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MARKET REACTIONS TO U.S. WEEKLY MONEY SUPPLY ANNOUNCEMENTS AFTER THE INTRODUCTION OF CONTEMPORANEOUS RESERVE REQUIREMENTS
An Empirical Note

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Movements across the nominal term structure of U.S. interest rates have continued to be positively correlated with weekly money surprises post-CRR. Bond and foreign exchange market evidence suggests that these may no longer be movements in the real term structure.

In February 1984 the Federal Reserve switched from lagged to contemporaneous reserve requirements (hereafter CRR). This empirical note presents evidence on exchange rate and short- to long-term interest rate reactions to the Fed's weekly money supply announcement after this date. The existing literature has shown that, between October 1979 and February 1984, the unanticipated component of the announcement was positively correlated with changes in both the foreign exchange value of the U.S. dollar and U.S. interest rates. [1] Post-CRR, the positive correlation between money surprises and interest rates – though weaker – persists. Exchange rate effects, however, disappear. The implications of these findings for the debate on the credibility of Federal Reserve policy is briefly assessed. [2]

The sample used here ends at September 1985. As a point of comparison, results from an October 1982 to February 1984 subperiod are presented. [3] The standard efficient markets model is utilized:

$$DMV_t = \beta_0 + \beta_1 UM_t + \beta_2 EM_t + \epsilon_t, \tag{1}$$

where

DMV_t = change in market variable over narrow interval including the money announcement,

[1] In October 1979 the Fed switched from a federal funds rate to a non-borrowed reserves operating procedure and concurrently stressed its adherence to monetary targeting and restraint. The empirical literature is broad. For recent studies, see, on exchange rates, Hakkio and Pearce (1985), and on the term structure of interest rates, Loeys (1985).

[2] The period after February 1984 has been as yet virtually unexplored in the literature. Roley (1986), however, has investigated short-term interest rate reactions.

[3] October 1982 is an appropriate starting point, since at this time the Fed switched from a non-borrowed to a borrowed reserves operating procedure, and first began to downplay the importance of *M1*. Loeys (1985), Roley (1986) and Huizinga and Leiderman (1985) have shown that there is a statistically significant change in the money surprise–interest rate relationship about this time.

UM_t, EM_t = unanticipated and anticipated changes in money; and
β_0, β_1, β_2, ϵ_t = parameters to be estimated and error term.

Market efficiency implies that $\beta_0 = \beta_2 = 0$. The dependent variables are changes in the three- and six-month U.S. Treasury bill and two-, five- and twenty-year government bond yields from 3 : 30 PM the day of the announcement to 3 : 30 PM the following business day, and noon-to-noon percentage changes in the U.S. dollar expressed in British pounds, German marks, Canadian dollars, Japanese yen and Swiss francs, and the unweighted average of these five currencies. Expected percentage changes in *M1* come from a survey conducted by Money Market Services, Inc. This series has been adjusted to correct for the downward bias demonstrated by Deaves, Melino and Pesando (1987). [4]

The table reveals two key points about the estimated coefficients of unanticipated money or 'responses'. [5]

(i) Although interest rates are still positively correlated with monetary innovations post-CRR – all responses are positive and significant at around 5% [6] – the 'response curve' (i.e., the pattern of responses over the term structure) seems to have shifted. It has shifted downward for all maturities and become relatively flat. The change in responses from the October 1982 to February 1984 subperiod is significant for three- and six-month bills.
(ii) There is no evidence that the foreign exchange value of the U.S. dollar is sensitive to surprises after February 1984. The latter is a departure from the previous subperiod, but one is unable, given the great amount of noise involved, to reject that responses have not changed.

These findings present difficulties for the view that movements in the nominal term structure are entirely movements in the real term structure. In order to explain the empirical regularities observed prior to February 1984, the policy anticipations approach argued that a combination of monetary targeting, that was deemed credible by market participants, and some degree of short-term price inflexibility led to rises in short-term real rates of interest following positive surprises in anticipation of future Fed tightening. [7] Immediate appreciation of the U.S. dollar was thereby induced. Long-term bond yield responses could also be rationalized under certain assumptions about the economic environment. In Roley and Walsh's (1985) fixed-price model, the more persistent were weekly money demand disturbances, the higher long-term interest rate responses relative to short-term could reasonably be. [8]

[4] U.S. interest rates (bill rates then being converted to true maturity basis) come from H.15 release of the Federal Reserve (via DRI, Canada), exchange rates from Bank of Canada's data base, changes in money from the Fed's H.6 release, and expected changes from Money Market Services, Inc. (the last two series courtesy of Vance Roley).

[5] Note that there is no evidence of money, bond or foreign exchange market inefficiency during February 1984 through September 1985. As well, the *W1* statistics indicate little evidence of within-subperiod changes in the responses of yields and currency prices to unanticipated money.

[6] Roley (1986) found insignificant (though positive) responses in the federal funds rate and the three-month bill rate. My results, I believe, are more accurate, since Roley (along with many others) implicitly constrains the market response to revisions (which are announced at the same time) to be equal to that of surprises but of *opposite* sign. See Huizinga and Leiderman (1985) for discussion.

[7] Siegel's (1985) model also viewed interest rate increases across the term structure as real. He assigned to monetary announcements a signalling role of the economy's future prospects.

[8] The intuition is that the more persistent money demand shocks are, the more persistently the Fed must push up interest rates in order to return money back to its target growth rate at a given rate of adjustment. A serial correlation coefficient of 0.996 was able to 'explain' twenty-year bond yield responses 25% as high as those for three-month bills during October 1979 through October 1982. Of course, one problem is that the assumption of fixed prices becomes increasingly tenuous the farther in the future adjustment is required to take place.

Table 1
Response of U.S. interest rates and exchange rates to U.S. money announcements.
$DMV_t = b_0 + b_1 \cdot UM_t + b_2 \cdot EM_t + e_t$. [a]

	b_0	b_1	b_2	*SEE*	R^2	*DW*	*BP*	*W1*	*W2*
			Maturity						
October 8; 1982–January 27, 1984									
Three months	0.013	18.660	−2.810	0.10	0.34	1.99	1.53	1.23	–
	(0.014)	(3.229)	(3.202)						
Six months	0.020	21.743	−4.557	0.12	0.35	1.94	6.52	1.98	–
	(0.016)	(3.272)	(3.699)						
Two years	0.012	18.023	−5.205	0.11	0.31	1.82	5.56	2.27	–
	(0.015)	(3.470)	(3.440)						
Five years	0.013	18.206	−6.100	0.10	0.36	1.95	3.02	2.92	–
	(0.013)	(3.141)	(3.114)						
Twenty years	0.014	14.487	−5.297	0.10	0.28	2.16	4.10	4.36	–
	(0.013)	(3.060)	(3.034)						
February 3, 1984–September 5, 1985									
Three months	0.015	7.124	−1.789	0.10	0.05	2.01	0.89	0.61	6.93
	(0.012)	(3.612)	(2.503)						
Six months	0.013	11.753	−2.994	0.11	0.11	2.21	0.01	0.64	3.81
	(0.013)	(4.023)	(2.788)						
Two years	0.003	11.374	−1.467	0.12	0.09	2.17	0.54	0.82	1.93
	(0.014)	(4.109)	(2.847)						
Five years	0.005	10.937	−1.076	0.12	0.07	2.22	1.92	0.37	2.10
	(0.014)	(4.369)	(3.027)						
Twenty years	0.007	7.978	−2.089	0.11	0.06	2.05	3.19	0.47	2.03
	(0.013)	(3.914)	(2.712)						
			Currency/U.S. dollar						
October 8, 1982–January 27, 1984									
British pound	0.062	45.050	−20.998	0.76	0.06	2.03	1.37	0.76	–
	((0.102)	(24.405)	(24.195)						
German mark	0.109	42.930	−8.076	0.62	0.07	1.99	0.80	3.32	–
	(0.083)	(19.746)	(19.576)						
Canadian dollar	0.012	6.072	−2.580	0.18	0.02	1.83	6.32	0.24	–
	(0.027)	(4.894)	(5.573)						
Japanese yen	−0.106	27.948	21.655	0.78	0.03	1.44	3.25	0.03	–
	(0.104)	(24.814)	(24.600)						
Swiss franc	0.066	38.889	2.386	0.73	0.04	2.09	0.42	1.29	–
	(0.097)	(23.257)	(23.057)						
Five-currency average	0.028	32.178	−1.522	0.51	0.06	1.85	1.18	0.19	–
	(0.068)	(16.334)	(16.193)						
February 3, 1984–September 5, 1985									
British pound	0.091	−19.569	−16.721	0.79	0.01	1.88	4.79	0.04	3.26
	(0.093)	(28.056)	(19.440)						
German mark	0.067	14.284	−15.315	0.80	0.01	1.93	5.35	0.03	0.76
	(0.095)	(28.651)	(19.852)						
Canadian dollar	0.030	0.745	−0.309	0.26	0.00	2.21	3.35	0.47	0.37
	(0.031)	(9.267)	(6.421)						
Japanese yen	0.059	4.276	−2.784	0.58	0.00	1.88	5.90	0.22	0.69
	(0.068)	(20.521)	(0.142)						
Swiss franc	0.75	15.479	−15.818	0.82	0.01	1.78	5.28	0.02	0.50
	(0.097)	(29.276)	(20.286)						
Five-currency average	0.064	3.043	−10.189	0.58	0.01	1.85	5.80	0.01	1.45
	(0.069)	(20.748)	(14.376)						

[a] *DMV* = changes in pertinent interest rate and exchange rates (in basis points) respectively over daily interval including announcement. *UM*, *EM* = unanticipated, anticipated percentage change in money. *BP* = Breusch–Pagan statistic ($\chi^2(2)$) testing for heteroscedasticity; standard errors are in brackets below estimates (when *BP* led to rejection of homoscedasticity at 5%, standard errors of White that are heteroscedastic-consistent used instead). *W1*, *W2* = Wald test-statistics ($\chi^2(1)$) for change in *UM* coefficient between first and second halves of the subperiod (*W1*), and from the previous subperiod (*W2*).

While short-term interest rates rise in response to monetary innovations after February 1984, the U.S. dollar does not appreciate. The implication is that, even at the short end, a combination of real and inflationary effects is at work. In addition, twenty-year bonds rise by as much as three-month bills. It is difficult to believe that real interest rate effects of this magnitude could be expected to extend so far into the future. It is more likely then that long-term interest rates are increasing either due to a change in the inflation premium or to overreaction in bond markets. [9]

I do not suggest that policy anticipations is not an adequate approach prior to February 1984. Market perceptions of the information content of the announcement may in fact have changed. It is believed that after this date the Fed may have paid less attention to the behavior of *M1*, in part due to its increasingly unpredictable relationship with nominal GNP. [10] Also, Roley (1986) argues that post-CRR money surprises may have contained a supply component. The reason is that, prior to the change in the reserve requirements, the link between money and reserves was considerably looser.

References

Axilrod, Stephen, 1985, U.S. monetary policy in recent years: An overview, Federal Reserve Bulletin 71, 14–24.

Deaves, Richard, Angelo Melino and James E. Pesando, 1987, The response of interest rates to the Federal Reserve's weekly money announcements: The 'puzzle' of anticipated money, Journal of Monetary Economics 19, forthcoming.

Hafer, R.W., 1986, The FOMC in 1985: Reacting to declining *M1* velocity, Federal Reserve Bank of St. Louis Review 68, 5–21.

Hakkio, Craig S. and Douglas K. Pearce, 1985, The reaction of exchange rates to economic news, Economic Inquiry 23, 621–636.

Hardouvelis, Gikas A., 1984, Market perceptions of Federal Reserve policy and the weekly monetary announcements, Journal of Monetary Economics 14, 225–240.

Huizinga, John and Leonardo Leiderman, 1985, Interest rates, money supply announcements, and monetary base announcements, Working paper no. 1705, Sept. (National Bureau of Economic Research, New York).

Loeys, Jan G, 1985, Changing interest rate responses to money announcements: 1977–1983, Journal of Monetary Economics 13, 323–332.

Roley, V. Vance, 1986, Market perceptions of U.S. monetary policy since 1982, Federal Reserve Bank of Kansas City Economic Review 71, 27–40.

Roley, V. Vance and Carl Walsh, 1985, Monetary policy regimes, expected inflation and the response of interest rates to money announcements, Quarterly Journal of Economics 100, 1011–1039.

Shiller, Robert, John Y. Campbell and Kermit L. Schoenholtz, 1983, Forward rates and future policy: Interpreting the term structure interest rates, Brookings Papers on Economic Activity I.

Siegel, Jeremy J., 1985, Money supply announcements and interest rates: Does monetary policy matter?, Journal of Monetary Economics 15, 163–176.

[9] Hardouvelis (1984) and Loeys (1985) are the main proponents of the former view, and Shiller, Campbell and Schoenholtz (1983) of the latter.

[10] See, for example, Axilrod (1985) and Hafer (1986).