THE MONEY SUPPLY PUZZLE AND TREASURY BILL MARKET EFFICIENCY: A NEW HYPOTHESIS AND THE EVIDENCE*

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1. INTRODUCTION

Regressions of Treasury bill (TB) rate responses on anticipated money supply (MS) during various periods from 1977 to 1982, an interval marked by significant turbulence in monetary policy, yield persistent findings of statistically significant negative coefficients of anticipated MS.[1] This is uniformly interpreted as evidence of TB market inefficiency. In contrast, the other independent variable in the regression, the forecast error (actual money less anticipated money and often called unanticipated money), frequently showed a positive coefficient, a sign which is neutral with respect to the existence of market efficiency.

While much effort has been expended in rationalizing the existence of the positive coefficient of unanticipated money (Hardouvellis, 1984; and Thornton 1991 and 1989, Fama, 1982, and Urich and Wachtel 1981 and 1984, to name a few), little attention has been directed to explaining the negative sign of the anticipated money coefficient. Falk and Orazem (1989) suggest that this sign may be due to systematic errors in Fed MS announcement estimates. Deaves, Melino and Pesando (1987), Roley (1983), and Clark, Joines and Phillips (1985) find that systematic errors in Money Market Services' (MMS) MS forecasts, the forecast almost always used by investigators, could also cause this result. These are plausible explanations, but even when Belongia, Hafer and Sheehan (1988) include an adjustment to help correct for lags in MMS forecasts, they still report a statistically significant negative coefficient over the 1978 to 1983 period.

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[1] See Cornell (1979, 1983), Bailey (1988), Grossman (1981), Loeys (1985), Roley (1982, 1983), Roley and Walsh (1984), Urich and Wachtel (1981, 1984) and Hardouvellis (1984) for some examples. Sheehan (1985) provides a good review of weekly money supply announcement research prior to 1986.

By comparison, similar studies over less turbulent periods usually produce statistically insignificant coefficients of anticipated MS, thus supporting the hypothesis of efficiency. These regressions embraced pooled observations over different (3- or 4-year) periods with break points often defined by major Fed policy changes, e.g., see footnote 1.

It is difficult to accept the belief that the TB market is efficient in certain periods, and inefficient in other periods. We believe that these indicated inefficiencies are due in part to the turmoil induced by the implementation of the Fed's reserve-targeting approach from November 1979 to 1981. Since the Fed's policy was not well defined, it left market participants with a strong sense of uncertainty as to what the policy meant and how it was to be implemented. This produced decreased confidence in participant forecasts, which were available at least by 3:30 P.M. on Thursday, the MS announcement day. When the 4:00 P.M. MS announcement is made, yielding unanticipated money, or the forecast error, participants sought to modify their forecasts in determining bid prices for TB's in the subsequent time interval 4:00 P.M. to 5:00 P.M. Their forecasts were altered by some kind of an error adaptive process. When changes in TB rates from 3:30 P.M. to 5:00 P.M. are regressed on this modified anticipated money, the coefficient of this variable is predicted to lose its significance. Should this prediction be confirmed, the hypothesis of market efficiency would be strengthened. We offer evidence in support of this hypothesis.

Previous studies embodied OLS regressions of pooled observations over various time periods with discrete break points. One exception is the time-varying maximum likelihood approach used by Belongia, Hafer and Sheehan (1988), who, however, reported weekly results only for the unanticipated money coefficient over the period 1978 to 1983. With few exceptions, investigators used as the anticipated MS measure the median forecast of Money Market Services (MMS) weekly survey of market participants, which was started in 1977. The exceptions were first order ARIMA forecasts reported by Grossman (1981) and Belongia and Sheehan (1987). Their findings were consistent with those using MMS forecasts.

A number of objectives are sought in this study. First, we expand the time horizon over which the study of efficiency is made from 1975 to 1985. Second, we apply uniform forecasting and estimation procedures over the entire period. Specifically, a second-order ARIMA procedure is used for forecasting MS changes because of difficulties, first noted by Roley (1983), with the MMS forecasts. Third, to pinpoint the precise weeks in which market inefficiencies are indicated, a Bayesian procedure is used for estimating coefficients in a time-varying regression. Fourth, since most studies focused solely on 3-month bills, we expand the coverage to include all T bills -- 3-month, 6-month and 1-year bills.

Fifth, after corroborating, among other things, that virtually all evidence of inefficiency lies in the years 1980-1981, a period marked by great uncertainty over

Fed policies and operating procedures, we suggest that participants responded to this uncertainty by modifying their ARIMA forecast to reflect an error adaptive procedure. Sixth, when this modified forecast is used in place of the ARIMA forecast in a standard OLS regression of changes in TB rates on anticipated and unanticipated money quantities for the interval 1980-1981, the coefficient of expected money is no longer statistically significant. We interpret these results as providing further evidence that forecast errors could have been important factors in yielding the inference of TB market inefficiency.

In sum, rather than being pure noise, we suggest that during the 1980-1981 period the forecast error had potential informational content to participants. Consistent with strong form informational efficiency, they acted "as if" they employed this information in an adaptive process.

The first section discusses the ARIMA model and the time-varying regression approach. After setting forth empirical results, the following section treats the money puzzle enigma. Further empirical findings are discussed next and the paper ends with some concluding comments.

2. A TIME-VARYING REGRESSION

We specify a strict time-series model which allows the parameters to take a random path. The model may be stated generally as follows:

$$\Delta TB_t = \beta_{0t} + \beta_{1t} AM_t + \beta_{2t} UM_t + u_t, \qquad (1)$$

where u_t is the error term with the usual properties. The expected change in the MS for each observation at time t, AM_t, is derived from ARIMA forecasts which are explained below. UM_t is then calculated by subtracting AM_t from the actual change in the MS. We assume market participants act "as if" they employed the ARIMA forecast as their forecast of the weekly change in MS. Changes in TB rates, TB_t, are calculated for 3-, 6-, and 12-month TB's, and separate regressions are run for each set of changes. Following Zellner, Hong and Min (1991), we employ a Bayesian procedure for estimating the coefficients $\beta_{it}(i = 0,1,2)$.

2.1. Money Supply and Treasury Bill Data

All MS figures come from the H-6 weekly releases of the Federal Reserve System. Data were compiled for every week from 1970 to 1985. The MS measure used is the seasonally adjusted M1 series which was called M1 through January 31, 1980, then M1B through the end of 1981, and M1 again thereafter. TB interest rates come from the Federal Reserve Bank of New York's 3:30 P.M. closing quotations and Telerate database service's 5:00 P.M. bid prices.

The dependent variable in the regression is the observed change in the TB rate from 3:30 P.M. to 5:00 P.M. on the announcement day. We chose this period because although the MS announcement is typically given around 4:00 P.M., in the unlikely event of leakage prior to the announcement, we would want interest rates to reflect this information.

2.2. The ARIMA Forecast of AM_t

MMS median survey data are not used for several reasons. First, the data for that series was not available over the entire period 1975-1985. Second, Hein (1985) questioned the effect a proxy, needed to capture a noise effect from the time of the survey to the time of the announcement, would have on the market efficiency of TB rates (Roley, 1983). In Hein's view, the methodology was flawed and led to market inefficiencies when corrected. Third, Deaves, Melino and Pesando (1987) suspect the series contains a downward bias.

A second--difference ARIMA forecast procedure is used because 1) a first--difference approach with the MS time series produces slope problems which contribute to a non-constant mean, and 2) a second difference approach is indicated by the Box-Jenkins procedure. A brief explanation of the forecast model is provided in the Appendix.

3. TIME-VARYING MODEL ESTIMATES

Graphical representations for anticipated money-regression coefficients are given in Figure 1 for 3-, 6- and 12-month TB rates over all of 1980 and 1981. To interpret these graphs, note where the horizontal line at $\hat{\beta}_1=0$, crosses an upper or lower HPD (Highest Posterior Density) bound. Whenever it does, that $\hat{\beta}_1$ value is significant at the .05 level in a Bayesian subjective sense--positively for an upper bound, negatively for a lower bound[2].

3.1. Anticipated Money Coefficients

For market efficiency, $\hat{\beta}_1$ should not differ significantly from zero. On average, for the entire interval 1975-1985, as discussed below, the hypothesis is supported by our evidence. Market efficiency of TB rates with respect to MS announcements is sufficiently robust even in the face of a weekly time varying Bayesian regime. By removing the shadow that existed over the stationarity

[2] The same results are found for $\beta_2=0$.

assumption in previous tests,[3] and with a broader sampling period, the earlier findings of market efficiency are reinforced.

Evidence in support of the hypothesis is not perfect, however, and, as in earlier OLS studies, instances of inconsistency should be noted. Ratios of the number of statistically significant $\hat{\beta}_1$ coefficients to the total number of $\hat{\beta}_1$ coefficients for a given year are set forth in Table 1. (All significant coefficients were negative except for the year 1975, when all (2) were positive). For 12-month TB's we record only one exception over the entire eleven-year period. Yet, from mid-December 1980 through mid-June 1981, many deviations from market efficiency occur for either 3- or 6-month TB's or both, sometimes several weeks in succession.[4] Since our ARIMA forecasts yield significantly negative coefficients of expected money over the 1980-1981 period, it is difficult to attribute earlier findings of such coefficients to deficiencies in MMS forecasts, the variable almost always used in such studies.

3.2. Unanticipated Money Coefficients

While not our primary focus, unanticipated money coefficients are reported to complete the picture. In line with previous investigators who found positive signs when the coefficient was significant, we test the hypothesis that $\hat{\beta}_2$ is greater than zero.

Most significant coefficients (all positive) were in the years 1980 and 1981, along with some shortly after the October 6, 1979 announcement, and in early 1982. Even though this pattern held primarily for 3- and 6-month TBs, significant responses (again all positive) were noted for 12-month TBs. Table 2 displays the ratios of the number of statistically significant $\hat{\beta}_2$ coefficients to the total number of $\hat{\beta}_2$ coefficients for each year. For the years 1980, 1981 an 1982, the hypothesis cannot be rejected.[5]

The most unexpected outcome for unanticipated money, however, was rejection of the hypothesis for virtually every announcement in the 1976-1979 time period. This is in contrast to previous authors (Grossman, 1981, Urich and Wachtel, 1981 and Roley, 1983), who found positive significant coefficients for

[3] Note that Belongia, Hafer and Sheehan (1988), although using a time-varying regression, did not report specific weekly time-varying coefficients of expected money.

[4] Documentation of numerous negative coefficients on anticipated MS for various intervals was made, of course, by previous investigators, e.g., Cornell (1979, 1983), Deaves, Melino and Pesando (1987), Grossman (1981), Urich and Wachtel (1981, 1984), and Belongia, Hafer and Sheehan (1988).

[5] Similar results were established by, among others, Grossman (1981), Hardouvelis (1984), Huizinga and Leiderman (1987), Roley (1982, 1983), Urich and Wachtel (1984), and Belongia, Hafer and Sheehan (1988).

their broad interval OLS regressions. Our results strongly support the hypothesis that during the 1976-1979 period, as well as the 1983-1985 period, unanticipated money was white noise and its coefficient is not in need of explanation.[6]

4. THE MONEY SUPPLY PUZZLE

In contrast to the positive unanticipated money coefficients the negative expected MS coefficient has received little attention. Falk and Orazem (1989) find evidence that this result may be due to an errors-in-variable problem, i.e., measurement errors in both the MS forecast and in the Fed's preliminary MS announcements. It is not clear, however, why these errors were present in the 1979-1984 period, the period of their study, and not in earlier periods where the anticipated money coefficient is not significantly negative. Deaves, Melino and Pesando 1987 provide evidence that a downward bias may exist in MMS' MS forecasts, and that correcting for this bias reduces the size of the negative coefficient but does not eliminate its statistical significance. But we find significant negative coefficients for many weeks during the 1980-1981 period with our time-varying regression regime even in the absence of MMS forecasts, i.e., when a second-difference ARIMA model is used to forecast the MS. In addition, as in the preceding case, it is not known why this downward bias in MMS forecasts would be confined to just this period.

We offer an additional explanation. During the period 1980-1981, participants anguished over the proper interpretation of the new Fed policy. They responded to this shock by modifying their ARIMA forecast with an error adaptive procedure. Since the MS announcement is typically made at 4:00 P.M. on Thursday, during the interval 4:00 P.M. to 5:00 P.M. participants have information on both unanticipated money and the forecast error, however defined, for determining their TB bid prices. This publicly available information would be embodied in Thursday evening TB prices. Therefore, while TB rates at 3:30 P.M. can be expected to reflect AM_t, changes in TB rates from 3:30 P.M. to 5:00 P.M. reflect UM_t plus various forecast error adaptive procedures. In a two-independent variable regression, the effect of excluding this process may bias the coefficients of AM_t and UM_t. While the possible bias of UM_t is of no relevance to us, the bias of the regression coefficient of AM_t is of concern. We present evidence in support of this bias.

To illustrate the evidence that emerges from the standard OLS treatment of two-variable regressions, we present the coefficients of AM_t and UM_t in Table 3 for each period with our ARIMA forecasts of MS. Note the typical signs of the AM_t is significant only in the 1980-1981 period.

[6] Information for pre-1980 and post-1981 periods is available upon request.

4.1. A Two-Stage Least Squares Approach

To help throw light on this adaptive process we specify a two-stage least squares procedure. Let P_t^*, defined below, denote a forecast error adaptive variable. We define the model

$$\Delta MS_t = AM_t + UM_t,$$

where

$$UM_t = \alpha_0 + \alpha_1 P_t^* + u'_t, \qquad (2)$$

and the error term u'_t has the usual properties. After estimating the coefficients α_0 and α_1 with OLS in the first-stage regression, we write

$$\Delta \hat{MS}_t = AM_t + \hat{\alpha}_0 + \hat{\alpha}_1 P_t^*, \qquad (3)$$

where $\Delta \hat{MS}_t$ denotes the expected change in MS after modification by the adaptive process $\hat{\alpha}_0 + \hat{\alpha}_1 P_t^*$. The modified forecast error, UM_t^*, become

$$UM_t^* = \Delta MS_t - \Delta \hat{MS}_t. \qquad (4)$$

The second-stage regression is then defined as

$$\Delta TB_t = b_0 + b_1 \Delta \hat{MS}_t + b_2 UM_t^* + u_t'', \qquad (5)$$

where u_t'' is again an error term with the usual properties. If the adaptive process is effective, then during the 1980-1981 period the estimate of b_1 should not differ significantly from zero.

The first task is to estimate the coefficients of equation (2). To do this, an appropriate measure of P_t^* must be defined. A host of candidates can be suggested, each of which we interpret as a surrogate for the set of all adaptive procedures participants may find useful.

We experimented with different *plausible* definitions of P_t^*. To be useful and effective as a surrogate, its regression coefficient, $\hat{\alpha}_1$, should reflect rational behavior and, at the same time, be statistically significant for the OLS regression (equation [2]) run over data for the 1980-1981 period, and not significant for regressions run over 1976-1979 and 1982-1985 periods. A definition satisfying these criteria was

$$P_t^* = [\,|UM_{t-1}|/MS_{t-2}] - [\,|UM_t|/MS_{t-1}]. \qquad (6)$$

The regression coefficients and their associated t values are presented in Table 4. Note that the coefficient $\hat{\alpha}_1$ is significant at the 0.05 level only for the interval 1980-1981. Also, its negative sign is consistent with rational behavior, i.e., a positive value of P_t^* should lead to a downward revision of UM_t. Autocorrelation of the residuals was not significant.

This definition of P_t^* has a minor difficulty. For, in equation (2), UM_t is a dependent variable and, at the same time, one of the four elements of P_t^* . This is somewhat awkward even though UM_t is only one of four elements. We mitigate this problem by interpreting UM_t in P_t^* , and only in P_t^* , as a proxy for some unknown macroeconomic variable in the environment. Participants are presumed to use this variable, which happens to be correlated with UM_t, as the fourth variable in P_t^* . Nevertheless we view P_t^* not as a definitive hypothesis, but instead as a surrogate for a host of adaptive processes that could be used by participants.

Given the foregoing we calculate $\Delta \hat{MS}_t$ and UM_t^* from equations (3) and (4), respectively, and substitute them into equation (5). OLS coefficients of (5) are estimated from data for each of the three time intervals (1976-1979, 1980-1981, and 1982-1985) and presented in Table 5.[7] If participants act "as if" they employ adaptive procedures consistent with P_t^* as given by equation (6), the coefficient b_1 for the 1980-1981 interval should no longer differ significantly from zero. And indeed the data in Table 5 confirms this hypothesis for every TB maturity. For comparison, we examine Table 3 (the standard regression) where the coefficient of AM_t is significantly negative.[8] Since the OLS estimates for 12 month bills for 1980-1981 showed statistically significant autocorrelation in the error terms, the coefficients were re-estimated using the Yule-Walker procedure from SAS. The revised estimates for this case appear in Table 5.[9] Finally, note that the properties of the standard OLS regressions for 1976-1979 and 1982-1985 in Table 3 virtually correspond to the properties of the two-stage procedure of Table 5, thus supporting the belief that this error-corrective process was active only in the 1980-1981 period.

These overall results are suggestive of an error-adaptive process at work in the TB market during the 1980-1981 period. It is difficult to believe that this

[7] The same analysis was run using MMS forecasts in place of the ARIMA forecast. The results were similar and are available from the authors.

[8] While $\hat{a}_1$ for 12-month bills is almost significant for the 1982-1985 interval, it is hazardous attaching too much significance to this result, since there is evidence that M_t was losing its importance as an indicator of monetary policy during this period.

[9] Finally, our results were not due to ARIMA forecasts. We duplicated the foregoing analysis over the period 1977 to 1985 using MMS forecasts and found similar results.

market is not innately and basically efficient, and when strong anomalies occur, they merit explanation.

5. CONCLUSIONS

In OLS regression studies of changes in TB rates on anticipated money, investigators have found negative coefficients on anticipated money, basically over the period 1977-1982. With a time-varying Bayesian regression regime, we pinpoint the precise weeks in which this negative response occurred: virtually all such responses lie in the April 1980 to July 1981 time frame, a period associated with the Fed's ill-fated attempt to implement a vaguely defined reserve-targeting approach. Explanations for OLS evidence of TB market inefficiency consist of 1) the possibility of an errors-in-variable problem (Falk and Orazem, 1989), and 2) the existence of a downward bias in Money Market Services' forecasts (Deaves, Melino and Pesando, 1987). Another explanation, not inconsistent with the foregoing suggestions, is that the Fed's new policy was creating more uncertainty in participant's money supply forecasts, spurring them to adopt error-corrective procedures to modify such forecasts. Evidence of this is provided by a two-stage least squares approach. When the initial money supply forecast is modified by an error-correcting procedure derived from a first-stage least squares regression, the coefficient of the modified forecast in a second-stage regression of changes in TB rates on the forecast is no longer statistically significant.

We have not identified the precise form of the error adaptive process. Our confirmed hypothesis is consistent with the view that some kind of a process was apparently active in 1980 to 1981, which was a response to the Fed's October, 1979 pronouncement of a new approach to monetary policy.

Our empirical findings support the belief that forecasting error, most likely induced by the Fed's new operating procedures, could have been an important factor in generating the apparent market inefficiencies observed during the 1980-1981 interval.

In the future we will study the efficiency of Chilean government bond market, using some of the techniques employed in this study and basically the same fundamental model which relates the changes in interest rates with the changes in money supply (expected and unexpected). This future study will provide additional evidence in the area of market efficiency for Chile.

APPENDIX

Weekly forecasts of AM_t are derived in the following manner. First, the MS series from 1970 to 1985 is obtained. Second, the series is second-differenced and appropriate terms and lags identified. Third, the differenced MS series is first fitted for the period 1970-1974, using the previously identified terms and lags. For the year 1975, the first year that forecasts are required, forecasted second differences are generated for each week. Forecasts for the next year, 1976, are done in identical fashion, i.e., the differenced MS series is fitted for the period 1970-1975 (instead of 1970-1974) using the identical terms and lags cited in the previous step. Weekly forecasts are then made for 1976. To obtain forecasts for all weeks through 1985, the same procedure is followed by advancing one year at a time. Fourth, forecasted second differences are converted into forecasted first differences which then lead to the desired weekly forecasts.

The identification procedure of the entire MS series yielded the following best fit:

$$ADM_t = a_1 SDM_{t-1} + a_2 SDM_{t-2} + a_3 SDM_{t-3} + a_4 SDM_{t-13} - b_1 MS_{t-1} - b_2 MA_{t-3},$$

where

ADM_t is the second difference in the actual money supply,
SDM_t is the second difference forecast at time t,
a_1, a_2, a_3, and a_4 are autoregressive forecast parameters,
MA_t is the moving average term at time t, and
b_1 and b_2 are moving average parameters.[a]

Using both partial and full autocorrelation residual plots as well as Chi-square tests, residuals in the second-difference approach proved to be pure white noise.[b,c]

a. A rational explanation cannot be provided for the term containing SDM_{t-13}.

b. Results of these fits for each of the years 1975-1986 (the ARIMA parameter values, statistics, and graphical representations) are available upon request from the authors.

c. To be assured that the converted first-difference forecasts are unbiased and efficient, following Grossman 1981, tests for these attributes were done. In each test year we found that first differences were unbiased and the residuals of these first--differenced forecasts were white noise. Also, in all cases the forecasts were efficient, i.e., the forecasts contained all available information from a strong-form point of view.

FIGURE 1

Anticipated Money Observations, 1980-1981
Beta 1, Highest Posterior Density (HPD) Estimates

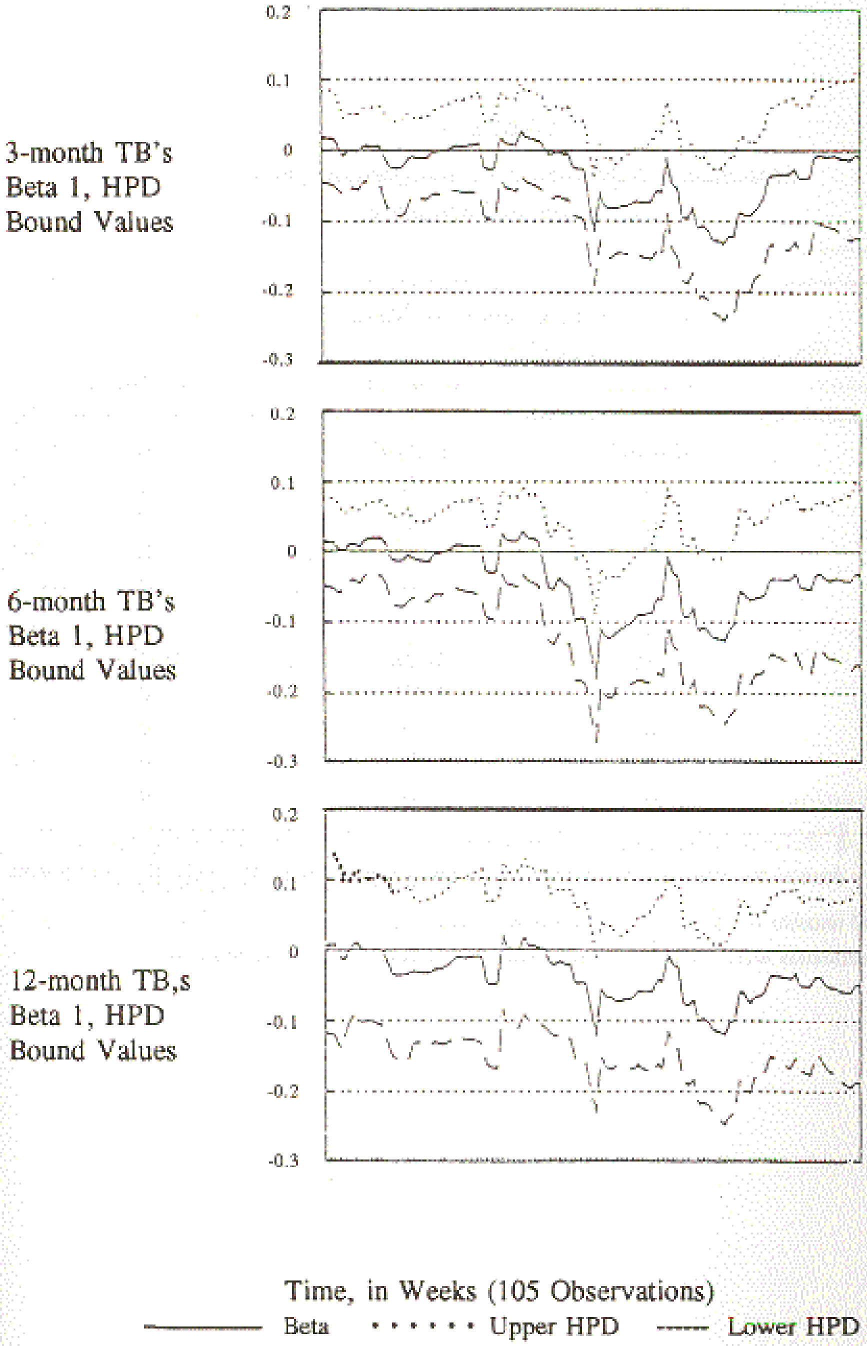

TABLE 1

Statistically Significant $\hat{\beta}_1$ Coefficients for each Treasury Bill Maturity[+]

	Relative Frequency by Maturity		
Year	3-Month	6-Month	12-Month
1975	0.019*	0.019*	0
1976	0	0	0
1977	0	0	0
1978	0	0	0
1979	0	0	0
1980	0	0.057	0
1981	0.385	0.288	0.019
1982	0	0.019	0
1983	0	0	0
1984	0	0	0
1985	0	0	0

[+] Each entry denotes the ratio of the number of statistically significant (0.05 level) $\hat{\beta}_1$ coefficients to the total number of $\hat{\beta}_1$ coefficients for each year.

* These coefficients were positive. Coefficients for all other years were negative.

TABLE 2

Statistically Significant $\hat{\beta}_2$ Coefficients for each Treasury Bill Maturity[+]

	Relative Frequency by Maturity[*]		
Year	3-Month	6-Month	12-Month
1975	0	0	0
1976	0	0	0
1977	0	0	0
1978	0	0	0
1979	0.019	0.058	0
1980	0.231	0.327	0.058
1981	0.365	0.462	0.269
1982	0.038	0.115	0.077
1983	0	0	0
1984	0	0	0
1985	0	0	0

[+] Each entry denotes the ratio of the number of statistically significant (0.05 level) $\hat{\beta}_1$ coefficients to the total number of $\hat{\beta}_1$ coefficients for each year.

[*] All coefficients for each year were positive.

TABLE 3

Estimated Coefficients for the Change in TB-Rate
Equation $[\Delta TB_t = a_0 + a_1 AM_t + a_2 UM_t + e_t]$
for the Periods 1976-1979, 1980-1981, and 1982-1985
(t-values in parentheses)

Panel A

Maturity (months)	AM_t	UM_t	R^2
	1976-1979		
3	0.002 (0.445)	0.003 (2.274*)	0.02
6	0.005 (1.238)	0.004 (3.286*)	0.05
12	0.003 (0.346)	0.006 (2.02*)	0.01
	1980-1981		
3	-0.08 (-2.38*)	0.05 (5.28*)	0.34
6	-0.09 (-2.45*)	0.05 (4.47*)	0.27
12	-0.08 (-2.66*)	0.05 (5.98*)	0.38
	1982-1985		
3	-0.004 (-0.548)	0.006 (2.520*)	0.02
6	-0.012 (-1.653)	0.010 (4.172*)	0.09
12	-0.013 (-1.829)	0.010 (4.034*)	0.09

*Indicates significance at the 0.05 level.

TABLE 4

Estimated Coefficients for the Equation

$UM_t = \alpha_0 + \alpha_1 P_t^* + u_t$

for the Periods 1976-1979, 1980-1981, and 1982-1985

(t-values in parentheses)

Period	$\hat{\alpha}_0$	$\hat{\alpha}_1$	R_2
1976-1979	0.08 (0.60)	-48.84 (-1.81)	0.01
1980-1981	0.20 (0.61)	-137.22 (-2.62*)	0.08
1982-1985	0.23 (1.11)	-3.16 (-0.07)	0.01

*Denotes significance at the 0.01 level.

TABLE 5

Estimated Coefficients for the Equation

$$\Delta TB = b_0 + b_1 \Delta \hat{MS}_t + b_2 UM_t^* + u_t''$$

for the Periods 1976-1979, 1980-1981, and 1982-1985

(t-values in parentheses)

Period	$\hat{b}_1$	$\hat{b}_2$	R^2
	3-Month Bills		
1976-1979	0.00 (0.77)	0.00 (2.19*)	0.02
1980-1981	0.00 (0.18)	0.05 (4.59*)	0.22
1982-1985	-0.00 (-0.56)	0.01 (2.53*)	0.02
	6-Month Bills		
	$\hat{b}_1$	$\hat{b}_2$	R^2
1976-1979	0.01 (1.75)	0.00 (3.14*)	0.06
1980-1981	-0.01 (-0.33)	0.05 (4.04*)	0.21
1982-1985	-0.01 (-1.66)	0.01 (4.18*)	0.10
	12-Month Bills		
	$\hat{b}_1$	$\hat{b}_2$	R^2
1976-1979	0.01 (0.61)	0.01 (1.96*)	0.02
1980-1981	0.01 (0.89)	0.04 (5.05*)	0.43
1982-1985	-0.01 (-1.85)	0.01 (4.04*)	0.09

*Denotes significance at the 0.05 level.

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