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THE RECENT FINANCIAL DEREGULATION AND THE INTEREST ELASTICITY OF THE SIMPLE M1 DEMAND FUNCTION: AN EMPIRICAL NOTE

by

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ABSTRACT

The main objective of this note is to examine whether the interest elasticity of money demand has increased during the last few years. A simple money demand regression that includes additional intercept and slope dummy variables defined over the interval 1981.01 to 1985.03 is estimated for the whole sample period 1961.01-1985.03. The regression results show that the elasticity of money demand with respect to market interest rates has for now increased. No shifts are detected in income and time trend elasticities. The in-sample predictions of the more interest-sensitive money demand regression are broadly consistent with the actual behavior of M1 observed so far in the 1980s. The residuals also suggest that the M1 demand function has been subject to transitory shocks over the same period.

Introduction

An important issue in the discussion of the effects of financial innovations on the money demand function has been the stability of the marginal relationship between real money balances and interest rates.[1] The recent round of financial deregulation which occurred with the introduction of NOWS, Super-NOWS and Money Market Deposit Accounts has raised the possibility that the interest elasticity of money demand might have increased during the last few years. Two interrelated reasons have been advanced for this potential rise in interest elasticity.[2] First, with M1 now containing assets potentially suitable for savings, it is possible that the public's demand for it is more sensitive to market yields than it was in the past, when it was closer to a pure transaction aggregate. This is so because the own rate of return on some assets like NOWS is still regulated and is set at levels below the open market rates. Second, since NOW accounts pay explicit interest but demand deposits do not, a given change in market interest rates causes a larger proportional change in the opportunity cost of holding NOWS than of demand deposits. As a result, changes in market rates might cause larger changes in NOWS than in demand deposits, thereby increasing the responsiveness of M1 as a whole to interest rate swings as NOWS become a larger fraction of M1.

Another implication of the above hypothesis, if it is valid, is that the potential rise in the interest elasticity of money demand may not be permanent. Since M1 now contains Super-NOWS whose own explicit return is

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[1] Cagan and Schwartz (1975), Simpson and Porter (1980), Hafer and Hein (1984), and Roley (1985).

[2] Brayton, Farr and Porter (1983) and Simpson (1984).

unregulated, the opportunity cost of holding Super-NOWS is lower relative that for NOWS. Therefore, as the proportion of M1 that is subject to unregulated own return (like Super-NOWS in the current period and NOWS in the near future) grows, the market rate elasticity is likely to decrease.[3]

The main objective of this note is to examine whether the interest elasticity of money demand has changed during the period 1981-1985. The empirical results presented here do seem consistent with the view that the public's M1 demand function has become more interest sensitive during this period. Furthermore, the increased interest-sensitivity of money demand is due to an increase in the interest-sensitivity of the 'other checkable deposits' component of M1. Therefore, the various episodes of unusual strength in M1 growth which have occurred during this period are essentially predictable and consistent with a money demand regression exhibiting relatively a higher interest elasticity with respect to the market interest rate.

2. Estimation Methodology and the Empirical Results

A money demand regression that is estimated including some additional intercept and slope dummy variables is used to examine whether financial innovations and deregulation have changed the parameters of the standard money demand function. The estimated money demand regression is

$$\begin{aligned}\Delta \ln(M/P)t = {} & a_o + b(L)\ \Delta \ln y_t + c(L)\ \Delta \ln R_t + d(L)\ \Delta \ln P_t \\ & + A_1 D1 + A_2 D2 + b(L)\ D1 * \Delta \ln y_t + c(L)\ D1 * \Delta \ln R_t + \\ & b(L)\ D2 * \Delta \ln y_t + c(L)\ D2 * \Delta \ln R_t + U_t \qquad (1)\end{aligned}$$

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[3] For more details see Simpson (1984).

where M is nominal money balances (currency plus total checkable deposits), y measures the real income, R is the nominal interest rate and P is the price level. D1 and D2 are the zero/one dummy variables, taking values 1 respectively in the periods 1974-1980 and 1981-1985 and zero otherwise. b(L), c(L), and d(L) are polynomials in the lag operator, L and L is defined by $L^s_x = X_{t-s}$. The real income-and interest rate-interaction variables (like D1*ΔlnX) are formed by taking products of the interest rate, real income, and the zero/one dummy variables. The statistical significance and the signs of the estimated coefficients on the interest rate-interaction dummy variables in the money demand regression (1) can be used to examine whether the interest rate elasticity has changed over time.

Though the focus of the present note is on the potential behavior of interest elasticity in the 1980s, the money demand regression (1) also permits the time trend and income elasticities to vary over this period. Therefore, the zero/one dummy variable D2 enters individually as well as in an interactive form with real income and the interest rate. Furthermore, several analysts have already documented considerable evidence that is consistent with the view that the parameters of the money demand regression had not been stable even over the late 1970s.[4] Additional zero/one dummy variables, defined over the interval 1974 to 1980, are also included in order to control for the effect that financial innovations might have had on the parameters of the money demand function in the 1970s.

The money demand regression (1) is standard in the sense that real money demand depends only upon real income and a nominal interest rate.

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[4] See, for example, Goldfeld (1976), Simpson and Porter (1980), Judd and Scadding (1982), and Dotsey (1983).

However, it differs in several ways from the form in which money demand regressions are usually estimated. First, the money demand regression (1) is estimated by simple distributed lags. This is to be contrasted with the more popular Koyck-lag specification in which geometric lag shapes are imposed on the distributed-lag coefficients of the independent variables. Since the point-estimates of long-term income and interest elasticities could be sensitive to the restrictions imposed on the lag shapes, the distributed-lag coefficients in the money demand regression (1) were freely estimated. Second, the price level enters the money demand regression (1) in a distributed lag form. The standard theoretical models of transaction demand for money typically assume that the price level elasticity of the demand for real money balances is zero. If this assumption is correct, the distributed-lag coefficients on the price level in the money demand regression (1) should add up to zero. However, the standard money demand theory does not say much about the speed with which real money demand adjusts over time.[5] If changes in the price level affect the demand for money with a lag, the individual distributed-lag coefficients on the price level in (1) would be different from zero.

Including the price level in the money demand regression (1) thus enables one to test directly whether lags exists in the response of real money demand to changes in the price level and whether the price level elasticity of demand for real money balances is zero. This is to be contrasted with the standard money demand regressions based on the real-partial

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[5] Goodfriend (1983) has argued that the lags found in the estimated money demand regressions could arise from the presence of measurement errors in the relevant independent variables.

adjustment hypothesis, in which the assumption about the absence of lags in the effect of the price level on real money demand is simply imposed on the data.[6] Third, the money demand regression here is estimated in the first difference form. The general use of differencing has been suggested to reduce the possibility of spurious regression results.[7] In fact, a recent study by Layson and Seaks (1984) indicated that the first-difference version of the money demand specification is statistically preferable to its level form.

In order to test whether interest elasticity has changed in the early 1980s, the money demand regression (1) is estimated using the monthly data that span the period 1959-1985.[8] The sum of coefficients on the interest rate (real income) variable provides an estimate of the long-term interest (income) elasticity over the earlier period 1959-1973. The sum of coefficients on the interest-interaction (income-interaction) dummy variable can then be used to test whether or not the interest rate (the income) coefficient in the relevant subperiod differ from the one in the earlier period 1959-1973. If the sum of coefficients on the interaction variable is statistically significant, it implies that a shift in the long-run value of the regression coefficient has occurred over the relevant subperiod. The sign and size of this sum would then indicate the nature and the magnitude

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[6] Spencer (1985) presents the empirical evidence that strongly rejects the assumption that the price level affects the demand for real money without lag. See also Gordon (1984).

[7] Granger and Newbold (1974), Plosser and Schwert (1978), and Plosser, Schwert and White (1982).

[8] I get similar results from the quarterly money demand regressions.

of the presumed shift in the parameter. In addition to the sum of coefficients on the interaction variables we have also presented F statistics that test the null hypothesis that each one - not the sum - of the coefficients on the interaction variables in the money demand regression (1) is zero. It is plausible that the t value on the sum of the estimated coefficients on the interaction variable is very small, indicating no shift in the long-run value of the relevant regression parameter and yet the F statistic is significant, the latter implying a shift in some of the coefficients on the relevant variable. An outcome like this simply means that the shape of the lag structure on the relevant independent variable is not stable over the subperiod, even though the magnitude of the long-run response of real demand to that variable is.

Two regression equations are reported in Table 1. Equation (1) is the money demand regression that includes all the intercept and slope dummy variables. Equation (2) is the money demand regression that retains only those dummy variables which are statistically significant.[9,10] These

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[9]The money demand regressions always included the current and the lagged values of changes in the price level. The sum of the estimated distributed-lag coefficients on the price level was not significantly different from zero, implying that the price level elasticity of demand for real money balances is zero. However, several individual distributed-lag coefficients on the price level were significant, suggesting lags in the effect of the price level on money demand. These results are in line with the findings reported in Spencer (1985).

[10]The constant term in the money demand regressions estimated here was generally significant and therefore was not suppressed to zero. The inclusion of the constant term in the first difference version of the money demand function amounts to permitting the influence of time trend on the holdings of real money balances. The time trend variable is a proxy for technological progress in the financial system and captures, though imperfectly, the influence of changes in the cash management techniques and other financial innovations on money demand. See Lieberman (1977, 1979).

regression results suggest two major inferences. First, the interest elasticity of money demand has increased during the last few years. The sum of distributed-lag coefficients on the interest rate-interaction dummy variables is negative and statistically significant (see the t values on this sum in equations (1) and (2), Table 1). For the period 1981-1985 these money demand regressions yield a long-term interest elasticity of - .16, which is substantially higher than the one (- .07) obtained from the earlier part of the sample period. Second, no significant shifts appear to have occurred in the long-term income elasticity of money demand. In fact, these money demand regressions provide point estimates of the long-term income elasticity which are closer to unity for most of the period studied here. Third, except for a shift that occurred in the constant term, these regressions imply that other long-run parameters of the M1 demand function did not change during the 1970s.

If the public's M1 demand function has become more interest sensitive during the 1980s, is this new money demand regression consistent with the actual pattern of money growth observed over the period 1981.01-1985.03? The within-sample prediction errors that are presented in Table 2 suggest this to be the case. Two sets of errors that occur in predicting the quarterly levels and growth rates of nominal money balances are presented. One set assumes that the interest elasticity of money demand has not increased during the 1980s. The money demand regression that omits the pertinent dummy variables is estimated over the entire sample period, and the estimated coefficients are used to generate the errors in predicting nominal money balances (see errors in Columns A1 and A2, Table 2). The other set of errors is generated under the assumption that the interest elasticity of money demand had been higher during the 1980s. The money

demand regression that includes the relevant dummy variables is estimated, and the estimated coefficients are used to generate the sample errors (see errors in columns B1 and B2 Table 2). A comparative analysis of the mean and the RMSE statistics clearly suggests the inference that the pattern of money growth that is predicted by this more interest-sensitive money demand regression is not at all inconsistent with the actual behavior of money growth over the interval 1981.01 to 1985.03.

Source of the Shift in the Interest Elasticity

In order to identify the source of the increased interest-sensitivity of the M1 demand function, the money demand regression reported in Table 1 (equation 2) was reestimated for the transactions deposit component of M1, with and without including 'the other checkable deposits'. For the money demand regression that excludes other checkable deposits from the transaction deposits, the shift variables on the interest-elasticity parameters are not statistically significant (the t value is -.5 and the $F2_R$ value, .89; see Equation 2.1, Table 3). When other checkable deposits are included in the transaction deposits, the same shift variables on the interest-elasticity parameters turn out to be statistically significant (the t value is -3.1 and the $F2_R$ value, 3.8; see Equation 2.2, Table 3). This suggests that it is the recent nationwide authorization of NOWS and Super-NOWS which is at the source of the increased interest-sensitivity of the M1 demand function.

The other checkable deposits pay an explicit rate of return, so that the explicit yield on money is no longer zero. The money demand regressions reported here do not include the variable measuring the own yield on money. This omission of the own yield variable from the money

demand regressions can, in general, affect the estimates of the remaining parameters.

In order to investigate the above issue, the money demand regression is reestimated by including a different proxy for the opportunity cost variable. Following Cagan (1983) a simple proxy for the explicit yield on money is calculated as the share of other checkable deposits in M1 multiplied by the yield on these deposits, 5-1/4 percent; the assumption being that the regulatory restrictions on the payment of an explicit rate on demand deposits are not circumvented.[11] This measure of the explicit yield on money is then subtracted out from the commercial paper rate, and the money demand regressions that include this redefined opportunity cost variable ($\bar{R}$) are reported in table 4. The sum of the distributed-lag coefficients on this opportunity cost-interaction dummy variables are still negative and statistically significant (see the t and F values, Equations 4.1 and 4.2, Table 4). This suggests the inference that the increased interest-sensitivity of the money demand function probably does reflect the increase sensitivity of money demand to the opportunity cost variable.[12]

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[11]This assumption is questionable. Klein (1974) has argued that the depository institutions have implcitly paid a competitive return on demand deposits, whereas Starz (1979) has noted that the implicit rate that is paid on demand deposits appears to be about one half of the competitive rate. Carlson and Frew (1980) however have raised some econometric issues and have argued that the statistical performance of Klein's measure of the yield on money in the money demand regression might be spurious.

[12]The results of this regression must be interpreted cautiously, as there are some problems with the approach taken here. Two potential problems are noteworthy. First, to be extent that some implicit return, though not necessarily at the competitive rate, is earned by the holders of demand deposits, the approach used here to calculate the own yield on money overstates the effect that the other checkable deposits have on the own yield. Second, some of the econometric issues raised by Carlson and Frew

(Footnote Continued)

Comparison with Some Existing Studies

The empirical results here partially support the general nature of findings reported in Brayton, Farr and Porter (1983) and Simpson (1984). These analysts have argued that the introduction of NOWS, Super-NOWs and Money Market Deposit Accounts has altered the interest sensitivity of the M1 money demand function. Thus, the period of strength in M1 demand in 1982 and 1983 could in part be explained in terms of an increase in interest elasticity in combination with a significant drop in short-term interest rates which occurred during that period.

Our results also imply that the financial innovations that occurred in the 1970s did not raise the interest elasticity of the M1 demand function during that period, a result that is consistent with the findings reported in Hafer and Hein (1984).

For the period 1961-1980 the monthly money demand regressions reported here imply that the point estimate of the long-term interest elasticity is -.07, which appears quite low when compared with the ones obtained from some standard money demand regressions.[13] As stated before, the standard money demand regressions are estimated in the level form and include the lagged dependent variable, the latter amounts to imposing a geometric shape on the distributed-lag coefficients of the independent variables.

(Footnote Continued)
(1980) may be applicable to this regression. Stochastic shifts in money demand could generate contemporaneous correlation between the error term and the opportunity cost variable, thereby biasing the estimated coefficients.

[13]For example, for almost similar sample periods the long-term interest elasticity is estimated to be -.13 in Judd and Motley (1984) and -.16 in Hafer and Hein (1984).

Since the money demand regressions reported here are estimated in the first difference form it will be interesting to examine whether the first-difference estimation of the standard money demand regressions still provides high estimates of the interest elasticity of money demand. Ignoring for the moment the dummy variables the standard lagged-dependent variable versions of the money demand regression can be derived from the equation (1) by imposing the following restrictions on lag structures

$$b(L) = b_1 \lambda \sum_{s=o}^{\infty} (1-\lambda)^s \lambda^s = (b_1 \lambda)/(1-(1-\lambda)L) \qquad (2a)$$

$$c(L) = c_1 \lambda \sum_{s=o}^{\infty} (1-\lambda)^s \lambda^s = (C_1 \lambda)/(1-(1-\lambda)L) \qquad (2b)$$

$$d(L) = 0.0 \qquad (2c)$$

$$d(L) = (\gamma-1) + \gamma \sum_{s=1}^{\infty} (1-\lambda)^s L^s = [(\gamma-1) + (1-\gamma)L]/[1-(1-\lambda)L] \qquad (2d)$$

$$a_o = 0.0 \qquad (2e)$$

The restrictions expressed as in (2a) and (2b) impose geometrically declining lag structures on income and interest rate variables. The restriction on d(L) as expressed in (2c) implies two assumptions.[14] The first is that the price level elasticity of the demand for real money balances is zero, i.e., the sum of distributed lag coefficients on the price level is zero. The second is that the demand for real money balances adjusts to the price level with no lags, i.e., each of the distributed lag coefficients on the price level is zero. The restriction (2e) amounts to assuming that time trend has no influence on the holdings of real money balances. Substituting (2a), (2b), (2c) and (2e) into (1) and ignoring dummy variables yield the money demand regression (3a)

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[14] Mehra (1978) and Spencer (1983).

$$\Delta \ln (M/P) = (b_1\lambda)/(1-(1-\lambda)L)\ \Delta \ln y_t + (C_1\lambda)/(1-(1-\lambda)L)\Delta \ln R \qquad (3a)$$

Alternatively, (3a) could be expressed as follows:

$$\Delta \ln (M/P) = b_1\lambda\ \Delta \ln y_t + c_1\lambda\ \Delta \ln R_t + (1-\lambda)\Delta \ln (M/P)_{t-1} \qquad (3b)$$

The money demand regression (3b), popularly known as the real-partial adjustment model of money demand, is one of the lagged dependent variable versions of the standard money demand function. Another version, known as the nominal partial adjustment model of money demand, is obtained if we assume that lags do exist in the adjustment of real money balances with respect to changes in the price level. But we retain the assumptions that the long-run price level elasticity of the demand for real money balances is zero and that the lag shape on the price level variable is geometric. These assumptions imply that d(L) follows the restrictions expressed as in (2d). Substituting (2a), (2b), (2d) and (2e) into (1) yields the following:

$$\Delta \ln (M/P) = b_1\lambda\ \Delta \ln y + c_1\lambda\ \Delta \ln R + (1-\lambda)\ \ln (M_{t-1}/P) \qquad (4)$$

The money demand regressions (3b) and (4) and their level versions were estimated over the sample period 1961-1980. Presented in Table 5 are the estimates of the long-term interest elasticity of money demand. These regression results show that the estimates of the long-term interest elasticity that are obtained from the level versions of the standard money demand regression are substantially higher than the ones obtained from the relevant first-difference versions. This suggests that high estimates of the long-term interest elasticity derived from the level versions of the standard money demand regression are not robust.

3. Concluding Remarks

The evidence presented here suggests that the interest elasticity of money demand has increased during the most recent period. If we take

into account the impact of falling nominal interest rates on the behavior of money demand, we could easily explain a significant fraction of the surge in M1 growth that has occurred at various times during the early 1980s. The empirical work also shows that the income and time trend elasticities of money demand have not so far changed during the last few years.

The evidence presented here do suggest that the recent round of financial deregulation which occurred with the nationwide introduction of NOWS, Super-NOWS and Money Market Deposit Accounts has been instrumental in raising the interest elasticity of money demand. If this explanation is correct, we may be heading towards a period during which there would remain some uncertainty about the magnitude of the interest elasticity parameter. As the fraction of assets in M1 which is deregulated grows overtime and as the own rates of return on these deregulated assets move with the market interest rates, it is quite plausible that the increase observed in the interest elasticity of money demand might fade away.

The finding that the interest elasticity of money demand has increased during the early 1980s does not by itself invalidate monetary targeting, nor does it reduce the usefulness of M1 as a guide to the long-run formulation of monetary policy. It does imply, however, that in the short run we could observe large swings in the growth rate of M1 following large, exogenous changes in nominal interest rates. In case we observe large, policy induced or exogenous breaks in the long-run behavior of nominal interest rates, changes in money growth which are induced by such changes in nominal interest rates need to be accommodated by a revision of the short-term monetary targets.

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Table 1

Formal Tests of a Change in Money Demand

Parameters, Monthly Money Demand Regressions

Equation 1

$$\Delta \ln(M/P) = \underset{(-1.6)}{-.002} + \underset{(3.5)}{.87}\ \Delta \ln y - \underset{(-4.4)}{.07}\ \Delta \ln R - \underset{(-1.8)}{.002}\ D1 + \underset{(1.2)}{.40}\ D1 * \Delta \ln y + \underset{(.02)}{.01}\ D1 *$$

$$\Delta \ln R - \underset{(-.05)}{.000}\ D2 + \underset{(.35)}{.16}\ D2 * \Delta \ln y - \underset{(-2.2)}{.09}\ D2 * \Delta \ln R$$

Sample-Period = 1961.01-1985.03 $\quad \bar{R}^2 = .449 \quad$ SER = .00358 $\quad$ ROW = $\underset{(1.7)}{.1}$

DW = 2.0 $\quad F1_y = \underset{(8,232)}{2.1} \quad F1_R = \underset{(9,232)}{2.3*} \quad F2y = \underset{(8,232)}{1.0} \quad F2_R = \underset{(9,232)}{2.6*}$

Equation 2

$$\Delta \ln (M/P) = \underset{(-3.0)}{-.002} + \underset{(6.5)}{1.0}\ \Delta \ln y - \underset{(-6.4)}{.07}\ \Delta \ln R - \underset{(-1.9)}{.001}\ D1 - \underset{(-3.3)}{.09}\ D2 * \Delta \ln R$$

Sample-Period = 1961.01-1985.03 $\quad \bar{R}^2 = .413 \quad$ SER = .00369 $\quad$ ROW = $\underset{(1.7)}{.1}$ $\quad$ DW = 2.1

Notes: ln is the natural logarithm, Δ the first difference operator, M the M1, R the commercial paper rate, y the real personal income, and P the personal consumption expenditure deflator. D1 and D2 are the zero/one dummy variables, taking values 1 respectively in the periods 1974-1980 and 1981-1985 and zero otherwise. D * Δln X is formed simply by taking the product of the zero/one dummy variable D and the X variable. The estimated coefficients on the income and interest rate variables are the sum of the coefficients that are estimated with a simple distributed lag and therefore provide estimates of the relevant long-term elasticitics. lny includes 8 contemporaneous and lagged terms; lnR, 9 such terms. The money demand regressions always included current and lagged values of the price level, the sum of distributed-lag coefficients on the price level constrained to zero. The regressions were estimated by the Hildreth-Lu estimation procedure. F1y (F2y) is the F test of the null hypothesis that each one of the coefficients on the income-interaction dummy variables is zero in the relevant subperiod. A similar interpretation applies to $F1_R$ and $F2_R$.

Table 2

Within-Sample Simulation Results, 1981Q1-1985Q1:
Percentage Error in Predicting Nominal Money Balances

	No Change in the Interest Elasticity of Money Demand during the 1980s		A Higher Interest Elasticity of Money Demand during the 1980s	
Year/Quarter	A1 Quarterly Levels	A2 Quarterly Changes	B1 Quarterly Levels	B2 Quarterly Changes
1981Q1	.42	1.69	-.21	-.84
1981Q2	.97	2.23	.06	1.10
1981Q3	-.28	-5.09	-1.08	-4.66
1981Q4	-1.04	-3.07	-1.97	-3.67
1982Q1	-.69	1.42	-1.82	.64
1982Q2	-.84	- .59	-2.36	-2.26
1982Q3	-.53	1.27	-1.94	1.73
1982Q4	1.36	7.76	-1.30	2.71
1983Q1	2.14	3.15	-1.64	-1.43
1983Q2	3.54	5.55	-.94	2.93
1983Q3	5.11	6.11	.98	7.83
1983Q4	5.33	.89	1.42	1.78
1984Q1	4.99	-1.31	1.53	.40
1984Q2	5.06	.24	1.90	1.51
1984Q3	5.06	- .00	2.50	2.45
1984Q4	4.31	-2.91	1.77	-3.01
1985Q1	4.89	2.27	1.67	- .34
Mean Error	2.34	1.15	- .08	.40
RMSE	3.39	3.44	1.62	2.93

Notes: Errors in the columns labeled 'Quarterly Levels' are calculated as the difference between the actual and predicted level, divided by the predicted level of nominal money balances. Errors in the columns labeled 'Quarterly Changes' are calculated as the difference between the actual and predicted quarterly growth rates, divided by the predicted growth rates of nominal money balances. The predicted values used in calculating these errors were generated in two ways. For the errors in columns B1 and B2 the predicted values used are from the money demand regression 2 summarized in Table 1. For the errors in columns A1 and A2 the predicted values used are from the money demand regression 2 that was reestimated omitting all the interest rate-interaction dummy variables; this amounts to assuming no change in the interest elasticity of money demand over the 1980s. RMSE is the root mean squared error.

Table 3

Disaggregated Money Demand Regressions: Explaining

The Source of the Shift in Interest Elasticity

Equation 3•1 : Demand Deposits

$$\Delta \ln (DD/P) = \underset{(-2.4)}{-.003} + \underset{(4.4)}{1.2}\,\Delta \ln y - \underset{(-5.3)}{.10}\,\Delta \ln R - \underset{(-2.3)}{.003}\,D1 - \underset{(-4.5)}{.006}\,D2 - \underset{(-.5)}{.027}\,D2 * \Delta \ln R$$

Sample-Period = 1961.01-1985.03 $\bar{R}^2 = .38$ SER = .00369 ROW = .3 DW = 1.94

$F2_R = .89$ (9,257)

Equation 3•2 :Demand deposits and Other Checkable Deposits

$$\Delta \ln (DD + OCD/P) = \underset{(-3.6)}{-.003} + \underset{(6.3)}{1.1}\,\Delta \ln y - \underset{(-6.2)}{.08}\,\Delta \ln R - \underset{(-2.0)}{.001}\,D1 + \underset{(.71)}{.001}\,D2 - \underset{(-3.1)}{.11}\,D2 * \Delta \ln R$$

Sample Period = 1961.01-1985.03 $\bar{R}^2 = .38$ SER = .0047 ROW = 0.0 DW = 1.94

$F2_R = 3.8$ (9,257)

Notes: DD is demand deposits and OCD is the other checkable deposits. See Notes in Table 1 for an explanation of the remaining variables.

Table 4

Money Demand Regressions that Include the Own Rate,

Equation 4.1 : Transaction deposits

$$\Delta\ln(DD + OCD/P) = \underset{(-3.6)}{-.003} + \underset{(6.4)}{1.1}\,\Delta\ln y - \underset{(-6.3)}{.08}\,\Delta\ln\bar{R} - \underset{(-2.0)}{.001}\,D1 + \underset{(.5)}{.0004}\,D2 - \underset{(-2.1)}{.08}\,D2 * \Delta\ln\bar{R}$$

Sample-Period = 1961.01-1985.03 $\bar{R}^2 = .38$ SER = .005 ROW = 0.0 DW = 1.95

$F2_{\bar{R}} = 3.4$ (9,257)

Equation 4.2 : Currency and Transaction Deposits (M)

$$\Delta\ln(M/P) = \underset{(3.4)}{-.002} + \underset{(7.2)}{1.0}\,\Delta\ln y - \underset{(-6.9)}{.07}\,\Delta\ln\bar{R} - \underset{(-1.8)}{.001}\,D1 + \underset{(.6)}{.0004}\,D2 - \underset{(-2.7)}{.07}\,D2 * \Delta\ln\bar{R}$$

Sample-Period = 1961.01-1985.03 $\bar{R}^2 = .412$ SER = .0037 ROW = 0.0 DW = 1.92

$F2_{\bar{R}} = 3.05$ (9,257)

Notes: $\bar{R}$ is the commercial paper rate minus the own yield on money. The own yield on money is measured as the share of other checkable deposits in M1 multiplied by the yield on these deposits, 5-1/4 percent. For other variables see notes in Table 1.

Table 5

Interest Elasticities of the Standard Monthly Money Demand Equations, 1961-1980

Level Form	Long-Run Elasticity
Real-Partial Adjustment Equation	-.23
Nominal-Partial Adjustment Equation	-.21
First Difference Form	
Real-Partial Adjustment Equation	-.03
Nominal-Partial Adjustment Equation	-.03

Notes: The estimates of the long-run interest elasticity are from the following money demand regressions.

Level Form

$$\ln (M/P) = a + b \ln y + c \ln R + d \ln (M/P)_{-1} + gD1$$

$$\ln (M/P) = \tilde{a} + \tilde{b} \ln y + \tilde{c} \ln R + \tilde{d} \ln (M_{-1}/P) + gD1$$

First Difference Form

$$\Delta \ln (M/P) = b\Delta \ln y + c\Delta \ln R + d\Delta \ln (M/P)_{-1} + eD1$$

$$\Delta \ln (M/P) = \tilde{b}\Delta \ln y + \tilde{c}\Delta \ln R + \tilde{d}\Delta \ln (M_{-1}/P) + \tilde{e}D1$$

The regressions are estimated by the Hildreth -Lu estimation procedure. For an explanation of the variables see the note in Table 1.