Fiscal Actions According to Selected Policy Combinations (Billions of Lire)

<table>
<thead>
<tr>
<th>First Differences</th>
<th>Equation A1Ir</th>
<th>Equation A3Ir</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \Delta \bar{B} )</td>
<td>( \Delta \bar{G} )</td>
</tr>
<tr>
<td>( t )</td>
<td>-0.493</td>
<td>0.204*</td>
</tr>
<tr>
<td></td>
<td>(3.62)</td>
<td>(1.64)</td>
</tr>
<tr>
<td>( t-1 )</td>
<td>-0.225</td>
<td>0.198</td>
</tr>
<tr>
<td></td>
<td>(5.43)</td>
<td>(2.08)</td>
</tr>
<tr>
<td>( t-2 )</td>
<td>-0.041*</td>
<td>0.175*</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(1.78)</td>
</tr>
<tr>
<td>( t-3 )</td>
<td>0.071*</td>
<td>0.134*</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(1.45)</td>
</tr>
<tr>
<td>( t-4 )</td>
<td>0.071*</td>
<td>0.075*</td>
</tr>
<tr>
<td></td>
<td>(1.22)</td>
<td>(1.24)</td>
</tr>
<tr>
<td>Sum</td>
<td>-0.631</td>
<td>0.786*</td>
</tr>
<tr>
<td></td>
<td>(2.36)</td>
<td>(1.64)</td>
</tr>
<tr>
<td>Constant</td>
<td>550.39</td>
<td>579.84</td>
</tr>
<tr>
<td></td>
<td>(5.17)</td>
<td>(5.60)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>.416</td>
<td>.404</td>
</tr>
<tr>
<td>D.W.</td>
<td>.55</td>
<td>.49</td>
</tr>
</tbody>
</table>

*not significant at the .05 confidence level.

Note: Almon lag structure was interpolated by a second-degree polynomial over the period \( t \) to \( t-4 \), constrained to zero at \( t-4 \). Regression coefficients are the top figures, and their "t" values appear below each coefficient in parenthesis. D.W. is the Durbin-Watson test statistic. First differences are taken between corresponding quarters of adjacent years.
Table 23 (cont.)

Beta Coefficients

<table>
<thead>
<tr>
<th>First Differences</th>
<th>Equation A1Ir</th>
<th>Equation A3Ir</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\Delta B$</td>
<td>$\Delta G$</td>
</tr>
<tr>
<td>$t$</td>
<td>-.5233</td>
<td>.1778</td>
</tr>
<tr>
<td>$t-1$</td>
<td>-.2388</td>
<td>.1725</td>
</tr>
<tr>
<td>$t-2$</td>
<td>-.0435</td>
<td>.1525</td>
</tr>
<tr>
<td>$t-3$</td>
<td>.0605</td>
<td>.1167</td>
</tr>
<tr>
<td>$t-4$</td>
<td>.0753</td>
<td>.0653</td>
</tr>
<tr>
<td>Sum</td>
<td>-.6698</td>
<td>.6850</td>
</tr>
</tbody>
</table>

Note: Beta coefficients have been computed by multiplying the regression coefficients by the ratio of the standard deviation of the change in the policy variable to the standard deviation of the flows in international reserves.
interpolated by a second-degree polynomial from period t to t-4; in addition, the weight at time t-4 is constrained to zero. This particular lag structure is the only one which makes any sense a priori. Lags are limited to four quarters on the ground that the time horizon of stabilization policies is expected to be approximately one year by the Italian central authorities.

Before treating the central topic of the section, it is worthwhile to discuss two findings.

First, the reduced-form equations for ΔIr yield expected and statistically significant results with respect to Δδ; the multiplier ΔIr/ΔG is positive which suggests, even though the sum of the coefficients from periods t to t-4 is not significant at the .05 confidence level, that the interest elasticity of the capital account is numerically larger than the interest elasticity of the money market multiplied by the price elasticity of the trade account (cf. Section 4.3.1).

The second finding concerns a comparison of equation A1Y with the empirical results obtained by Anderson and Jordan.1 In their work, a dollar change in the monetary base, as they define it, will increase nominal GNP in the U.S. by 16 dollars over a period of one year, while a dollar change in the domestic source component of the base raises the nominal GNP in Italy by 33 cents over a period

1"Monetary and Fiscal Actions," Tables I and II.
of five quarters. Such a strong divergence of results can be attributed to the fact that two different concepts of monetary base are used and that Anderson and Jordan measure first differences of adjacent quarters, whereas my first differences refer to corresponding quarters of adjacent years. That the difference of results might be due to differences in measurement procedures is substantiated by a comparison of the "beta coefficients": to a value of .91 of Anderson and Jordan corresponds a value of .47 in Table 22 above.

However, the most revealing observation to be made from the analysis of the characteristics of the lag structures of Tables 22 and 23 is that, contrary to the instantaneous multipliers shown in Tables 19 and 20, cumulative fiscal actions over a period of one year have a larger impact on the GNP than the corresponding monetary actions. This difference in results is perfectly consistent with the model developed in Chapter 4. There, I noted that a system of fixed exchange rates acts as a constraint on monetary policy which loses its bite progressively as time goes by. In the long run monetary policy is totally ineffective. The size of the beta coefficients of Table 22 are most indicative in this respect. A change in the domestic source component of the base induces the largest response in the GNP in the current and first quarter after the change. In the second quarter the impact on the GNP is virtually zero; in the third and fourth quarters it becomes negative. According to the model's implications, the sum of the coefficients would
eventually approach zero. This lag structure has its counterparts in the lag structure of $\frac{\Delta Ir}{\Delta B}$ (Table 23). Again, the expected impact of $\Delta B$ on international reserves occurs in the quarter of the change and in the two quarters immediately following. For later quarters, the impact of $\Delta B$ on $\Delta Ir$ becomes positive. According to the theoretical model, the sum of the coefficients would eventually approach minus one.

Briefly stated, the influence of monetary actions on economic activity occurs faster than that of fiscal actions (cf. beta coefficients of $\Delta B$ and $\Delta G$, and $\Delta$Deficit for periods t and t-1 in Table 22); however, the total effect of the latter increases over time while that of the former declines. These results, it should be stressed, are not only consistent with the implications of the model in Chapter 4, but also in agreement with the classical and neoclassical contention that changes in the quantity of money (in this case base money) cannot affect real variables in the long-run equilibrium.

In other words, the apparent contradiction between current and cumulative effects of monetary and fiscal actions vanishes when the constraints imposed by fixed exchange rates are explicitly incorporated into the model. The long-run emasculation of monetary policy in no way detracts from its power as an instrument of economic stabilization. On the contrary, the evidence seems to indicate that the impact of monetary actions on economic activity within 3 to 6 months is strong and predictable. In all cases monetary impulses are transmitted over a shorter time interval than fiscal impulses.
The increased effectiveness over time of fiscal policy, on the other hand, detracts from its power as an instrument of economic stabilization. The relatively long lags of fiscal actions reflect two basic and well-known shortcomings of budgetary policy. Long intervals separate the time at which necessity for action is recognized from the actual implementation of the action. A second interval exists between output and the actual disbursement of funds by the government agencies. In Italy government payments always follow the delivery of goods, services, and the formation of capital goods. At times the payment is completed over a number of annual installments.\(^1\) If to this is added the deeply rooted "bookkeeper's view" among fiscal authorities that new government expenditures must be financed by almost an equivalent increase in tax revenues, regardless of the nature underlying the rise in expenditures, there is ample reason for the poor showing of fiscal actions as a stabilization instrument in Italy.

To further analyze the relative importance of fiscal and monetary actions as instruments of economic stabilization, additional insight can be gained by briefly examining some instances during which fiscal and monetary authorities pulled in opposite directions. In Table 26 I have summarized the basic information concerning the size of the budget deficit and its financing for the periods which immediately precede and follow the turning points in the business

\(^1\)See Relazione, 1969, p. 224.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deficit of the central government</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>865</td>
<td>847</td>
<td>1560</td>
<td>2021</td>
<td>1789</td>
</tr>
<tr>
<td><strong>Financed by:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Net sales (+) to, or net redemptions (-) from, the public and the banking system of long-term government securities</td>
<td>-210</td>
<td>20</td>
<td>621</td>
<td>1093</td>
<td>358</td>
</tr>
<tr>
<td>(b) creation of base money</td>
<td>1075</td>
<td>827</td>
<td>939</td>
<td>928</td>
<td>1431</td>
</tr>
</tbody>
</table>

*The central government includes the Treasury, the Cassa DD.PP., and government corporations (Aziende autonome).

Source: Banca d'Italia, Relazioni.
cycle. To better interpret the figures of the table it is useful to restate the Monetarist view with regard to the influence of fiscal actions on economic activity. The latter depends quite crucially on the method of financing government expenditures. Both taxation and borrowing from the public involve a transfer of command over resources from the public to the government and, hence, have equivalent effects over \( Y \). Only a deficit financed by creating base money is necessarily expansionary. It follows that for a given deficit—defined as expenditures minus tax revenues—its effect will be more (less) expansionary the larger (smaller) is the amount of base money which is created to finance the deficit. During the severe credit crunch of October, 1963, the June, 1964, fiscal policy had an overall inflationary influence.\(^1\) The second half of 1964 was characterized by monetary expansion; fiscal policy, on the other hand, turned restrictive. In fact, even though the government deficits in 1963 and 1964 were approximately of equal magnitude, the 1964 budget had a more restrictive impact than the 1963 budget because of the lower incidence of base money as a source of finance. Various measures to cut aggregate demand were taken by the fiscal authorities when the leading target variables (cf. Table 18 above) were already indicating that the previous restrictive monetary actions had pro-

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\(^1\)Cf. Also the general considerations of Governor Carli in the *Relazione* of 1964, especially p. 470.
duced their intended effects. Fiscal policy was more expansive in 1965 than in 1964. Roughly speaking, the switch in the quality of fiscal policy occurred with a lag of about 6 to 12 months with respect to the end of the June, 1964, credit crunch.

Finally in 1969, to the effort of the monetary authorities to impart a pronounced deceleration to the growth rate of the monetary base (especially during the second and third quarters) corresponded a highly expansive fiscal policy. The base-money-financed deficit was 1431 billion lire in 1969 versus 928 billion lire in 1968 (cf. Table 24). The lack of coordination between fiscal and monetary

---

1 On February 24, 1964

(1) taxes on gasoline were raised by 21 percent with an estimated additional revenue for the Treasury of 80-85 billion lire per annum;

(2) new automobiles and motor boats were subject to an excise tax of 7-15 percent. The tax was repealed on November 11, 1964;

(3) instead of the 15 percent withholding tax on dividends established in 1963, shareholders were given the option of either paying a 5 percent withholding tax as an advance (acconto) on their income tax liabilities or a flat 30 percent on total earned dividends. In the latter case the taxpayer was assured anonymity in front of the tax authorities. Roughly speaking, the measure meant that the price of anonymity was set equal to the difference between the two rates.

On September 22, 1964, regulations were issued to the effect that the purchase of most consumer durables (including automobiles) would require a minimum down payment of 25 percent, with the remaining balance to be paid in not more than 24 monthly installments. These regulations were repealed on October 31, 1965. Finally, in 1965 the turnover tax (I.G.E.) was raised from 3.3 to 4 percent except on foodstuffs, fertilizers, agricultural machinery, seeds, and gasoline. Additional revenues were estimated at 196 billion lire per year.

2 In January, 1965

(1) the government entrusts a special fund of 100 billion lire with the Instituto Mobiliare Italiano (IMI) with the ex-
tions was so obvious and frustrating as to prompt the Governor of
the Banca d'Italia, Dr. Guido Carli, to frankly state that since 1951,
budget policy in Italy, with the exception of 1965 and 1968, had
failed dramatically in pursuing stabilization objectives. Quite
to the point, stabilization policy in Italy has been predominantly
limited to monetary actions.

5.4 SUMMARY OF MAJOR FINDINGS

The major conclusions of this chapter are that monetary poli-
cy (a) is quite effective in the short-run in spite of the economy's
interdependence with the outside world and (b) has been the predom-
inant instrument of economic stabilization in Italy.

Regression analysis has indicated that the value of the multi-
plier $\Delta Ir$ with respect to $\Delta \bar{Y}$ is substantially larger (algebraically)
than the value of -1 which assures emasculation of policy. On the
average, to an increase of $1 in the domestic source component of

pressed purpose of resurrecting the financial conditions of
small and medium size firms;

(ii) economic operators and individuals in the South of Italy are
given a preferential tax treatment. The Cassa del Mezzo-
giorno, the primary government investment agency for the
South, programs new investments;

(iii) in an effort to boost building industry, a fresh program of
government-subsidized dwellings and hospitals goes into ac-
ton. Extending a previous regulation, new home owners are
exempted from real estate taxes during the first 25 years
of the building life;

(iv) tax rates on investment goods are lowered.

On December 14, 1965, the government takes over the payment of a
portion of social security contributions for which the employers are
liable (this measure is often referred to as the fiscalizzazione
degli oneri sociali).

\[2\] See Relazione 1969, pp. 404-409.
the base has corresponded an outflow international reserves of 50 to 65 cents, and vice versa. These results, in addition to confirming the effectiveness of monetary policy, indicate that the Italian monetary authorities have not adhered to the so-called "rules of the game" which prescribe that domestic and foreign source components of the base move in the same direction, thus assuring that the effects on the domestic money supply of balance-of-payments disequilibria are reinforced by a similar action taken by the authorities. Italy's disregard for the gold exchange standard prescription confirm Nurkse's early work and Bloomfield's follow-up research which found that in about 60 percent of the cases changes in the domestic assets of central banks were compensated by opposite movements in their foreign assets.

Two particular instruments have enhanced the effectiveness of monetary policy in Italy. The central bank has frequently issued regulations to banks to the effect that their net foreign indebtedness should be either zero or not exceed certain maximum levels. Through the use of this regulation the Bank of Italy has pursued a sterilization policy. Swap operations between the Italian Exchange Office and commercial banks have been the second way through which Italian monetary authorities have altered the composition of the banks' balance sheet. Both the sterilization policy and the swap operations were used to counteract the effects of balance-of-payments disequilibria on the base, money supply, and ultimately on general economic activity.
Further evidence in support of the short-run efficacy of monetary actions was gained during the discussion of the "right" policy mix. It was first noted that the estimates of the reduced-form equations of the model could not be used simultaneously as a test of the model and an indication of what policies the Italian central authorities have predominantly used from 1958 to 1969. In search of information which was independent of the regression results, it was discovered through an institutional analysis of the Italian budget system that the central authorities had maneuvered the cash budget deficit and the domestic source component of the base independently, letting new issues of government securities be determined endogenously in the system. A statistical analysis of the lag structure of that policy mix and of the reduced-form equation of the model in the absence of the Treasury's budget restraint revealed that current monetary actions have had a clear comparative advantage over current fiscal actions in influencing ultimate target variables. Over a period of one year, however, the cumulative effects of fiscal actions have been larger than those of monetary actions. This difference in results between current and cumulative impact multipliers is perfectly consistent with the implications of the model of Chapter 4. Because of the constraints imposed on the economy by a system of fixed exchange rates, independence of monetary policy vanishes in the long run. In no way, however, does the long-run emasculation of monetary policy detract from its power as a stabilization instrument. The evidence presented in this chapter points out that the strongest
impact of monetary actions on economic activity occurs between 3 and 6 months and that this impact is quite reliable. In all instances monetary impulses are transmitted over a shorter time interval than fiscal impulses.

The inability of fiscal policy to stabilize economic activity has its causes in long decision lags and long intervals between the formation of output and the actual disbursement of funds by government agencies.

In several instances fiscal policy has countered the effects of monetary actions which have been primarily responsible for whatever stabilization policy has been carried out in Italy.


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