Exchange Rate Flexibility And Monetary Policy

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Abstract

It has been argued that floating rates protect economies from monetary shocks originated abroad and provide greater autonomy and independence. Those who have tried to use the money demand function to explain insulating properties have excluded exchange rate flexibility variable in their models. This paper estimates a money demand function that includes exchange rate flexibility as another determinant of the demand for money for the major industrialized countries.

Introduction

One of the traditional arguments in favor of floating exchange rates is that they insulate economics from foreign disturbances and provide autonomy to policy makers, as far as the use of monetary policy is concerned (Johnson, 1969, p. 12). Indeed, allowing the currencies to float in 1973 was expected to lead to greater autonomy in national monetary policy and a small degree of interdependence in macro variables.

Researchers who have tried to investigate the insulating properties of flexible exchange rates, have relied on models with different degrees of sophistication and different levels of theoretical content. For example, Mussa (1979) used a standard two-country macromodel to analyze the transmission of a reduction in desired spending and a reduction in the foreign money supply. He concluded that under flexible exchange rates the trade balance link is cut off supporting the insulation properties of the flexible view. Bahmani-Oskooee and Milani (1988) also showed that interdependence between inflation rates and growth rates of output have indeed increased for the period of 1973-85 for the industrial countries. Furthermore, they concluded that exchange rate flexibility is not a factor contributing to interdependency of inflation rates and output rates for the industrial countries. On the other hand, while Branson (1983) uses the monetary model of the balance of payments, which assumes virtually no structure, Swaboda (1983), uses principal component analysis as his main statistical tool rather than a model to analyze the degree of interdependence of key macroeconomic variables.

One implication of the increased independence in national monetary policy under floating rates is that the aggregate demand for money in a country could depend on other factors such as the exchange rate variability in addition to the interest rate and the level of income. Mundell (1963) has argued that the effectiveness of the monetary policy could also depend on the exchange rate. Bahmani-Oskooee and Pourheydarian (1990) estimated a money demand function that included real exchange rate as another variable in the money demand function. They showed that the real effective exchange rate exerts significant impact on the demand for money in the cases

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of Canada, Japan, and the United States.

The primary purpose of this paper is two-fold. First, to estimate a money demand function that includes exchange rate flexibility as another determinant of the demand for money for Canada, France, Germany, Japan, United Kingdom and the United States, over the floating period of 1976-1994. Second, to explain that the exchange rate flexibility has indeed increased the national domestic monetary autonomy for the above countries. Since our work is empirical, our approach will be similar to Swoboda (1983). However, we use regression analysis to address the issue at hand rather than the principal component method used by Swoboda. Our approach is also different from other studies in that most authors have given very little attention to the empirical verification of the effect of variability of the exchange rate on the money demand function. Section I describes the model. Section II presents the estimation results. Summary and conclusion is provided in Section III, and data definition and sources are cited in the appendix.

I. The Money Demand Function in an Open Economy

In formulating the demand for money in open economies, it has been suggested that in addition to traditional factors (i.e., interest rate and income), other variables could be included in the money demand equation. However, since it is the central theme of this paper to assess the effects of exchange rate flexibility on the demand for money, we will incorporate the measure of exchange rate flexibility into the demand for money equation. Following Hamburger's (1977) formulation of the demand for money for open economies with the addition of exchange rate flexibility as another determinant of the demand for money, we have:

$$\log M_t = \beta_0 + \sum_{i=0}^{K} \beta_1 \log Y_{t-i} + \beta_2 \log i_t + \sum_{i=0}^{N} \beta_3 \log \sigma_{t-i} + u_t$$

where

M = desired M1 in real term,
Y = real income
i = nominal rate of interest
σ = variability measure of exchange rates
u = random error term

It is expected that $\hat{\beta}_1 > 0$ and $\hat{\beta}_2 < 0$. As far as the effects of exchange rate flexibility (σ) are concerned, increased flexibility of exchange rates is supposed to lower demand for domestic money. It could be argued that as domestic currency's volatility increases in terms of other currencies, domestic resident may demand less of domestic currency. It could also be argued that as domestic currency fluctuates, the public may expect further fluctuation and thus, demand less of domestic real cash balances. In sum, it is expected that $\beta_3 < 0$.

Besides the expected sign of the coefficients, some other features of the equation (1) deserve mention. First, as we discussed before, a change in current exchange rate flexibility may further induce a change in future exchange rate flexibility. To take into account this possible problem, we impose a distributed lag structure on the exchange rate flexibility variable and let the data decide the nature of the weights. By the same token, since the permanent income is defined as a weighted average of present and past values of the measured income, following Hamburger (1977), we also impose a distributed lag structure on measured income and again allow the data to determine the nature of the weights. In choosing the optimum number of lags, we rely on the level of significance of all estimated coefficients.

II. Estimation Results

The money demand equation was estimated for Canada, France, Germany, Japan, United Kingdom, and the United States using quarterly data for the floating rate period of 1976 I-1994 IV. In all six cases, correction is made for second order serial correlation among the disturbance terms which is indicated by the value of

RHO reported in Table 1, for each individual country.

It is evident from Table 1 that the exchange rate flexibility exerts a significant effect on the demand for money in the cases of Canada, Germany, United Kingdom, and the United States. In the results for Canada, the significant effects come after passage of 8 lags, in the case of Germany and the United Kingdom after passage of 3 lags. In the case of United States not only is its effect instantaneous, but it also has significant effect after the passage of 1 quarter lag. The results also reveal that the long-run effects of a change in the exchange rate flexibility which are usually derived as the sum of the lag coefficients, are negative in all cases supporting our hypothesis. Finally, the estimated coefficients of income and interest rate variables have the correct signs in all cases and are significant in most cases.

Summary and Conclusion

The supposition that floating rates protect countries from monetary shocks originated abroad and provide greater autonomy and independence has been widely shared. Those who have tried to use the money demand function to explain insulating properties of the flexible exchange rates have excluded the exchange rate flexibility variable in their models. In light of any development in foreign countries, especially under the current international monetary system which could have implications in stabilizing the domestic monetary policy, we made an attempt to incorporate a measure of exchange rate flexibility in the demand for money function. The money demand function was estimated for Canada, France, Germany, Japan, United Kingdom, and the United States for the period of 1976-1994. It was shown that the measure for exchange rate flexibility had significant effects on the demand for money in the short run and long run for most countries.

Since the long-run elasticity of exchange rate flexibility of the demand for money was negative in all countries, it was concluded that more flexibility in the exchange rates, would decrease the demand for money, leading to an increase in the effectiveness of the monetary policy under the floating rates system.

Suggestions for Future Research

The model introduced in this article can be extended in three different ways. First, in order to further support the hypothesis that the exchange rate flexibility is an argument in the demand for money, the model can be estimated for other industrial countries and perhaps some of the developing countries. Second, it is possible to find an alternative way of measuring exchange rate flexibility variable as a risk factor in the demand for money function. Finally, in order to test the robustness of the estimates, the model can be estimated for different periods of time.

Appendix

Data source: all data are quarterly for the 1973-1994 period and are taken from the various issues of the International Financial Statistic of IMF.

M: this variable is defined as the ratio of $(M_1/P) \bullet 100$ where

P: 1990 = 100, CPI

Y: (Real income), this variable is defined as GDP at 1990 prices

i: nominal interest rate, defines as the govern ment bond rate

σ: variability measure of exchange rates, this variable is computed for each quarter as the standard deviation of percentages changes in real effective exchange rates over the preceding eleven quarters and the current quarter (exchange rate is defined as units of domestic currency per unit of foreign currency, 1990 = 100)

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Table 1
Estimated Coefficient of Money Demand Equation

	Canada	France	Germany	Japan	United Kingdom	United States
Constant Term	6.2595	7.4714	5.8625	13.4501	8.0166	7.644
	(4.25)	(85.8)	(40.65)	(2.28)	(2.79)	(7.11)
log i	-0.3890	-0.0740	-0.0716	-0.0945	-0.5455	-0.1755
	(4.82)	(2.02)	(1.58)	(2.60)	(2.37)	(3.44)
$\log(y)_{t-0}$	9.5832	0.2016	0.7001	1.3583	0.7836	1.6769
	(0.92)	(0.41)	(1.67)	(2.39)	(0.53)	(3.32)
$\log(y)_{t-1}$	-0.1434	0.5584	1.4156	1.2058	2.4415	0.2632
	(0.35)	(1.16)	(2.95)	(2.09)	(1.14)	(0.59)
$\log(y)_{t-2}$	0.0649	0.7580	1.094	0.7617	3.2893	0.7074
	(0.16)	(1.688)	(2.30)	(1.52)	(1.42)	(1.60)
$\log(y)_{t-3}$	0.6972	0.8292	0.6937		3.5135	
	(2.01)	(2.01)	(1.66)		(1.53)	
$\log(y)_{t-4}$	1.2423	0.8007			3.3010	
	(3.09)	(1.48)			(1.56)	
$\log(y)_{t-5}$	1.1890	0.7012			2.8386	
	(2.88)	(1.20)			(1.82)	
$\log(y)_{t-6}$	0.0263	0.5597				
	(.042)	(.70)				
Σ lag coefficient	3.65	4.4090	3.9043	3.2459	16.1678	2.6476
	(1.80)	(2.02)	(2.95)	(2.43)	(1.61)	(3.11)
$\log(s)_{t-0}$	-0.0193	0.0009	-0.0546	0.0018	-0.1025	-0.0531
	(0.42)	(0.02)	(1.09)	(0.03)	(0.69)	(2.17)
$\log(s)_{t-1}$	-0.0097	0.790	0.0218	-0.0298	-0.1012	0.0523
	(0.45)	(1.70)	(0.5987)	(0.70)	(0.81)	(1.82)
$\log(s)_{t-2}$	-0.0076	0.0028	0.0136	-0.0237	0.0510	-0.0550
	(0.33)	(0.11)	(0.46)	(0.69)	(0.51)	(2.28)
$\log(s)_{t-3}$	-0.0112	0.0685	-0.0413	-0.0059	-0.0971	
	(.53)	(1.54)	(1.10)	(0.18)	(0.80)	
$\log(s)_{t-4}$	-0.019	-0.0600	-0.1048	-0.0022	-0.3847	
	(1.04)	(1.51)	(2.09)	(0.05)	(2.52)	
$\log(s)_{t-5}$	-0.0294			-0.0385		
	(1.38)			(0.78)		
$\log(s)_{t-6}$	-0.0407					
	(1.74)					
$\log(s)_{t-7}$	-0.0513					
	(1.74)					
$\log(s)_{t-8}$	-0.0599					
	(1.42)					
Σ lag coefficient	-0.2481	-0.0668	-0.1654	-0.0985	-0.7368	-0.0558
	(2.63)	(2.19)	(1.88)	(2.19)	(1.72)	(2.14)
R^2	0.97	0.66	0.97	0.94	0.97	0.95
RHO	0.3023	0.4356	0.7105	0.5681	0.3842	0.6457
	(2.02)	(3.08)	(5.79)	(5.07)	(2.89)	(5.93)
SER	0.0414	0.0338	0.0370	0.0352	0.0963	.0331

Numbers in parentheses are t-ratios.

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