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Financial Innovation, Deregulation, and Money Demand in France, Italy, and Japan

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Summary

This paper examines the recent behavior of monetary aggregates and the process of financial innovation and deregulation in France, Italy, and Japan. While the experience of each country is interesting in itself, our primary objective is to add the analysis of these three countries to the large and growing literature concerning the response of the demands for monetary aggregates to changes in the financial market in industrial countries. Our interpretation of recent developments in the three countries studied is that the forces behind the process of financial innovation and deregulation are similar in the countries studied. Moreover, the associated changes in the structure of financial markets are comparable both across these three countries and other industrial countries. Nevertheless, the behavior of monetary aggregates in recent years was quite different. In the cases of France and Italy, the introduction of new types of financial assets seems to account for an important part of the overprediction of money demand relationships estimated through the late 1970s. In contrast, very important changes in financial markets in Japan have been associated with no apparent shift in money demand relationships in recent years. This suggests either a more sophisticated model of the effect of innovation and deregulation on money demand is needed or that factors besides changes in financial structures lie behind the apparent instability in historical money demand relationships in these and perhaps other industrial countries.

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One alternative explanation of the apparent shifts in demand for money has been that historically high interest rates and inflation rates have led to permanent changes in money demand as households and firms invest in techniques to economize on money holdings. Although the possible tests of this hypothesis were certainly not exhausted in this study, a number of plausible tests were performed that did not support the hypothesis.

I. Introduction

The impact of financial innovation and deregulation on the ability of the authorities of the industrialized countries to effectively pursue a strategy of monetary targeting has varied from country to country. In some cases, the authorities seem to have had no major problems in achieving their preannounced monetary targets; in other cases, the targets were not met, the monetary aggregates were redefined and the strategy of monetary targeting was discontinued or substantially modified. In the literature on the relationship between financial innovation and deregulation, money demand and monetary targeting, there have been a number of explanations of why problems with monetary targeting arise. However, these discussions have been focused on a limited set of topics and have not considered a number of important factors. There has been a tendency to overlook the fact that financial innovations are largely endogenous to past and present monetary policies and that both the kind and the tempo of financial deregulation are under the control of the authorities. Moreover, most of the literature has focused only on what are regarded as the major problem cases like the United States, Canada, and the United Kingdom. In particular, there are no studies that combine, in a compact way, a description of the forces driving the processes of financial innovation and deregulation in countries other than those indicated above with an empirical analysis of the stability of their money demands over the last few years. This paper fills a portion of this gap by considering the experiences of France, Italy, and Japan.

In addition to examining the individual experience of these countries, this paper provides the basis for cross-country comparisons of experience with monetary aggregate targeting in periods of financial innovation and deregulation. A well-known difficulty in working with data for individual countries is that we have only one or two episodes during which rapid changes in inflation rates and nominal interest rates are intertwined with innovations and deregulation in financial markets. Inspection of the experience on a country-by-country basis can therefore provide only limited information as to which of these factors was most important. Moreover, in focusing on countries where historical money demand relationships seem to have been unstable, analysts have neglected cases where similar factors have not led to changes in money demand relationships.

The existence of such cases, and our analysis suggests that Japan might fit this description, would indicate that alternative reasons for the apparent instability of money demand should be explored.

The resolution of these issues is important if monetary aggregate targeting is to maintain or regain its place as primary strategy for the conduct of policy. In fact, if the primary cause of recent unexplained changes in velocity of targeted aggregates in some countries is due to movements in interest rates and inflation rates that are outside historical experience, there are reasons to believe that the old relationships will re-establish themselves as a reliable guide to policy in the more stable economic environment that has begun to re-emerge recently. If, on the other hand, financial innovation and deregulation have altered the nature of targeted aggregates in a fundamental way it would follow that a considerable time might be required before the properties of these new financial aggregates can be predicted and the authorities can therefore rely on monetary targeting. In the simplest terms, we want to distinguish between movements along an historical money demand function, where perhaps the value of some of the arguments of the function could at times lie outside historical experience, and shifts in the function due to the availability of new financial assets brought about by financial innovation and deregulation or other factors that are not modeled. Problems with the attempt of making this judgment on the basis of cross-country comparisons certainly exist; in particular, while a comparative analysis of recent experience with interest and inflation rates is straightforward, a similar analysis of the nature and importance of financial innovation and deregulation is much less easily done. The analysis of recent experience in France, Italy, and Japan presented in this paper is a preliminary step in this direction.

Our analysis suggests that, for France, Italy, and Japan, the most important factor that drove the processes of financial innovation and deregulation appears to have been the need to finance large budget deficits. This led to attempts by the authorities to issue securities that were more competitive with the liabilities of existing depository institutions. These developments in turn forced the commercial banking industries to defend their market shares. Moreover, the new government securities provided an attractive asset base for new types of financial instruments issued by both existing and new financial intermediaries.

While the impetus for financial innovation and deregulation across these countries was similar, the implications of this process for the degree of stability of the demand for monetary aggregates appear to be quite different among the three countries. In the case of Japan, money demand does not appear to have shifted in any significant fashion over the last few years even though financial innovations appear to be quite important. In the case of France and Italy, money demand is found to

have shifted downwards by a magnitude that exceeds what one would expect by just looking at the flow of funds into those new assets which are not included in the monetary aggregates. While the impact of innovation and deregulation varied across countries, the effects of historically high inflation rates and interest rates were not found to be an important source of instability in demands for targeted aggregates in any of the three countries.

II. A Model of Money Demand and Estimation Procedures

In this section, we investigate the possible effects of financial innovation and deregulation on the behavior of the monetary aggregates in the countries under consideration with the help a familiar model of money demand. The model proposed by Chow (1966) postulates that per capita *real money balances are an endogenous variable and adjust slowly to* changes in the arguments of the function. 1/

Throughout the paper, capital letters indicate natural values, subscripts lagged values, * and ^{e} equilibrium and expected values. Money and income are entered on a per capita and seasonally adjusted basis, and money and interest rates are quarterly averages.

The general form of the regression model is as follows:

1/ An alternative model proposed by Laidler (1982a) postulates that per capita nominal money balances are exogenous--they cannot, therefore, be regarded as adjusting slowly--and that the variables that we normally have on the right hand side of money demand equations, prices in particular, are the ones that might adjust slowly to the monetary shocks. A priori, the relevance of this model could be determined through an evaluation of the nature of the monetary policy that is carried out in the country and sample period under consideration. Practically, however, because the exact nature of the monetary policy being carried out is not always easy to identify, and the estimating equations derived from the two models are quite similar, we did preliminary tests with both models. The results from the alternative model were implausible for Japan and France and quite similar to the more traditional model for Italy. For this reason, only the results obtained from the conventional model are reported in this paper. Results from the alternative model are available from the authors.

$$\log\left(\frac{M^{*d}}{P}\right)_t = b_0 + b_1 \log Y_t^e + b_2 R1_t + b_3 R2_t \qquad (1)$$

$$\log\left(\frac{M}{P}\right)_t - \log\left(\frac{M}{P}\right)_{t-1} = \alpha\left\{\log\left(\frac{M^{*d}}{P}\right)_t - \log\left(\frac{M}{P}\right)_{t-1}\right\} \qquad (2)$$

$$\log Y_t^e - \log Y_{t-1}^e = \beta(\log Y_t - \log Y_{t-1}^e) \qquad (3)$$

Where:

M = per capita nominal money balances

P = income deflator

Y = per capita nominal income

R1 and R2 = proxies for opportunity costs of holding money

α and β = speeds of adjustment for money and expected income

Data sources and definitions for each country are provided in Appendix A.

In the empirical research that follows, for each country the focus is on the demand for the monetary aggregate that is being targeted--M2 held by residents in the case of France, or for which official forecasts are given--M2 + CDs in the case of Japan, or that could be targeted if a formal policy of monetary targeting were adopted--M3 in the case of Italy. The period covered runs from 1960(I) to 1983(III) for France and Italy and to 1983(IV) for Japan. For each country, we first fit the model up to 1979. In order to detect any instability, the estimation period is progressively lengthened and the out-of-sample static forecast values for the period 1979-1983 are also computed. If instability is detected, we investigate whether it is to be attributed mainly to the availability of new financial assets or to other possible factors.

To cope with non-linearity and simultaneity, a two-stage, non-linear estimation package is employed. The list of instruments includes a constant, a trend variable, the lagged values of the endogenous variables and current and lagged values of such exogenous variables as government spending, exports and world inflation. The estimation package does not supply any information as to whether the residuals are autocorrelated. We employed an ad hoc procedure for testing for first order autocorrelation by first estimating a value for rho. The regressions were estimated in level form unless this parameter was significant. The lagged adjustment hypothesis implies that a higher order autocorrelation may be present; however we did not attempt to account for this.

III. Money Demand in France: Estimation, Simulation, and the Role of Financial Innovation

In the case of France, M2 held by residents--M2R in the notation of the Bank of France--is the targeted aggregate and is therefore also the focus of our analysis. The two proxies for the opportunity cost of holding money that we selected are a long-term interest rate, R, and the inflation rate. 1/ Formally:

$$\log\left(\frac{M^{*d}}{p}\right)_t = b_0 + b_1 \log Y_t^e + b_2 R_t + b_3(\log P_t - \log P_{t-4}) \qquad (4)$$

While Appendix B gives a detailed account of why we decided not to include certain variables, the inflation rate and permanent (and not actual) income are important determinants of the demand for M2R. The main reason for the inclusion of inflation is that deviations in inflation from trend have been large and abrupt, 2/ and nominal interest rates have not been free to adjust. In these circumstances, nominal interest rates captured only a fraction of the change over time in the opportunity cost of holding money vis-à-vis real assets. Moreover, for both objective and subjective reasons, the relevant choices for French savers seem to have been between money and real assets. To quote Melitz (1976)

> Another way to look at things is to stress a native French distrust of financial instruments rooted in rural mentality... French analysts often refer to this sort of mentality in attempting to explain the much lower state of general development of banking and financial markets in the country as opposed to the U.S. or Great Britain. According to this perspective, money viewed as a store of value, is traditionally a closer substitute for some commodity durables, like land, than are non-money paper instruments in France.

1/ The long-term rate was chosen on the basis of preliminary empirical work. Two recent studies also make use of a long-term rate; see Banque de France (1983) and Ministère de l'Economie (1984). Throughout the paper, inflation is taken to be the first difference in the logarithm of the GDP or GNP deflator between time t and t-4.

2/ The behavior of the domestic inflation rate appears to be dominated, at times, by movements in world prices and price controls.

A similar point was made, more recently, by Raymond (1983) and Banque de France (1983); the latter writes that shares and real assets "have long been considered as the best protection against inflation." These qualitative statements are well supported by empirical work that finds a statistically significant coefficient for the inflation rate in studies of money demand for France. 1/ The use of permanent income reflects the view that, for broad monetary aggregates such as M2 in France, store of value function is important for money demand. Precedents for the use of such variables can be found in David (1971), Ministère de L'Economie (1984) and Frochen (1984).

The empirical evidence is summarized in Table F1. The results suggest that the demand for M2R is more than unit elastic with respect to permanent income, which is not surprising given the large drop in velocity that characterized the period up to 1975 and was only partially offset thereafter. 2/ Both of the proxies for opportunity costs, the inflation rate, and the long-term interest rate, are statistically significant. 3/ If we consider equation (1), the elasticities of money demand with respect to the interest and inflation rates are -.095 and -.045 respectively. 4/ Third, the estimated values of the adjustment parameters α and β indicate that, while the adjustment process of real money balances to their equilibrium levels is almost completed within

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1/ See David (1971), Gradmont (1973), Melitz (1976), Al-Khuri and Nsouli (1978), Boughton (1979), Frochen and Roubine (1980), Dehove (1980), Frochen (1983) and Ministère de l'Economie (1984). This result does not appear to depend upon the use of any particular proxy for the expected rate of inflation. In fact, Daloz, David, Grandmont, Al-Khuri and Nsouli, Boughton and Dehove employ the actual rate of inflation, Frochen and Roubine and Frochen define expected inflation to be equal to $0.3\dot{p} + 0.7\dot{p}^e_{-1}$, and Melitz uses the following expression

$$\sum_{i=1}^{19} (0.9)^i \dot{p}_{-1} / \sum_{i=1}^{19} (0.9)^i$$

2/ Velocity was equal to 3.25 in 1960(I), 2.10 in 1975(IV) and 2.26 in 1983(III).

3/ At this point, we should stress that the distribution of the t-ratios is only asymptotically normal.

4/ If we were to use a short- rather than a long-term interest rate, the elasticity with respect to inflation would tend to be larger relative to that of the interest rate variable and this would be consistent with the results obtained by Melitz (1976), Al-Khuri and Nsouli (1978) and Frochen (1983). Also notice that our estimates for b_1, b_2, and b_3 are fairly close to those obtained by Ministère de l'Economie (1984).

Table F1. France: Demand for M2R

(2SLS estimates; t-statistics in parentheses)

Equation Number	Model	Estimation Period: 1961(IV) to	b_0	b_1	b_2	b_3	α	β	Rho	SEE x 10,000
1	1	1979(III)	-2.676	1.556	-.013	-.007	.220	.945	.528	101
			(8.360)	(16.974)	(2.544)	(2.676)	(2.144)	(6.204)	(2.965)	
2	1	1980(III)	-2.728	1.572	-.014	-.008	.245	.892	.530	102
			(8.230)	(16.094)	(2.540)	(2.825)	(2.142)	(6.073)	(2.832)	
3	1	1981(III)	-2.617	1.538	-.011	-.008	.217	.890	.483	98
			(8.195)	(16.918)	(2.906)	(2.920)	(2.273)	(6.000)	(2.712)	
4	1	1982(III)	-2.593	1.531	-.011	-.008	.232	.845	.474	97
			(8.186)	(16.922)	(2.838)	(3.419)	(2.251)	(6.054)	(2.572)	
5	1	1983(III)	-2.211	1.416	-.008	-.007	.213	.949	.625	98
			(4.999)	(11.970)	(2.063)	(3.551)	(1.598)	(7.402)	(3.671)	

the quarter, learning processes are significantly slower; only about twenty percent of the gap between actual and permanent income is eliminated within the quarter. 1/

As shown in equations 2-5 in Table F1, the estimates appear to be fairly stable except when the 1982(IV) - 1983(III) observations are included. 2/ To investigate the stability issue further, and to determine in what direction money demand has shifted over the recent quarters, we computed the out-of-sample static simulation values for the period 1979(IV) to 1983(III) on the basis of equation 1 in Table F1. Table F2 and Chart F1 present the results. The equation tracks fairly well up to the third quarter of 1981, when it begins to overpredict. The overprediction is reversed in the first quarter of 1982 but again becomes large through the end of the simulation period. More generally, for seven of the sixteen quarters included in the simulation period, the error exceeds the in-sample standard error estimate; six out of these seven errors are overpredictions. 3/

Our overall results are quite similar to those obtained by Frochen (1983, 1984), Insee (1984) and Ministère de l'Economie (1984); this occurs in spite of the fact that these studies explain the demand for M3 and make use of equations, estimation techniques and sample periods which are not the same as ours.

We turn now to the downward shifts in the demand for M2R which characterize the post-1981(II) and, even more so, the post-1982(II) period. 4/ Three alternative hypotheses will be investigated in turn. The first is that starting in July 1982, when price controls were implemented, actual inflation, which is our regressor, probably underestimates expected inflation. The adoption of the policy of price controls does roughly coincide with the worsening in the overestimation

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1/ Our estimates appear to be more reasonable than those by Daloz (1969), Canarella and Roseman (1978), Al-Khuri and Nsouli (1978), Boughton (1979) and Frochen (1983).

2/ For a discussion of the stability of money demand over the 1970s see Al-Khuri and Nsouli (1978), Boughton (1978) and Rati (1982). If we also consider the study by the Banque de France (1983), it would appear that no major shift occured over the decade.

3/ The adoption, in 1977, of explicit monetary targets does not appear to be a cause of a major shift in money demand, as Dennis (1983) suggests. It is true that velocity starts going up in 1977 but it is also the case that inflation accelerates at the end of 1977 and the long-term rate of interest starts rising at the end of 1978.

4/ Recall that we are using static simulations.

Table F2. France: Actual and Forecast Values for M2R

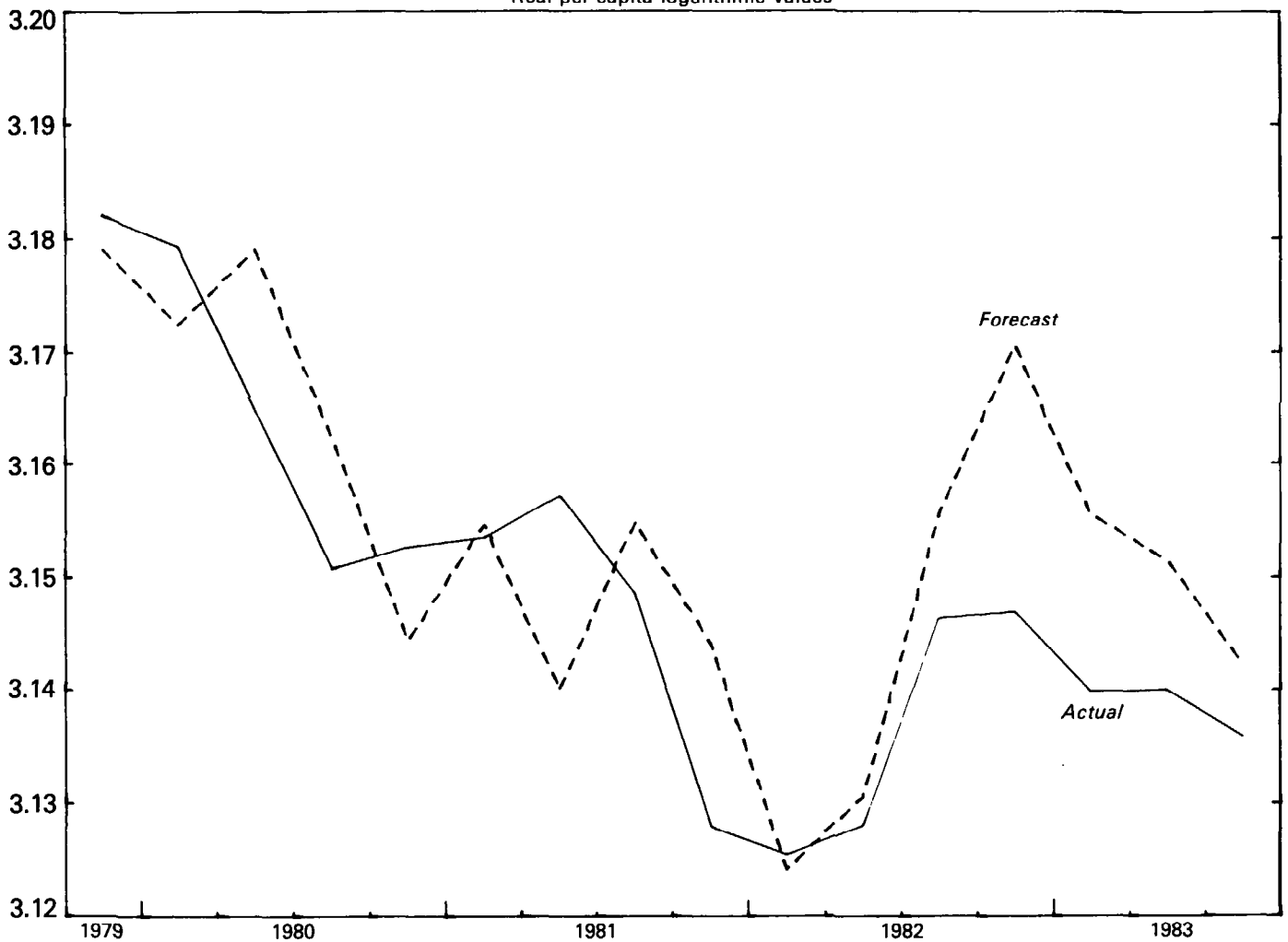
(Real per capita logarithmic values)

Time	Actual Values (A)	Forecast Values (B)	Forecast Errors (A - B)*100
1979(IV)	3.1820	3.1790	0.30
1980(I)	3.1792	3.1724	0.68
(II)	3.1650	3.1790	-1.39
(III)	3.1508	3.1625	-1.17
(IV)	3.1526	3.1443	0.82
1981(I)	3.1534	3.1546	-0.11
(II)	3.1572	3.1400	1.71
(III)	3.1485	3.1548	-0.63
(IV)	3.1278	3.1440	-1.62
1982(I)	3.1254	3.1241	0.13
(II)	3.1280	3.1305	-0.25
(III)	3.1463	3.1554	-0.91
(IV)	3.1469	3.1705	-2.36
1983(I)	3.1398	3.1555	-1.56
(II)	3.1399	3.1513	-1.14
(III)	3.1359	3.1421	-0.62

CHART F1

MONEY DEMAND IN FRANCE: ACTUAL AND OUT-OF-SAMPLE STATIC FORECAST STOCK OF M2R

Real per capita logarithmic values



problem. Moreover, measured inflation fell rapidly immediately after the adoption of the policy. 1/ The order of magnitude of the elasticity of money demand with respect to inflation is such as to generate a large overestimation of the actual money stock if one were to use a rate of inflation of, for example, seven percent instead of thirteen percent, which was the rate prevailing at the time the switch in policy regime occurred. On the other hand, however, it is also the case that, de facto, the policy of price controls ended in October, 1982 and that our equation generates the largest prediction error in the fourth quarter of the same year. Furthermore, the equation starts overpredicting in a systematic fashion in the third quarter of 1981, well before price controls came into effect, and continues to overpredict throughout 1983. On the whole then, we do not find the hypothesis convincing.

A second hypothesis, which is often included in studies of money demand in the United States, 2/ is that our equation overpredicts because it ignores the possible ratchet effects of the interest rate variable. According to the hypothesis, as interest rates rise, economic agents turn permanently to money economizing devices; thus, when interest rates fall, the desired stock of money does not increase. This hypothesis appears to have passed some formal statistical tests in the case of the United States.

As in the United States, money demand equations for France have also been found to overpredict over the last few years in circumstances where interest rates were falling from the unprecedented high levels of the early 1980s. However, no shifts in money demand were detected in the latter part of the 1970s, when French interest rates were also declining. Because the issue can be tested empirically, we experimented with two alternative, extra regressors in our money demand equations. The former is simply the maximum level of the interest rate variable reached over the period up to time t; the latter, first suggested by Simpson and Porter (1980), is the cumulated sum of the deviation in the interest rate from its moving average. 3/ When the former variable is included in the

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1/ The measured annual rate of inflation fell by five percentage points in about six months.

2/ See, for instance, Enzler et al. (1976) or Simpson and Porter (1980).

3/ The exact definition is the following:

$$\sum_{j=1}^{t} \left(R_t - \frac{1}{6} \sum_{i=j-5}^{i=j} R_i\right)^+$$

where + indicates that only positive values are taken into account. The initial value for this variable was set equal to zero.

equation and this is estimated over the period up to 1983(III), the variable is neither significant nor correctly signed. Moreover, the standard interest rate variable is no longer significant and the equation still overestimates over the post-1981 period. The second variable fares better, but only in the sense that it has the expected sign and is significant. The standard interest rate again becomes insignificant and overprediction of money demand remains evident.

A third possibility is that the fall in money demand was related to financial innovations. Until the mid-1960s the choice of French savers had been limited to either assets with controlled interest rates or to shares and real assets which have long been considered as the best protection against inflation. In subsequent years non-regulated rates on bank deposits were permitted. However, minimum amounts and maturities limited access to such deposits. Checking accounts also paid no interest, at least formally. 1/ The situation changed toward the end of the 1970s, when the supply of government bonds, which traditionally played a limited role, grew at a very rapid pace and provided savers with alternative assets. 2/ Since then, the average government bond maturity has declined continuously, the share of indexed government bonds has increased 3/ and new types of bonds have appeared. 4/

The issue of new, high-yield bonds by the Treasury forced banks and non-banks to innovate and seek changes in regulations. New instruments that are included in the M2 and M3 monetary aggregates include savings deposits with an indexed, tax-free yield that were offered for the first time in June 1982. Although they are not available to all investors and can only be purchased in limited amounts, 5/ at the end of 1983, the outstanding stock was 30.1 billion francs, an amount equal to 1.6 percent of M2 held by residents. 6/ Liquid savings deposits were offered for the

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1/ Deygas (1983) points out that de facto these accounts had a non-zero nominal yield.

2/ New issues by the government sector and public utilities accounted for 27 percent of the total in 1976 and 42 percent in 1983.

3/ The percentage of newly issued indexed bonds reached 10 percent in 1982 before declining somewhat in 1983. The use of indexed interest rates has also spread to bank credit. Because of the high inflation rates of the last decade, banks felt they could not afford to lend money on a medium-term basis at fixed rates.

4/ The new instruments provide holders with a range of options. For example, some of them can be redeemed before maturity, while others grant the privilege to purchase more bonds at the same yield.

5/ Only people with limited incomes have access to this asset; in 1983 the deposit could not exceed 20,000 francs.

6/ Of the total 30.1 billion francs, 13.7 billion francs are included in the M2R aggregate with the remainder included in M3.

first time in October 1983. According to Insee (1984), from the point of view of savers, these assets are similar to savings deposits with a return free of taxes. 1/ At the end of 1983, their outstanding stock was 42.8 billion francs, an amount equal to 2.3 percent of M2R. 2/ In addition, new instruments not included in the monetary aggregates include money market funds at commercial banks that were introduced as a substitute for time deposits following the change in regulation which restricted yields on time deposits in 1981. 3/ The availability of variable interest bonds provided the banks with investments which made it possible to offer such deposits (Py (1983)). At the end of June 1983, their outstanding combined stock was 82 billion francs, or 4.4 percent of M2R. 4/

The hypothesis that these changes in the financial system altered money demand seems to be reasonable in that velocity started drifting in the latter part of 1981 just when new assets became available, and the process accelerated in the summer of 1982 when demand for these assets, money market funds in particular, picked up. A conservative way to evaluate the importance of the new instruments that are not included in the monetary aggregates is to contrast the cumulated amounts by which money demand overpredicts to the figures on the outstanding stocks of such assets around 1983(III). Table F3 gives the values of the actual and simulated M2 nominal money stocks as well as of the simulation errors. The cumulated sum of the errors over the post-1981(II) period is equal to 147 billion francs. At the end of 1983, the outstanding stock of new instruments not included in the M2 aggregate was equal to about 108 billion francs. Our interpretation of these data is that it supports the view that the problem of the missing money in France is related to the growth of alternative financial assets.

1/ The maximum amount that can be held if F 10,000. These funds are channeled to finance projects. The net of tax return has been set at 7.5 percent.

2/ Of the total 42.8 billion francs, 33.2 billions francs are included in M2R with the remainder included in M3.

3/ In September 1981, the minimum terms for eligibility for interest at the market rate on time deposits were raised from F 100,000 for one month to F 500,000 for six months.

4/ To further stress the quantitative relevance of the above assets, we could mention that the inclusion of money market funds in the definition of M2R would raise its observed rate of growth from 10.8 to 12.3 percent in 1982 (the target rate was 12-13.5 percent) and from 11.2 to 14.2 percent in 1983 (the target rate was 9.0). We thank Alessandro Leipold for drawing our attention to this fact.

Table F3. Actual and Simulated
Nominal Money Stocks 1/

(Billions of francs)

	Actual (A)	Simulated (B)	(A-B)
1979(IV)	1,199	1,195	
1980(I)	1,233	1,225	
(II)	1,254	1,272	
(III)	1,279	1,294	
(IV)	1,309	1,299	
1981(I)	1,344	1,345	
(II)	1,389	1,365	
(III)	1,430	1,440	-10
(IV)	1,461	1,485	-24
1982(I)	1,503	1,501	+2
(II)	1,555	1,559	-4
(III)	1,600	1,615	-15
(IV)	1,631	1,670	-39
1983(I)	1,668	1,695	-27
(II)	1,712	1,731	-19
(III)	1,740	1,751	-11

1/ Deseasonalized, mid-quarter figures.

Although results similar to ours have also been obtained by Frochen (1983, 1984), Insee (1984), and the Ministère de l'Economie (1984), these studies suggest that financial innovation may not be the only major cause of the phenomenon of the missing money. Frochen points out that, over the recent period, long-term interest rates have become positive in real terms--this is unusual for France--and the market for bonds has expanded considerably. Our reaction to the real interest rate argument is that both the nominal interest rate and inflation are included in the regressions reported in this paper and this should capture the effects of changes in real interest rates on velocity. Furthermore, long-term real interest rates 1/ became positive in 1979(III) and by 1980(I) were already equal to 3.3 percent; on the whole, the time correspondence between the phenomenon of missing money and positive real interest rates seems weak. Much the same objection applies to the argument that stresses the role of the growth in the market for bonds. It is not easy to explain why such growth should have resulted in a shift in money demand just around 1981.

In conclusion, it is possible that factors such as ratchet interest rate effects or growth in the market for bonds might have contributed, at one stage or another, to the downward shift in money demand in recent years. However, it appears that, for France, financial innovation is the single most important cause of the shift. As for the policy implications that follow from our results, we would stress these aspects. First, in the process of determination of the target rate of monetary growth, the authorities may have to rely less on the empirical evidence on money demand obtained on the basis of data drawn from the experience of the 1960s and 1970s. Second, unless the stability of the demand for M2R is restored by modeling the returns on the new financial assets, the issue of what should be the intermediate target of monetary policy remains.

IV. Money Demand in Italy: Estimation, Simulation, and the Role of Financial Innovation

The real demand for M3 in Italy is assumed to depend upon permanent real income, a trend variable, the yield on long-term private bonds and the inflation rate. 2/ Formally

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1/ Real rates are defined as the difference between R and $\dot{p}$.

2/ A first detailed explanation of why these variables and not others were included can be found in the recent study by Calliari, Spinelli and Verga (1984). In that study it is shown that: (i) permanent income performs better than actual income, (ii) actual inflation performs better than either an Arima variable or a variable based on the results of a

$$\log(\frac{M^*d}{P}) = b_0 + b_1\log(\frac{Ye}{P}) + b_2R + b_3(\log P_t - \log P_{t-4}) + b_4 \text{ TREND} \quad (5)$$

Two considerations influenced the conduct of our empirical research. First, recent work on the demand for M3 which was based on the equation above has shown that no serious stability issue arises as far as the 1970s are concerned. 1/ Thus, the equation can be seen as a fairly accurate description of the structural relationships up to the end of the 1970s and can be relied upon in order to detect subsequent potential drifts in velocity. Second, by looking at Chart I1, it is evident that the post-1979(III) period witnesses a large and persistent deviation in M3 velocity from trend. This raises the issues whether our equation explains the recent drift in velocity and, if not, what the role of financial innovation has been.

As was done for France, the model is estimated over different sample periods. The results of these regressions are shown in Table I1. The sum of the elasticities with respect to income and time explain the long-run steep downward trend in velocity, which fell from a value of 0.42 in 1960(II) to 0.25 in 1979(III)--see Chart I1. The interest rate variable is always strongly significant, while inflation is only marginally significant. The elasticities of money demand with respect to interest rates and inflation, computed on the basis of equation 1 in Table I1, are -0.23 and -0.02. The adjustment parameters α and β are both significant; real money balances appear to adjust considerably faster than expected income.

2/ (Cont'd from page 15) survey, (iii) the own return on money and the open economy variables are only marginally significant (at times) and never appear to make a decisive contribution to the explanation of the behavior of the dependent variable. In further tests preliminary to the present study, we experimented once again with the unconvered Eurodollar rate. Results were as follows. First, its statistical significance depends on the sample period and on the model adopted. Second, its presence among the regressors does not help explain the large deviation in velocity from trend that characterizes the post-1979 period. This plus the fact that the covered Eurodollar rate, which is obviously a more correct proxy for the opportunity cost of holding money vis-à-vis foreign assets, performs even worse led us to the decision to drop open economy variables altogether. We will come back to these aspects later on.

1/ See Calliari, Spinelli and Verga (1984) who estimate their equation over the period 1961(IV)-1980(I).

CHART I1

INCOME VELOCITY OF MONEY IN ITALY

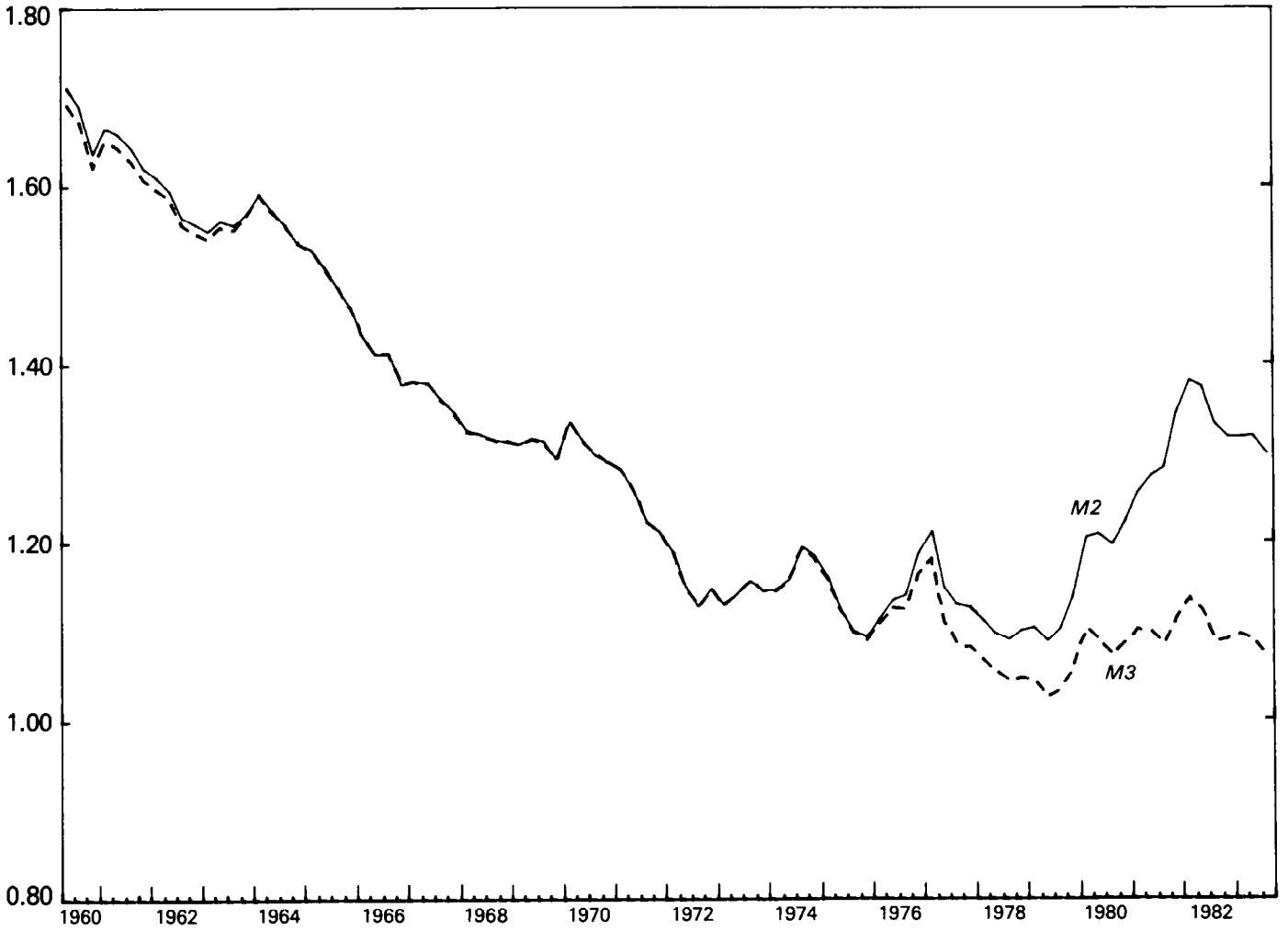

Table I1. Italy: Demand for M3

(2SLS estimates; t-statistics in parentheses)

Equation Number	Model	Estimation Period: 1961 (IV) to	b_0	b_1	b_2	b_3	b_4	α	β	Rho	SEE x 10,000
1	1	1979 (III)	3.166	.586	-.025	-.003	.013	.327	.645	---	89
			(3.278)	(3.222)	(5.049)	(1.774)	(7.003)	(3.108)	(5.144)		
2	1	1980 (III)	2.624	.693	-.025	-.004	.012	.217	.698	---	92
			(2.102)	(2.918)	(4.873)	(2.132)	(5.223)	(2.814)	(6.517)		
3	1	1981 (III)	2.132	.785	-.019	-.005	.010	.192	.619	---	91
			(1.384)	(2.666)	(4.412)	(2.865)	(3.811)	(2.394)	(6.208)		
4	1	1982 (III)				CONVERGENCE FAILED					
5	1	1983 (III)				CONVERGENCE FAILED					

Turning to stability, it is evident from the two sets of estimates given in the table that a major problem arises as we move into the 1980s. In fact, as we extend the sample period beyond 1979(III), the estimation results worsen systematically until convergence becomes impossible to achieve. Having established that a breakdown has occurred in a relationship that has been found to hold over the 1960s and 1970s, the question arises whether money demand has shifted up or down. Empirical tests are needed to settle this issue because, although velocity drifted upwards, both interest and inflation rates rose substantially starting around 1978; between 1978(IV) and 1982(II), the former went from 13 to 21 percent, the latter from 13 to 16 percent. Thus, we computed the out-of-sample static forecast values on the basis of equation 1 in Table I1. Results are presented in Table I2 and Chart I2. The models start overpredicting at the beginning of the simulation period; the overprediction is reversed in 1981(II,III) and then comes back on a much larger scale at the end of 1981. By the second quarter of 1983, overestimation reaches 6.6 percentage points. The in-sample standard error of equation 1, Table I1, is about 0.9 percent; the out-of-sample forecast error of the same equation is at least twice as large in nine out of sixteen quarters, starting with 1980(I).

The exclusion of some important explanatory variable from the regressors is a possible source of these problems. Because well over ninety percent of M3 yields some explicit return, a potential missing variable is a proxy for the own return on money. As a proxy, we took the interest paid on various types of bank deposits. This variable was entered first separately and then in differential form, but it did not improve the predictive properties of the model over the post-1979 period. 1/

Uncertainty was also considered as a potential missing variable. Although there are conflicting theories as to the direction of the influence of uncertainty on money demand, 2/ and although we do not know how to empirically distinguish between variability and unpredictability (Kantor (1983)), we experimented with a moving standard deviation (around a moving trend) of the inflation rate. 3/ The variable was not significant and did not help explain the drift in velocity.

1/ Of course, this result could be due to the lack of a good proxy for the explicit return on money balances. In fact, although banks have often negotiated the interest on deposits on an individual basis, we had no data on such dealings and therefore had to use the official data. On the whole, however, we doubt the availability of better data would rescue the equation.

2/ See Frenkel (1977), Klein (1977), Blejer (1979), and Mascaro and Meltzer (1983).

3/ The variable was constructed as follows. Define $X = 100 \cdot \ln(P/P_{-1})$. Compute its mean value over the last six quarters $MX = (X + X_{-1} + \ldots + X_{-5})/6$. The regressor will therefore be $(1/6)[(X - MX)^2 + (X_{-1}-MX)^2 + \ldots + (X_{-5}-MX)^2]$.

CHART 12

MONEY DEMAND IN ITALY: ACTUAL AND OUT-OF-SAMPLE STATIC FORECAST STOCK OF M3

Real per capita logarithmic values

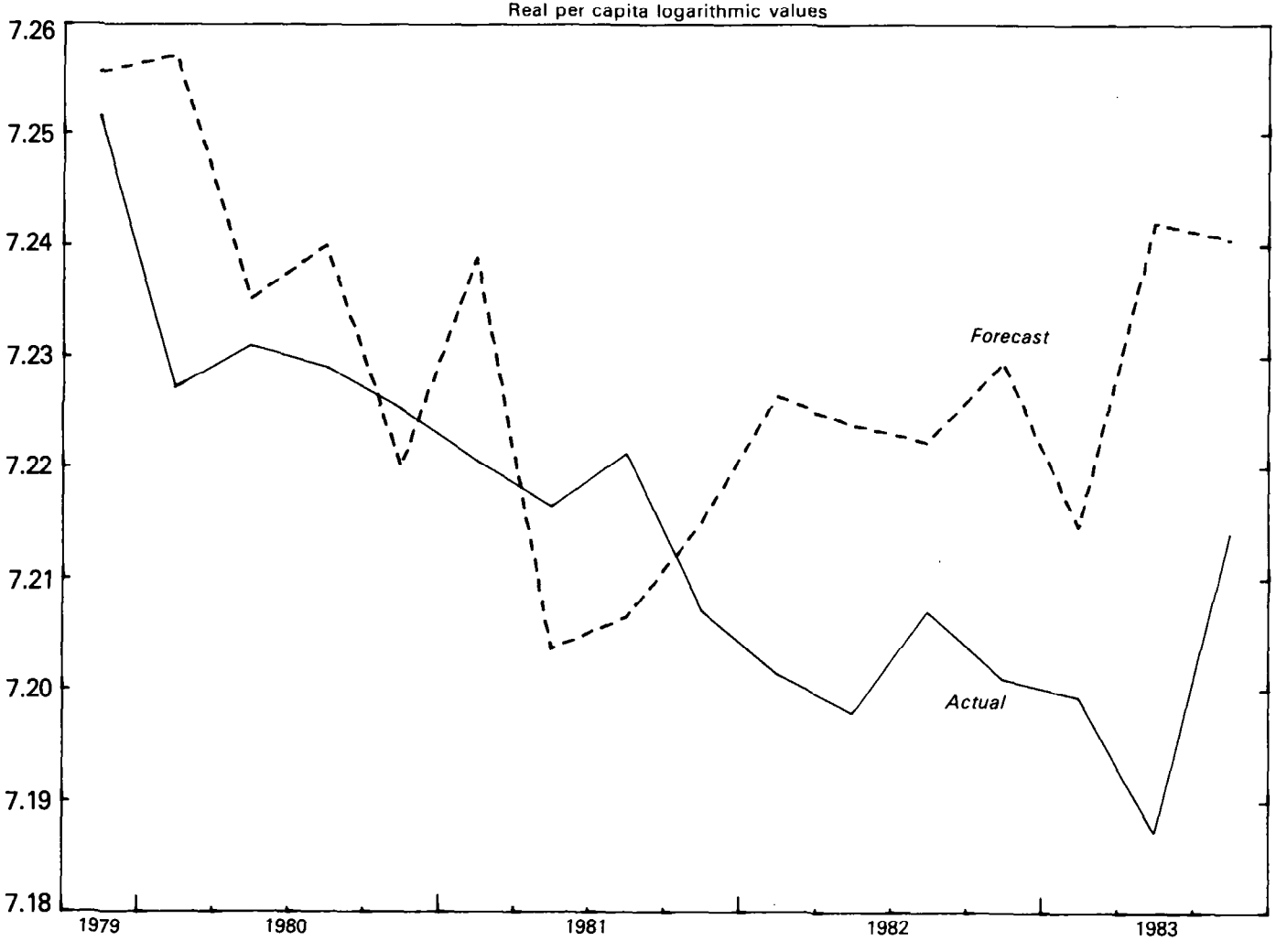

Table I2. Italy: Actual and Forecast Values for M3

(Real per capita logarithmic values)

Time	Actual Values (A)	Forecast Values Model 1 (B)	Forecast Values Model 2 (C)	Forecast Errors 100*(A - B)	Forecast Errors 100*(A - B)
1979 4	7.251	7.255	7.258	-0.407	-0.692
1980 1	7.227	7.257	7.256	-2.996	-2.908
2	7.230	7.235	7.230	-0.424	0.013
3	7.229	7.240	7.235	-1.102	-0.683
4	7.225	7.241	7.241	-1.611	-1.591
1981 1	7.220	7.239	7.241	-1.874	-2.061
2	7.216	7.194	7.199	2.181	1.702
3	7.221	7.207	7.204	1.332	1.658
4	7.207	7.229	7.223	-2.274	-1.673
1982 1	7.201	7.224	7.217	-2.285	-1.563
2	7.197	7.215	7.213	-1.736	-1.531
3	7.207	7.222	7.215	-1.514	-0.876
4	7.200	7.237	7.230	-3.625	-3.007
1983 1	7.199	7.246	7.234	-4.719	-3.546
2	7.187	7.253	7.244	-6.634	-5.719
3	7.214	7.240	7.241	-2.668	-2.710

The rate of change of the exchange rate was also considered as a potential missing variable although previous research has not found the uncovered or the covered foreign interest rates to play a significant role in the explanation of the behavior of the Italian money stock. Following a suggestion of the Bank of Italy which, in its report for 1980, 1/ suggested that households may have transferred assets abroad because of fears of devaluation, we experimented with the actual rate of depreciation as well as with the sum of the Eurodollar rate and depreciation. Once again, these variables were found to be statistically insignificant. 2/

The possible importance of ratchet effects of interest rates on money demand was also explored. The interest rate on long-term bonds rose by more than seven percentage points between 1973 and 1977 and by another eight points between 1979 and 1981; subsequently, it declined fairly rapidly. To test the hypothesis, we experimented with the same two variables described above for France. Neither variable was useful in improving the money demand relationship. In some of the equations, the ratchet interest rate variable was negatively signed and significant, but it was simply crowding out the other interest rate variable and, more important, it did not prevent the equation from overpredicting.

Having considered a number of plausible alternatives, we turn to the hypothesis that the phenomenon of missing money might be due to financial innovation. The most important factor behind recent innovations in Italy's financial markets is clearly seen in the authorities' intention, made explicit in the Bank Report for 1979, to pursue a policy "aimed at reducing the financing of the Treasury . . . by money creating institutions as well as establishing a direct link with savers." 3/ This policy was implemented initially through sales to the public of ordinary treasury bills (OTBs) 4/ and subsequently by sales of longer-term bonds. This resulted in an unprecedented divergent behavior in the growth of M2 and M3 (see Chart II). The relatively rapid growth in the outstanding quantity of OTBs resulted from a widening policy-induced gap between the yield on bank deposits and OTBs. Two factors were responsible, starting in 1979, for this gap. On the one hand, the size of the public sector borrowing requirements induced the Treasury to raise the yield on OTBs.

1/ Page 303.
2/ Page 233.
3/ Page 233.
4/ OTBs are very liquid, have maturities of 3, 6, or 12 months, are available in low denomination, and are tax free.

On the other hand, because of a contemporary tightening in the policy of credit ceilings, the banking system did not find it profitable to bid for deposits. 1/

The effects of this shift into OTBs on the conduct of monetary policy did not receive widespread attention during the late 1970s and early 1980s. First, it had always been clear that the shift was policy-induced and not exogenous. Second, the shift occurred within M3 and slowed down significantly in 1983 when bank deposits became, once again, competitive with respect to OTBs and the rates of growth of M2 and M3 converged. Third, at the end of 1983 the Bank of Italy was still targeting credit rather than money.

The recent phasing out of the policy of credit rationing was bound to result in more attention being paid to the nature of certain new financial assets and to their effect on the demand for the traditional monetary aggregates. In this context, attention has focused on a part of the long-term government debt, which is not included in M3. Since 1981, when the authorities initiated a policy of lengthening the average maturity of the outstanding debt, credit certificates of the treasury (CCTs) have grown rapidly. In some respects these instruments have a greater degree of "moneyness" than assets, such as CDs, issued by banks and the OTBs that are included in the definition of the broadly defined money stock (Banca Commerciale Italiana (1984)). These instruments are very liquid in the sense that there exists a deep and active secondary market. Their yield is indexed on that of short-term bonds and is revised twice a year. Moreover, they are available in denominations smaller than those of OTBs, and unlike the OTBs, CCTs exist physically and can be transferred, at zero cost, from one economic agent to another.

1/ This phenomenon was exacerbated by the fact that, during the previous years, the banking system had been forced to buy large quantities of long-term, low yield bonds. This meant that (i) short-term credit, whose interest rate could be raised, represented only a small fraction of total credit so that the extra costs of higher yields on deposits could not be passed on to borrowers and (ii) banks were actually trying to reduce their bond portfolios and managed to keep on lending without having to worry about falling bank deposits. On all this, see Bank Reports for 1979, pp. 219 and 233, for 1980, p. 221, for 1981, p. 248. In the Reports for 1980, p. 221, and 1981, p. 247, we find yet another reason why banks did not find it profitable to bid for deposits and invest in bonds. On the one hand, the cost of required reserves against deposits was on the rise and on the other, because the general public had easy access to the market for bonds, the spread could not become economically meaningful.

Another development is the recent growth in the market for CDs. Because of regulations which limited the incentive to issue CDs, the market was practically nonexistent up to the second half of the 1970s. In the early 1980s, in an attempt to provide banks with a way of distinguishing between transactions and savings deposits, some of the restrictions were lifted. As a result, the incentive to issue CDs was enhanced slightly and a secondary market developed. 1/ The total stock of CDs in the hands of the public represented 1.9 percent of M3 at the end of 1977 and 3.3 percent in mid-1983. CDs issued by ordinary banks (at fixed rates and with a maturity of 6 to 18 months) are included in the definition of M2 and M3. However, CDs issued by special credit institutions are not. Although the latter have a longer maturity (18 to 60 months) they often carry an indexed rate and are probably a very close substitute for instruments included in the traditional monetary aggregates.

In order to gain some perspective on the possible importance of these new assets, we compare changes in the amounts outstanding with prediction errors in the money demand relationships described above. The traditional aggregates are defined as follows. M1 is the sum of coins, notes, and current accounts at banks and post offices. M2 is the sum of M1, savings and time deposits at banks and post offices, and certificates of deposit issued by ordinary banks. M3 is the sum of M2 and OTBs. Table I3 gives the actual and forecast figures for M3 over the post-1978(III) period. The model generates a cumulated sum of overpredictions of about 128,000 billion lire. The stock of CCTs with indexed rates, which, as mentioned above, are considered by some to be close substitutes for assets included in the definition of M3, amounted to about 43,000 billion lire at the end of our sample period, i.e., to only 1/3 of the total missing money. If one also considers the outstanding stock of CDs which are not already included in M3, we have another 16,000 billion lire. Thus, the combination of CCTs and CDs would directly explain about half of the phenomenon of the missing money.

To look into this point more thoroughly, we did further tests. First, we brought the return on CCTs with indexed yields into the analysis. The explicit assumption was that, in the early 1980s, these assets have become the third major alternative way (besides long-term private bonds and real assets) of holding wealth. The assumption was tested in different ways. One way was to include the yield on CCTs as a third proxy

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1/ See Bank Report for 1980, p. 224, and 1981, p. 248. The return on required reserves was raised from 5 to 9.5 percent and more banks were allowed to issue CDs. On the whole, regulations remain tight and interest rates, which are controlled by the authorities, are far from being competitive, given the nature of the asset. For instance, in 1982 the yield on CDs was lower by 2 percent than that on other, similar assets.

Table I3. Actual and Forecast Nominal M3

(In billions of lire)

Time	Actual values (A)	Forecast values (B)	Simulated errors (A-B)
1979 4	280,936	282,085	-1,148
1980 1	294,139	303,085	-8,946
2	305,837	307,137	-1,300
3	316,314	319,821	-3,507
4	329,427	334,780	-5,353
1981 1	345,249	351,781	-5,532
2	358,455	350,722	7,733
3	370,959	366,050	4,909
4	384,628	393,477	-8,849
1982 1	398,707	407,925	-9,218
2	415,276	422,549	-7,273
3	432,346	438,943	-6,597
4	449,472	466,068	-15,596
1983 1	464,068	486,496	-22,428
2	479,168	512,035	-32,867
3	499,764	513,279	-13,515
			-128,000

for the opportunity cost of holding money; the variable did not prevent the estimation program from failing to achieve convergence when the estimation period included 1982 and 1983. Another way was to include the difference between the returns on long-term private bonds and CCTs as a regressor; this experiment also failed. Yet another experiment was to replace, starting in 1980(IV), the return on private bonds with that on CCTs. This amounts to the assumption that, in the early 1980s, CCTs emerged as the major financial asset alternative to money. The econometric results looked much the same as before and the out-of-sample forecast improved only marginally.

On balance this evidence, plus the fact that the demand for M4 is not stable but simply less unstable than that for M3 (see Table I4), leads the authors to conclude that the upward drift in velocity of the 1980s can only be partially attributed to financial innovation.

V. Money Demand in Japan: Estimation, Simulation and the Role of Financial Innovation

The demand for M2 in Japan is assumed to depend on permanent income and two proxies for the opportunity cost of holding money balances. The proxies are the difference between a short-term interest rate and the inflation rate on the one hand, and the yield on three-month time deposits on the other. Formally, the demand for real money balances is the following:

$$\log(\frac{M}{P})_t = b_0 + b_1(\frac{Y}{P})^e_t + b_2(R_t - RTD_t) + b_3[(\log P_t - \log P_{t-4}) - RTD_t] \quad (6)$$

The yield on three-month time deposits, RTD, was taken to be a proxy for the own return on money balances. A short- rather than a long-term rate of interest was chosen on the basis of preliminary research. The rate of inflation is entered as an additional variable because nominal interest rates have never been completely free to adjust to market forces. In addition, the limited availability of financial assets alternative to money balances suggests that Japanese economic agents may have been sensitive to the return on real assets. 1/ Table J1 presents the results

1/ In Appendix B, there is an introduction to the literature on money demand in Japan. Our own preliminary empirical research has shown that the inclusion, among the regressors, of either a time trend variable or a long-term interest rate or the Eurodollar rate does not lead to any

Table I4. Italy: Demand for M4

(2SLS estimates; t-statistics in parentheses)

Equation Number	Model	Estimation Period: 1961 (IV) to	b_0	b_1	b_2	b_3	b_4	α	β	Rho	SEE x 10,000
1	1	1979 (III)	3.706	.482	-.026	-.003	.014	.360	.622	---	87
			(3.997)	(2.769)	(5.267)	(1.972)	(7.858)	(3.237)	(4.939)		
2	1	1980 (III)	3.486	.526	-.026	-.003	.014	.285	.686	---	90
			(3.474)	(2.777)	(5.460)	(2.125)	(7.288)	(3.172)	(6.169)		
3	1	1981 (III)	3.053	.606	-.020	-.005	.013	.260	.596	---	90
			(2.492)	(2.607)	(4.847)	(3.000)	(5.591)	(2.671)	(5.671)		
4	1	1982 (III)				CONVERGENCE FAILED					
5	1	1983 (III)				CONVERGENCE FAILED					

Table J1. Japan: Demand for M2

(2SLS estimates; t-statistics in parentheses)

Equation Number	Model	Estimation Period: 1961(IV) to	b_0	b_1	b_2	b_3	α	β	Rho	SEE x 10,000
1	1	1979(II)	-.956 (2.556)	1.115 (22.221)	-.013 (2.594)	-.009 (2.443)	.199 (3.172)	.351 (4.299)	---	85
2	1	1980(IV)	-.952 (2.910)	1.114 (25.590)	-.014 (3.173)	-.008 (2.693)	.210 (3.119)	.341 (4.514)	---	83
3	1	1981(IV)	-.970 (3.068)	1.117 (26.740)	-.014 (3.247)	-.008 (2.828)	.208 (3.251)	.339 (4.669)	---	81
4	1	1982(IV)	-1.027 (3.272)	1.126 (27.310)	-.014 (3.191)	-.008 (3.057)	.203 (3.227)	.326 (4.700)	---	79
5	1	1983(IV)	-1.036 (3.301)	1.129 (27.469)	-.015 (3.303)	-.008 (3.000)	.200 (3.182)	.317 (4.696)	---	79

obtained from the estimation of the equation above over different time periods and with M2 as a dependent variable. On average, the elasticity with respect to income is equal to 1.12, which explains the systematic and moderate decline in income velocity of money over the quarter of a century that we consider. 1/ The two proxies for the opportunity cost of holding money are both significant. As calculated from equation 1 in Table J1, the elasticities of money demand with respect to R - RTD and p - RTD are equal to -.046 and -.019, respectively. As for the nature of the adjustment process involved, the results suggest that both adjustment and learning lags are important.

In contrast to the two countries discussed above, there is no apparent shift in money demand in Japan during the 1980s. The only noticeable change is a slight tendency on the part of the adjustment parameters α and β to fall. The remaining parameters are basically unaffected by the inclusion of further observations.

More evidence on the stability issue was obtained through the out-of-sample static simulation of equation 1. In the case of Japan, the beginning of the simulation period was chosen to be 1979(III) because CDs

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1/ (Cont'd from page 24) significant improvement in the results. The suggestion that a trend variable be included among the regressors can be found in Bank of Japan (1975). When the variable is included, the coefficient on permanent income falls or rises depending on the sign of the coefficient on the trend variable. This holds independently of whether a short- or long-term interest rate is used or whether money is considered to be endogenous or exogenous. Results are worse if a long-term rate, the yield on telegraph and telephone bonds in our case, is used. In particular, the interest rate variable is not significant--its t-statistic varies from -0.8 to -1.3 depending on the estimation period--while the inflation rate always is. The rest of the equation is practically unchanged. This holds independently of whether a trend variable is present or not and whether the money stock is considered to be exogenous or not. The Eurodollar rate tends to take on a positive coefficient which, at times, turns out to be statistically significant. This too holds independently of whether a short- or long-term rate is used and whether money is considered to be exogenous or not. Because one often reads that changes in the relative yield on postal savings resulted in large shifts in the demand for bank deposits (which are included in M2) around 1980, we also experimented with the yield on postal savings certificates of less than one year as an extra regressor. The variable was not found to be significant and correctly signed.

1/ Velocity of M2 was equal to 1.66 in 1961(IV) and to 1.08 in 1983(IV).

became available in the summer of 1979. 1/ The simulation results were expected to throw some light on two related issues, namely (i) has demand for M2 remained stable after the introduction of CDs?, and (ii) are the simulated values closer to the values of M2 or M2 + CDs, i.e., did the funds that went into CDs come from assets included in M2? Before going into the simulation exercise, we fitted a few equations with M2 + CDs as a dependent variable. The results, some of them are given in Table J2, turned out to be almost exactly the same as the corresponding ones in Table J1.

The results of the simulation equation 1 in Table J1, are presented in Table J3 and Chart J1. In contrast to the two countries discussed above, and the recent experience in several other industrial countries, the equation tends to underpredict the demand for M2 in recent years. The forecast value exceeds the actual value in only five out of eighteen quarters from 1979(III) to 1984(IV). The only two consecutive over-prediction cases occur in 1980, when an outflow of funds into postal savings took place. The absolute size of the forecast errors also appears to be relatively small. The error is always smaller than one percent and in two cases it is greater than the in-sample standard error of 0.85 percent.

Our interpretation of the evidence is that money demand in Japan stayed reasonably well on track over the last 4-5 years and that no shifts can be detected due to financial innovation or other factors. This result is surprising since the general impetus for innovation and the type of financial innovations in Japan is in many respects similar to that observed in other industrial countries.

The creation of the Gensaki market, which is similar to the RPs market in the United States, marked a first successful attempt at making financial assets with market-related yields available to the general public. 2/ This event, which is considered as a major and early step in the process of financial innovation, occured in the late 1960s when securities companies were trying to finance their bond portfolios while firms were looking for higher returns on their surplus balances. It was only natural for the former to start selling bonds to the latter under

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1/ This is why equation (1) was estimated over the period up to 1979(II).

2/ It was not until 1968 that interest rates on new issues of government bonds, industrial bonds and bank debentures were adjusted at intervals to changes in the official discount rate. Interest rates on bank deposits became less rigid in 1972 when they too started moving with the discount rate, although with a delay and by lesser amounts.

CHART J1

MONEY DEMAND IN JAPAN: ACTUAL AND OUT-OF- SAMPLE STATIC FORECAST STOCK OF M2

Real per capita logarithmic values

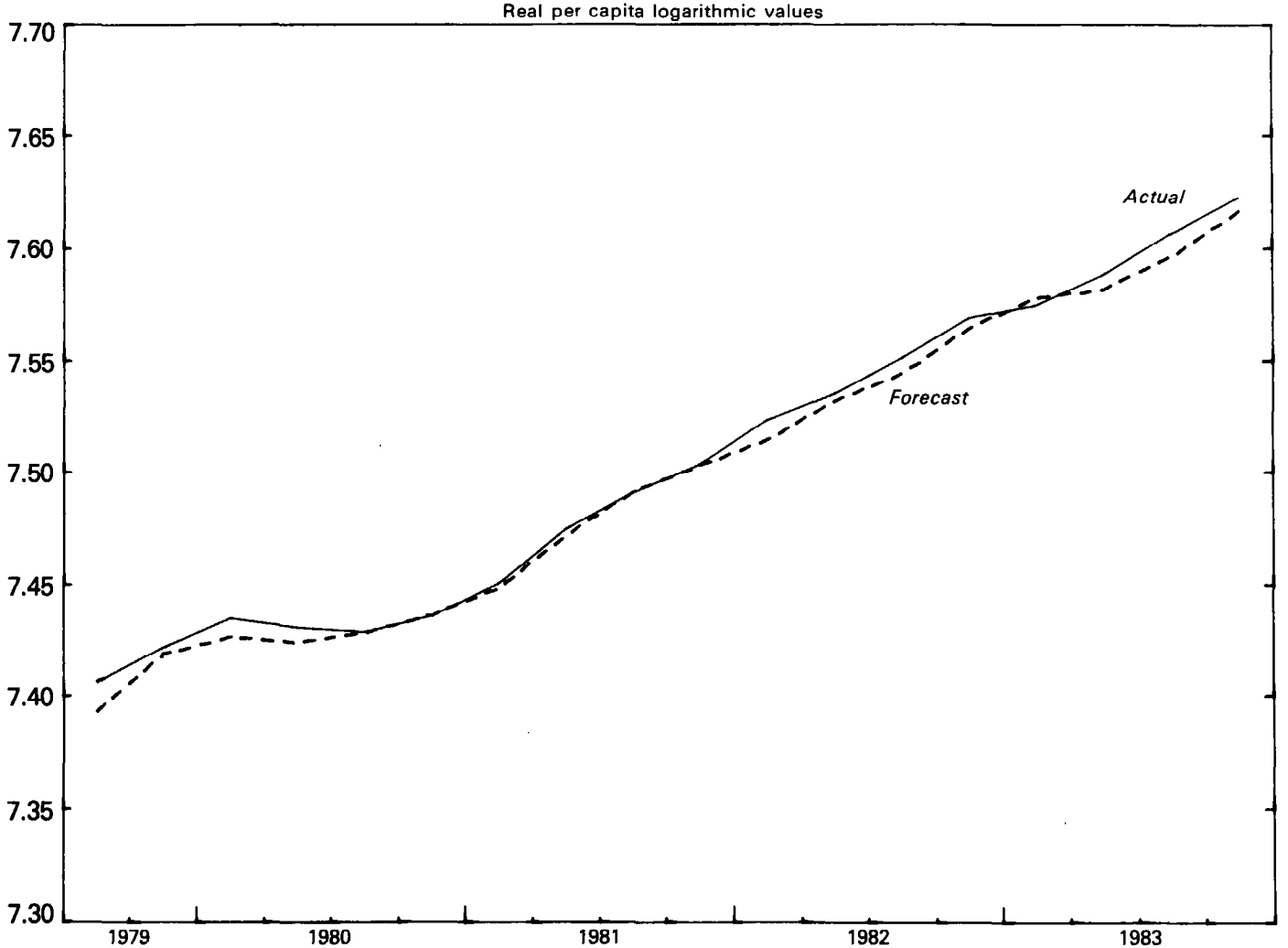

Table J2. Japan: Demand for M2 + CDs

(2SLS estimates; t-statistics in parentheses)

Equation Number	Model	Estimation Period: 1961 (IV) to	b_0	b_1	b_2	b_3	α	β	Rho	SEE x 10,000
1	1	1981(IV)	-.994	1.121	-.014	-.008	.208	.327	---	82
			(3.047)	(25.942)	(3.140)	(2.808)	(3.130)	(4.472)		
2	1	1983(IV)	-1.086	1.137	-.015	-.009	.198	.303	---	80
			(3.240)	(25.873)	(3.084)	(2.990)	(3.069)	(4.508)		

Table J3. Japan: Actual and Forecast
(Equation 1, Table J1) Money Stocks

(Real per capita logarithmic values)

Time	Actual Values M2 (A)	Actual Values M2+CDs (B)	Forecast Values (C)	Forecast Errors 100*(A - C)	Forecast Errors 100*(B - C)
1979 3	7.406	7.410	7.398	0.791	1.238
4	7.421	7.427	7.424	-0.331	0.246
1980 1	7.434	7.441	7.431	0.289	0.988
2	7.430	7.440	7.433	-0.263	0.679
3	7.428	7.437	7.433	-0.572	0.407
4	7.435	7.444	7.434	0.088	0.970
1981 1	7.450	7.459	7.446	0.332	1.230
2	7.474	7.483	7.471	0.296	1.206
3	7.491	7.501	7.490	0.030	1.038
4	7.503	7.515	7.504	-0.074	1.061
1982 1	7.523	7.535	7.513	0.953	2.182
2	7.535	7.548	7.531	0.335	1.648
3	7.550	7.564	7.544	0.613	2.011
4	7.569	7.583	7.565	0.391	1.873
1983 1	7.574	7.590	7.579	-0.471	1.177
2	7.587	7.606	7.582	0.582	2.390
3	7.606	7.625	7.597	0.891	2.791
4	7.622	7.641	7.617	0.479	2.402

short-term repurchase agreements. Subsequently, securities companies also started acting as brokers for transactions between financial and non-financial institutions. 1/

Over the last ten years, the process of financial innovation has reflected the relationship between interest rate regulations and the need to finance government deficits. 2/ In the latter part of the 1970s, mainly because of the increased variability in interest rates and their tendency to rise, the banking system became less willing to purchase long-term government bonds at controlled interest rates. 3/ In 1977, the government issued five-year bonds, still at controlled interest rates, and one year later, two- to four-year bonds were offered at auction. Securities companies took advantage of this situation by supplying assets with unregulated interest rates similar to the money market mutual funds (MMMFs) available in the United States.

1/ The largest spread between the Gensaki rate and the rate on three-month bank deposits was registered in 1974 and amounted to some 12 percentage points (Christflow (1981)). The Gensaki market has continued to grow for several years free of any official control on interest rates and volume. In 1976 guidelines were introduced covering the variety of bonds that might be traded, the maturities of the repurchase agreements and the institutions allowed to participate in the market. In 1978 limits were also imposed for each participating securities house on its position as broker and its position for its own account and the central bank set limits on each participating bank's position. Those restrictions have been eased gradually over the last few years while interest rates have remained free.

2/ In the case of Japan, inflation and reserve requirements do not appear to have played a major role in the process of financial innovation. In fact, inflation has been generally low and the effective average reserve ratio is about 1 percent. However, as far as inflation is concerned, Christelow (1981) writes that in the 1970s "much higher inflation rates and greater variation in inflation rates, compared with the 1960s, have made a relatively fixed interest rate structure less workable than it was." On the role of inflation, see also Pigott (1983). As for reserve requirements, they certainly have played a meaningful role in the development of the General Account which will be explained in the text below.

3/ According to Eken (1984), the reasons for the reluctance on the part of banks to keep absorbing long-term bonds were the following. First, there was a drop in the flow of deposits which was due to the availability of new instruments with market interest rates. Second, because of greater interest rate volatility, the risk of capital losses arising from higher interest rates from sales of banks' bond holdings in the secondary market increased. Third, over the previous years, increased holdings of government bonds had lengthened the maturity of commercial banks' assets while their deposit liabilities had remained short.

In order to counteract the loss of funds to the securities companies, the banking industry responded in two ways. First, in 1972 it introduced the SOGO or General Account. De facto, this is a demand deposit which yields a return similar to that on time deposits 1/ and therefore resembles the negotiable orders of withdrawal (NOW) or automatic transfer service (ATS) accounts in the United States. Second and more important, in May 1979, the banking industry obtained permission to issue large denomination CDs. Since then the market for CDs has become less regulated; in particular, interest rates are now free to move in line with the interbank and the Gensaki rates. 2/ These two innovations--i.e., the availability of SOGO accounts and CDs--marked the beginning of the process of bypassing regulations on the payment of interest on bank deposits.

By the end of 1984, when the large quantities of ten-year bonds issued in 1975 are about to mature, as much as one-fifth of all government bonds outstanding could be within two years of maturity. Further deregulations of interest rates on bonds and the start of a process of

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1/ The account combines a time deposit and an ordinary deposit. Payments are automatically debited to the ordinary account. Overdrafts in this account are permitted up to 90 percent of the amount in the time deposit, which serves as collateral for the overdraft. The interest rate is 1/4 percentage point higher than the rate received on time deposits. For the purpose of the present analysis, it is important to note that the SOGO account tends to blur the distinction between demand deposits and savings deposits, i.e., between M1 and M2.

2/ In 1979, the central bank specified that maturities be limited to the three and six month range and that CDs be negotiable only with the permission of the original issuers. The Bank of Japan also controlled the volume, originally setting ceilings of 25 percent of each bank's capital. Since then, issue limits have been adjusted upward several times. In April 1980, the ceiling was raised to 50 percent of each bank's capital. Later on, a repurchase market in CDs, which in effect allows very short maturities, developed. The high minimum denomination of CDs, which attracted corporate rather than household funds, was reduced from 500 to 300 million yen in January 1984. As a result of the recent financial agreement between the United States and Japan, the Japanese Finance Minister will seek to lower the minimum size of CDs to 100 million yen and to reduce the minimum maturity to one month, both by April 1985, while enlarging each bank's CD issuing ceiling. Furthermore, effective December 1, 1984, foreign and Japanese banks will be authorized to issue and sell short-term negotiable Euroyen CDs.

formal deregulation of interest rates on bank deposits are possible. 1/ In fact, these bonds with time to maturity less than two years will become very competitive with time deposits. Furthermore, it is improbable that the government will be able to replace the maturing bonds with similar long-term bonds with regulated interest rates.

Although there appear to be striking similarities between the processes of financial innovation and deregulation in Japan and other industrial countries, at least as far as the nature of the new financial instruments are concerned, the Japanese authorities do not see these processes as undermining their control over the money stock or reducing the effectiveness of monetary policy. This view is consistent with the empirical work carried out in this study. On the effectiveness issue, Suzuki (1983a) points out that "Innovation will continue so long as there are controls but . . . the continuation of controls is not a necessary condition for effectiveness of monetary policy." As financial innovation and deregulation progress and interest rates become more and more market-determined, the authorities simply plan on relying more on the cost of reserves to banks and of credit to firms, and less on credit rationing and window guidance. As for monetary control as such, it appears that the authorities are carefully and firmly monitoring the speed of financial innovation and deregulation 2/ so that " . . . for some time to come, there appear to be no grounds for anxiety about the controllability of M2 + CDs" (Suzuki (1984)). Furthermore, the behavior

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1/ Interest rates on new issues of bonds and bank debentures are still strongly influenced by the Ministry of Finance except for the two- and four-year bonds. Interest rate regulations on deposits still remain. However, it is very likely that the Bank of Japan guidelines restricting deposit rates will be revised early in 1985 when banks will be permitted to sell new types of large denomination deposit instruments with market-determined interest rates.

2/ Shimamoto (1983) explains why financial innovation is proceeding at a slower rate in Japan: ". . . the underlying consensus among participants in Japan's financial system is that it is desirable to introduce financial innovation rather cautiously, thereby preventing drastic changes which might undermine the stability of the whole system." Nevertheless, the Bank of Japan (1983) mentions the problems that stem from the contemporaneous presence of regulated and unregulated interest rates. Similar concepts are expressed by Suzuki (1984).

of money demand over time, i.e., its degree of stability, has never been such "as to make it unclear what the appropriate supply of money was" (Suzuki (1984)). 1/

1/ The Japanese authorities have also made an interesting effort to envisage the scenario which might come about at a much later stage of the processes of financial innovation and deregulation when the number of components of the monetary aggregates with market related interest rates will have gone up considerably. According to Shimamoto (1983):

> "Since the assets with payments facility will reflect market interest rates, it will not be possible to control them with movement of interest rates. Rather, the effectiveness of monetary policy will be preserved by the irreducible distinction between real assets and financial assets, with the balance between the two achieved by flexible interest rates. Once this happens, assets with payments facility will cease to be a leading indicator of nominal expenditures and become a simultaneous one. They then will lose their ability to function as intermediate leading targets but will preserve their functions as quick and relatively accurate indicators of changes in nominal expenditures generated by changes in interest rates. Transactions indicators will then be the gauge by which to judge the effectiveness of monetary policy transmitted through interest rate changes."

Suzuki (1983a) also suggests that

(i) demand deposits will basically disappear and therefore M1 will lose its meaning;

(ii) the returns on time deposits, postal deposits, CDs, financial debentures, bills sold by banks, bonds, TBs, commercial paper, and corporate bonds will all get very close to one another; thus, only time and postal deposits, which are risk-free, will be held;

(iii) M2 and M3 would be unaffected by market interest rate fluctuations, would be impossible to control from the supply side and would move to reflect demand. Suzuki concludes that, in such situations, the interest rate transmission mechanism would still be at work and preserve the effectiveness of monetary policy.

Data: Definitions and Sources

France

Nominal GDP: IFS, line 99b. The 1968 (II) figure was corrected by interpolation. The data prior to 1965 are from INSEE.

Real GDP: IFS, line 99b.r. The data prior to 1965 are from INSEE.

Population: IFS, line 99z. Quarterly figures obtained by interpolation.

Yield on longterm bonds: IFS, line 61.

M2: IFS, lines 34 & 35.

Italy

Nominal GDP: Isco, Conti Economici Trimestrali.

Real GDP: Isco, Conti Economici Trimestrali.

Population: IFS, line 99z.

Yield on long-term private bonds: Bank of Italy, Bulletin.

M3: Bank of Italy, Bulletin.

CCT: Bank of Italy, Bulletin.

CD: Bank of Italy, Bulletin.

Japan

Nominal GDP: IFS, line 99a.

Real GNP: IFS, line 99a.r.

Population: IFS, line 99z.

Short term rate: IFS, line 60b.

Interest on time deposits: Bank of Japan, Economic Statistics Monthly.

M2: IFS, line 34 & 35.

CD: IFS, line 26aa.

Further Experiments With Money Demand in France

We looked into the role of the own rate of return on money balances, but without success. The reasons for the failure may be simple. Usually, the problem of finding a meaningful and statistically significant proxy for the own rate of return arises because of the impossibility of finding both a representative explicit interest rate and an adequate way of bringing the implicit returns into the picture in those situations where, because of regulations, the former is not free to adjust. In the case of France, we seem to face much of the same problem. The three rates of return on money balances that are available to us, the passbook savings rate and the rates on notes and housing savings (which already represent poor proxies for the actual explicit returns that depend a great deal on who is the holder of the deposit as well as upon its size), do not move with market rates and yet we do not know anything about potential implicit returns. The situation, however, is even more complicated than that; the three interest rates apply to components of both M2 and M3 and those components by and large are of the same order of magnitude. All in all, it could be that the "own return" on M2 is, in fact, the return on M2-M3. In spite of all these problems, we went on to compute the weighted average return on M2 which was then plugged into the equation; its coefficient turned out to be nonsignificant and with the wrong sign. The simple passbook savings rate was also tried out as was the difference between the weighted average own rate and the short-term rate; results did not change. Finally, the own rate and the short-term rate were entered separately: the latter turned out to be significant, the former did not. So the own rate was eventually dropped.

Much the same story applies to the role of open economy variables. We experimented with two alternative proxies for the opportunity cost of holding money vis-à-vis foreign currency, namely the 90-day premium (or discount) on the U.S. dollar and the sum of the Eurodollar rate and the premium on the dollar. For each of the two variables, we also computed the average of the current and previous quarter value as an alternative regressor. The sum of the Eurodollar rate plus the premium never turned out to be significant. The premium on the dollar (or its average value over the last two quarters) was never significant when the equation was fitted to the sample period 1961 to 1983. Over the sample period 1974 to 1983 the premium was marginally significant (t-statistic = 1.56), its average value was strongly significant. The problem, however, is that (i) once the 1982(III) to 1983(II) observations are dropped, even the average premium is not significant, and (ii) the Eurodollar rate plus the premium is the proper variable to consider and this, as has been said, was never found to be significant. All this reminded us of Argy's (1983a) study which shows that the covered interest differential in the market for both the U.S. dollar and the deutsche mark has been close to zero for nearly all months since April, 1974. For an early discussion of the choice of alternative interest rates as well as open economy variables, see David (1971) and Grandmont (1973).

Finally, we investigated the role of the three different dummy variables which are encountered in the literature--see Daloz (1969), David (1971), Grandmont (1973), Boughton (1979), Frochen and Roubine (1980) and Frochen (1983). The first one is a variable that is meant to capture the consequences of the sale, in early 1973, of gold-denominated bonds on money demand. The second is meant to take care of the consequences on the measured money stock of strikes that took place in 1968 and 1979. The third is meant to capture the effects on the money stock of the process of repatriation of capital from Algeria in the very early 1960s. We do not argue that, in studies of money demand over short time periods, it is not worth or even necessary to use one or more such variables. What we have found in our regressions, however, is that these variables never make any significant contribution to both the in-sample and the out-of-sample explanatory power of the model.

Money Demand in Japan: The Literature and the Issues

Five major issues emerge from the analysis of the literature on money demand in Japan. The first relates to the endogeneity-exogeneity of the money stock. Some of the studies ignore this issue and, de facto or explicitly, consider the nominal money stock as adjusting to changes in the demand for it (Villanueva (1972)), Al-Khuri and Nsouli (1978), Boughton (1979, 1981), Christelow (1981)). On the contrary, in its first study of money demand, the Bank of Japan (1975) wrote:

> "In Japan, as the M2 stock leads income and prices in fluctuation on the average, when there is an imbalance in the demand for and supply of the stock of M2, it is more likely for demand to be adjusted--via changes in GNE and prices through the transmission mechanism--rather than supply being adjusted. Therefore the actual M2 stock as observed in statistical presentation, is more representative of the supply volumes of the M2 stock and demand may be said to be in the process of adjusting to supply changes."

Interestingly enough, this view was partially modified three years later (Bank of Japan (1978))--by then the process of monetary targeting was already formally in place--when the Bank wrote:

> ". . . in our country it is difficult to state that the supply-and-demand have been adjusted satisfactorily through the interest rate mechanism, and it is not entirely clear as to whether the ex-post money stock reflects the demand for money or the supply of money."

From a practical point of view, however, by using either the inverse of velocity or the real money stock on the left-hand side of its estimating equations, the Bank too has always adopted the assumption of an endogenous nominal money stock, see Suzuki (1984) or Ishida (1984). Chopra (1983) is the only author who attempts to settle the issue empirically. His conclusion is that money demand can best be explained by a model which specifies the nominal money stock as an endogenous variable. This result is rationalized in two ways. On one hand, it is pointed out that, in the short run at least, the nominal money stock is allowed to deviate *even substantially from its forecast path in order to accomodate money* demand. On the other, it is stressed that the Bank uses interest rates as its operating targets. The problems with Chopra's analysis are the following. First, it is not clear how to go from the short to the long run, when the nominal money stock is certainly exogenous. Second, money is not necessarily and totally endogenous when the central bank controls interest rates--see the literature mentioned in Section III.

The second issue relates to the nature of the adjustment process involved. The equations estimated so far fall into three groups. One group includes the studies that incorporate adjustment lags only. The estimated speed of adjustment of the money stock varies from 10-15 percent per quarter (Bank of Japan (1978), Boughton (1979, 1981)), to 25-40 percent (Bank of Japan (1975), Suzuki (1984), Ishida (1984)), to 40-45 percent (AlKhuri and Nsouli (1978), Christelow (1981)). A second group includes those equations estimated by the Bank of Japan (1978) which impose full adjustment with respect to all variables except the inflation rate. A third group includes the studies by Villanueva (1972) and Chopra (1983) that combine learning and adjustment lags. Chopra's work does not provide any estimate for the length of learning lags because expected income is computed exogenously; as for adjustment lags, the speed of adjustment tends to fall in the 25-50 percent per quarter range. Villanueva (1972) estimates an equation a la Feige (1967) and therefore obtains a direct estimate for both the learning and the adjustment speeds. The former is 80 and 25 percent for M1 and M2, respectively, the latter close to 100 percent. This would indicate that, if there is any lag at work, that is a learning lag and not an adjustment lag as most studies imply.

The third issue relates to the choice of a short- or a long-term interest rate as the proper explanatory variable. 1/ By and large, the in-sample explanatory power of the equations does not seem to be affected by the choice. 2/ Christelow (1981), however, concludes as follows:

> "In choosing between an equation featuring a long-term market interest rate and one featuring a short-term rate, the authorities might well have chosen the first. In [our] equations . . . the significance of the coefficients of all variables . . . was somewhat higher and the standard error of the equation was somewhat lower, using a long-term interest rate . . . .
>
> In fact, the . . . equation, featuring a short-term market interest rate, yielded a far better prediction of money demand in 1979 and 1980."

The explanation offered for this result is that many new financial assets that are alternatives to money holdings have relatively short maturities; thus, a short-term rate would now represent a better proxy for the opportunity cost of holding money.

1/ Villanueva and Chopra both use a short rate, Al-Khuri and Nsouli and Boughton use alternatively a short and a long rate, the Bank uses a variety of interest rate variables at the same time.

2/ We mainly refer to the results obtained by various authors in the estimation of the demand for M2.

The fourth issue relates to the role of the inflation rate. In a situation where interest rates are not free to move, the inflation rate tends to be an important proxy for the opportunity cost of holding money balances. In fact, Al-Khuri and Nsouli (1978) and Boughton (1979, 1981) find negative and statistically significant coefficients on the inflation rate. The Bank of Japan, however, has argued at times against the hypothesis of a negative relationship between money demand and inflation. For instance, in its 1978 study, the Bank writes ". . . under circumstances where fears of inflationary rekindling are not yet wiped out among many income classes, demand for financial assets has been intensified as a precautionary motive against future income uncertainties and fears of major emergency expenditures." In our view, this would simply point to a problem in using actual inflation as a proxy for expected inflation, as well as actual income as a proxy for expected income.

The fifth issue relates to stability. Al-Khuri and Nsouli (1978) conclude that the demand for M2 did not shift in 1971 when the Bretton Woods system collapsed. Boughton (1979) concludes that "The Japanese M2 function is one of the most stable of all those examined . . . and the predictions are the most accurate." Ram (1982) investigates the stability properties of Boughton's equation further by means of the Cooley and Prescott technique and concludes that it is not clear whether, over the sample period up to 1977, demand for M2 has been stable. Christelow (1981) does some out-of-sample dynamic simulations for the period 1979-80 and shows that demand for M2 + CDs is more stable than the demand for M2 alone. This would suggest that investment in CDs was, in fact, financed by drawing down other bank deposits included in M2. Suzuki (1984) concludes that since 1974 no structural change can be detected in the demand for either M1 or M2+CDs. This view is not shared by Ishida (1984) whose results seem to suggest that the structure of the demand for M1, M2 or M3 must have changed around 1977(I).

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