Economics Letters 25 (1987) 63–66
North-Holland

MONETARY POLICY AND SHORT-TERM INTEREST RATES
New Evidence on the Liquidity Effect

Gikas A. HARDOUVELIS *

Columbia University, New York, NY 10027, USA

Received 25 June 1987

There is evidence of a strong liquidity effect in the period October 1979–October 1982, when the Federal Reserve targeted the growth rate of $M1$, and thus monetary surprises were more exogenous than they were in other periods.

1. Introduction

Since the middle 1970s, empirical evidence on the liquidity effect, i.e., that expansions in monetary growth decrease nominal interest rates in the short run, is mixed. [1] The most striking evidence against the presence of a liquidity effect is provided by Mishkin (1982), who finds a positive correlation between nominal interest rates and contemporaneous money surprises. Yet, evidence from the money announcements literature reveals that markets perceive the existence of a strong and long-lived liquidity effect [see Hardouvelis (1987)]. The money announcement studies carry a lot of weight because, unlike most econometric work, in these studies the money surprise is econometrically exogenous.

Mishkin notes that his positive coefficient may be due to lack of exogeneity of the money surprise. During his sample period (1960–1976), the Federal Reserve followed interest rate targets, and thus responded to shocks which increased interest rates by increasing money growth. This, of course, can generate a positive association between interest rates and money surprises. In this paper, I try to uncover a possible liquidity effect by utilizing the period after October 1979, when the Federal Reserve followed monetary aggregate targets as opposed to interest rate targets, and thus simultaneity issues are less problematic. I also examine the reaction of spot exchange rates to corroborate the possible presence of a liquidity effect.

2. Theoretical framework

As in Mishkin (1982), I regress the unanticipated change in the interest rate on unanticipated money, output, and inflation:

$$i_t - {}_{t-1}F_t = a_0 + a_1 s_t + a_m[m_t - m_t^e] + a_y[y_t - y_t^e] + a_p[p_t - p_t^e] + u_t. \quad (1)$$

* I wish to thank Eugene Fama and Frederic Mishkin for comments on an earlier draft, and Barnard College for research support.

[1] See Reichenstein (1987) for a review of the literature.

i_t is the annualized three-month Treasury bill yield to maturity at the first trading day of quarter $t+1$. ${}_{t-1}F_t$ is the corresponding forward yield computed from the three- and six-month yields of the first trading day of quarter t. $-(a_0 + a_1 s_t)$ is a proxy for the expected risk premium embodied in ${}_{t-1}F_t$, and s_t is constructed as the average absolute change in the average quarterly three-month Treasury bill yield of the last eight quarters. (Note that i_t may also contain a risk premium that is not captured by s_t.) m_t is the quarterly growth rate of the seasonally adjusted $M1$, and equals 100 times the change in the log of $M1$ from the last month of quarter $t-1$ to the last month of quarter t. y_t and p_t are the quarterly growth rates in the seasonally adjusted levels of the industrial production index and the consumer price index, defined the same way as m_t.[2] m_t^e, y_t^e, and p_t^e are the market participants' expectations of m_t, y_t, and p_t at the beginning of quarter t. They are generated using univariate autoregressions with four lags. Alternative univariate or multivariate specifications provide similar results.[3]

Eq. (1) comes from a money demand–money supply framework and the assumption of efficient markets. I hypothesize that a_m is negative (the liquidity effect), a_y is positive (the income effect), a_p is positive (the Fisher effect), and a_1 is negative. Of course, it is possible to observe a negative a_m in the absence of a liquidity effect, if the risk premium in i_t (say, recession risk) declines with an unanticipated increase in money. Thus to corroborate the existence of a liquidity effect, I also examine the response of spot exchange rates:

$$e_t - {}_{t-1}f_t = b_0 + b_m[m_t - m_t^e] + b_y[y_t - y_t^e] + b_p[p_t - p_t^e] + v_t. \tag{2}$$

e_t is 100 times the log of the spot exchange rate (the price of a foreign currency in terms of U.S. dollars) at the first trading day of quarter $t+1$. ${}_{t-1}f_t$ is 100 times the log of the three-month forward exchange rate at the first trading day of quarter t.[4] If the risk-free real rate of interest decreases in the United States, it causes an incipient capital outflow which depreciates the dollar. But if the real rate decreases because the risk premium decreases, the value of the dollar does not change because there is no incipient capital outflow as the lower real rate reflects the lower risk of holding dollar denominated assets [see Cornell (1983)].[5]

3. Empirical evidence

Row 1 of table 1 replicates Mishkin's results, but row 2 shows that a liquidity effect is present after the end of Mishkin's sample period.[6] The remaining rows isolate this liquidity effect in the subperiod October 1979–October 1982, when the Federal Reserve followed strict $M1$ targets. (After October 1982, the Federal Reserve adopted additional wider monetary aggregates as targets.)[7] During the same period a very strong income effect is also observed. Notice that s_t is not a very good

[2] Finally revised numbers cause a small measurement error bias because the revisions are not in the information set of market participants.

[3] s_t is also one of the regressors and thus OLS provides correct standard errors [see Pagan (1984, p. 233)]. Also, the inflation series has unstable coefficients and for this reason I included additional dummy slope coefficients, one for each lag, which were set to zero prior to October 1979.

[4] The specification of eq. (2) excludes the behavior of foreign money output and prices, which could lead to potential bias if, within the quarter, foreign money, output, and inflation surprises are correlated with the corresponding surprises in the United States.

[5] If the expected rate of inflation decreases in the United States, the dollar appreciates [see Frankel (1979)].

[6] All data series were taken from the DRI data banks, except for the interest rates which come from the Salomon Brothers publication on monthly yields.

[7] The small sample sizes of many of the subperiods should make us cautious in interpreting the results.

Table 1
Eq. (1),
$i_t - {}_{t-1}F_t = a_0 + a_1 s_t + a_m[m_t - m_t^e] + a_y[y_t - y_t^e] + a_p[p_t - p_t^e] + u_t$. [a]

Sample	a_0	a_1	a_m	a_y	a_p	$\bar{R}^2$	SEE	DW
1960.2–1976.4	0.061	−1.27*	0.199	0.100*	0.420*	0.228	0.68	2.03
	(0.178)	(0.354)	(0.141)	(0.051)	(0.206)			
1977.1–1985.3	0.040	−0.876	−1.11*	0.401*	0.577	0.225	1.95	2.11
	(0.772)	(0.692)	(0.410)	(0.178)	(0.647)			
1977.1–1979.3	−0.673	1.31	0.148	0.117	−1.01*	0.194	0.47	2.27
	(0.663)	(1.51)	(0.303)	(0.125)	(0.413)			
1979.4–1985.3	−0.909	−0.241	−1.28*	0.484*	0.618	0.231	2.30	2.16
	(1.42)	(1.11)	(0.560)	(0.230)	(0.910)			
1979.4–1982.3	−0.981	−0.532	−3.57*	1.22*	−0.654	0.551	2.42	1.58
	(2.49)	(1.74)	(1.02)	(0.393)	(1.31)			
1982.4–1985.3	−1.63	0.284	−0.014	0.325**	0.495	0.007	1.14	2.51
	(1.02)	(0.954)	(0.412)	(0.193)	(0.765)			
1960.2–1985.3	−0.004	−1.03*	0.060	0.104*	0.212	0.098	1.08	2.29
	(0.161)	(0.311)	(0.121)	(0.049)	(0.177)			

[a] Standard errors are inside the parentheses. * and ** denote statistical significance at the 5% and 10% level. $\bar{R}^2$ is the coefficient of determination adjusted for degrees of freedom, SEE is the regression standard error, and DW is the Durbin–Watson statistic. A coefficient of, say, 0.154 denotes an increase of 15 basis points. The results in the last row are from a WLS regression with weights equal to one over the SEE of each of the three subperiods, 1960.2–1976.4, 1977.1–1979.3, and 1979.4–1985.3.

proxy for the expected risk premium because it fails to capture the post-October 1979 increase in expected risk which should have accompanied the corresponding increase in (quadrupling of) interest rate volatility. Also, after 1976, our specification cannot detect a Fisher effect. Table 2 presents the exchange rate results for the post-October 1979 period, which confirm the existence of a liquidity effect. The dollar depreciates after an unanticipated increase in money growth.

Table 2
Eq. (2),
$e_t - {}_{t-1}f_t = b_0 + b_m[m_t - m_t^e] + b_y[y_t - y_t^e] + b_p[p_t - p_t^e] + v_t$. [a]

Country	b_0	b_m	b_y	b_p	$\bar{R}^2$	SEE	DW
United Kingdom	−1.87	3.35*	−1.23*	1.80	0.129	6.15	1.59
	(1.26)	(1.47)	(0.614)	(2.35)			
Japan	−1.05	3.43*	−1.17	0.005	0.127	6.87	2.08
	(1.42)	(1.64)	(0.685)	(2.61)			
Switzerland	−3.07*	2.82	−1.32**	−2.40	0.160	7.29	2.17
	(1.50)	(1.73)	(0.727)	(2.80)			
Germany	−2.89*	2.45	−1.04	−1.51	0.103	6.58	2.47
	(1.36)	(1.57)	(0.657)	(2.52)			

[a] See the notes of table 1. A coefficient of, say, 2.24 denotes depreciation of the dollar by 2.24%.

4. Conclusion

The Federal Reserve's de-emphasis of interest rate targeting allowed us to detect an economically significant liquidity effect. In the period October 1979–October 1982, an unanticipated increase in the quarterly growth rate of $M1$ of 1% decreases the annualized three-month Treasury bill rate by 357 basis points. Although during this period the Fed was not able to stick to its seasonally adjusted $M1$ targets on a weekly or monthly basis, it did manage to keep $M1$ within targets on a quarterly and annual basis. Thus in our *quarterly* sample, changes in the growth rate of $M1$ were more exogenous than they were before October 1979. Before October 1979 the liquidity effect cannot be detected, perhaps because of the strong endogeneity of the money supply process, which biases the estimated coefficient of unanticipated money in the positive direction. [8]

References

Cornell, Bradford, 1983, The money supply announcements puzzle: Review and interpretation, American Economic Review 73, 644–657.

Frankel, Jeffrey, 1979, On the mark: A theory of floating exchange rates based on real interest differentials, American Economic Review 69, 610–622.

Hardouvelis, Gikas A., 1987, Reserves announcements and interest rates: Does monetary policy matter?, Journal of Finance 42, 407–422.

Mishkin, Frederic, 1982, Monetary policy and short-term interest rates: An efficient markets–rational expectations approach, Journal of Finance 37, 63–72.

Pagan, Adrian, 1984, Econometric issues in the analysis of regressions with generated regressors, International Economic Review 25, 221–248.

Reichenstein, William, 1987, The impact of money on short-term interest rates, Economic Inquiry 25, 67–82.

Salomon Brothers, 1985, An analytical record of yields and yield spreads (Salomon Brothers, New York).

[8] When I used $M2$, the monetary base, non-borrowed reserves, their corresponding seasonally unadjusted series, or the seasonally unadjusted $M1$, I was unable to uncover a liquidity effect in the post-October 1979 period. This shows the importance of utilizing the Fed's target, i.e., the seasonally adjusted $M1$.