

## **Inflation and the World Demand-for-Money Function**

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### **I. Introduction**

One of the basic propositions of the monetarist school is that inflation is a monetary phenomenon in the sense that it is uniquely caused by an expansion of the money supply. Although this school of thought starts with a refined version of the traditional quantity theory, in broad terms, its proponents find the roots of inflation, at least in the long run, simply in the growth of the money supply over time. This type of analysis, well elaborated at the national level, has recently been applied at the world level (see *Gray, Ward and Zis (1976), Frowen and Kouris (1977) and (1979), Zis (1978) and Parkin (1978)*). In this case the expansion of the overall money supply in a world of fixed exchange rates would be responsible for the rate of world inflation. It therefore follows that a small open economy would be severely restricted in controlling its domestic rate of inflation, as it would have no means of controlling the world monetary aggregates. However, a key assumption in this analysis is that the demand for money (or its equivalent, the velocity of circulation) is a stable and predictable function of a number of independent variables. Thus increases in the world supply of money, with the velocity of circulation being constant, would tend to transmit inflationary impulses across countries. If, on the other hand, we are faced with an unstable velocity of circulation, the inflationary impact of monetary expansion can easily be counter-balanced by changes in velocity in the opposite direction. Furthermore, additional sources of political instability arise if the interest elasticity of the demand-for-money function is significantly non-zero. Then fiscal policy does matter and by affecting aggregate demand it can affect the rate of inflation. The arguments so far may be summed up by saying that if the world demand-for-money function is either unstable and/or its interest elasticity is significantly non-zero, then the potency of a global approach in explaining inflation seems to be weak.

The assertion that the interest elasticity of the world demand for money is in fact both significantly non-zero and unstable is strongly supported by our own empirical findings (Frowen and Kouris (1977) and (1979)). The aim of the present study is to integrate and extend the results of our previous research on the world demand for money. In contrast to the earlier studies mentioned, our concept of the world now includes fourteen countries instead of ten. We also test our hypothesis using both  $M_1$  and  $M_2$  definitions of money. As regards the opportunity cost variable, we concentrate on just one interest rate, the euro-dollar rate, which was found to be the variable yielding the best results in our previous studies. Furthermore, we supplement our empirical analysis with a simple test of whether in the long run domestic inflation rates are affected by world inflation or not.<sup>1</sup>

## II. Do National Inflation Rates Diverge?

To start with we would like to test the hypothesis of whether world inflation rates converge (or diverge) with domestic inflation rates. Only if in the long run countries on fixed exchange rates have similar inflation rates, will the global approach have any validity. Otherwise the whole exercise is void of content. To test this proposition we gathered quarterly, seasonally adjusted data of the most representative inflation indicator, the GNP deflator. The period covered was 1963 (1) to 1971 (4) and the countries considered were USA, UK, Japan, W. Germany, France, Italy, Netherlands and Belgium. The choice of both time period and number of countries was constrained by data availability. For every country a world inflation variable was calculated equal to the weighted average<sup>2</sup> of the above eight deflators, minus the country's own deflator. In this way each country's inflation was correlated with a different world inflation variable without having to worry about the simultaneity between the two. In order to arrive at a long-run inflation measure, a five-period moving average<sup>3</sup> of every series was constructed according to the formula:  $X_t = (X_t + X_{t-1} + X_{t-2} + X_{t-3} + X_{t-4})/5$ . All variables were expressed in ratio form (*i. e.*, current values over previous period values).

<sup>1</sup> Our thanks are due to G. Zis for again supplying us lavishly with data produced by the Manchester University inflation workshop.

<sup>2</sup> The weights used were the 1967 dollar value of the GNP of each country.

<sup>3</sup> Long-run inflation rates can, of course, be represented by using yearly or longer span observations. In this way, however, the time interval of the remaining data is considerably reduced and the hypothesis cannot be appropriately tested.

Lastly, the exercise was carried out only for the countries where data were most reliable.<sup>4</sup> The short and long-run simple correlation coefficients for the countries mentioned are reported in Table 1.

*Table 1*  
**Short and long-run simple correlation  
coefficients between domestic and world inflation rates**

	Short-run (i. e. actual) data	Long-run (i. e. moving average) data
	<i>r</i>	<i>r</i>
USA .....	0.42	0.56
UK .....	0.31	0.75
Japan .....	0.24	0.51
West Germany ..	0.50	0.70
France .....	0.22	0.64
Italy .....	0.26	0.42

This test is purely descriptive, of course, since it does not establish any causality but simply purports to measure for each country the strength of association between the national and the world inflation rates. What clearly emerges from observing the two sets of correlation coefficients is that in the longer term, domestic and world inflation rates do tend to move at a closer pace than in the short term. We can now pursue this analysis a step further. Using moving average data we established a very simple model that explains inflation at the national level with world inflation being the only explanatory variable. Thus we regressed national inflation rates as a function of world inflation. The results are reported in Table 2. The national inflation rate is a function of world inflation.

Most Keynesian economists would list a number of factors that cause inflation in the domestic economy other than world inflation trends. Nevertheless we single out this variable, being aware of the fact that specifying such a simple model necessarily implies that we give an "unfair" advantage to the one independent variable included, since it

<sup>4</sup> For the Netherlands and Belgium the data were derived by linear interpolation from annual series. Thus, as they were inferior to the rest, they were not used in the correlation analysis. They were, however, used in deriving the world inflation rates.

Table 2

## Domestic inflation rates as a function of world inflation rates

Country	Constant	$WP_t$	$R^2$	DW
USA .....	0.4461 (2.83)	0.5569 (3.57)	0.316	0.08
UK .....	- 0.2805 (1.31)	1.2809 (6.04)	0.561	0.84
Japan .....	0.6851 (6.18)	0.3235 (2.95)	0.256	0.47
West Germany ..	- 0.4167 (1.52)	1.4120 (5.19)	0.485	0.17
France .....	0.2336 (1.32)	0.7693 (4.38)	0.404	0.40
Italy .....	0.3096 (1.04)	0.6942 (2.35)	0.177	0.16

*T*-ratios in parentheses.  $WP_t$  = world inflation rate.

would invariably absorb some of the variation left out by the omitted variables. In this sense its coefficient would have an upward bias and tend to appear more significant than it would otherwise be. The model put forward becomes:

$$\dot{P}_{it} = a + b\dot{WP}_{it} + e_{it}$$

Where

$\dot{P}_{it}$  = the inflation rate in country *i*

$\dot{WP}_{it}$  = the world inflation rate net of country's *i* inflation rate

$e_{it}$  = error term.

The results obtained from applying this model to the period 1964 (1) - 1971 (4) (four observations were lost because of using moving averages instead of actual quarterly data) are listed in Table 2.

Our simple model reveals that in general world inflation is a dominant factor (judging from the *T*-ratios) in explaining changes in national inflation rates. Our world inflation indicator turned out to be significant in all cases at the customary 5 % level. It is noteworthy that in the case of the UK, W. Germany, the USA and France, it became relatively more significant than in Japan and Italy, although the last two are also open economies. No attempt for any autocorrelation cor-

rection has been made, since from the beginning it was noted that the specification of the model is incomplete. Had we proceeded to estimate the model via autoregressive least squares, the autocorrelation coefficient would spuriously capture the influence of any omitted explanatory variables.

On the basis of these results there seems to be a case for world inflation influencing domestic inflation in the long run. Admittedly the approach followed was quite simplistic. However, our intention was not to conclusively test a fully specified inflation model (a task that would in any case be quite challenging for any economist) but instead to see if there is a correlation, or rather a simple causality, between domestic and world inflation rates. To this end our findings tend to support the thesis that in a world of fixed exchange rates the causes of inflation should be sought *also* at the international level. (See on this point *Johnson* (1972) and (1973), *Mundell* (1971), *Swoboda* (1974) and *Parkin* (1976)).

### III. The World Demand for Money

We can now proceed to test the world demand-for-money function. Our previous studies revealed that this relationship is explained primarily by changes in income, interest rates and a partial adjustment hypothesis between actual and desired cash balances. Both a simple static and the dynamic version of our model confirmed the existence of this relationship and revealed the superiority of the euro-dollar rate over the domestic rate when the analysis is carried out at the world level. It should be noted that this type of analysis is relevant for countries with freely convertible currencies under a fixed exchange rate system. Such a situation existed, as is well known, up to 1971.<sup>5</sup> Nevertheless, our results are also highly significant for any group of countries participating in system of joint floating, such as the former so-called European 'snake' or the European Monetary System.

The formulation used is identical to the one we employed in our previously study. We first estimate a naive static version of the demand for money where the money stock is merely a function of income and

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<sup>5</sup> During this so-called fixed exchange rate period there have been a number of realignments. For this reason we have converted the money stock series according to the current exchange rates while the GNPs were converted by using constant 1963 exchange rates. This point has been elaborated further in our reply to the paper by *Zis* (1978) {see *Frowen* and *Kouris* (1979)}.

the interest rate. As a second step, the analysis becomes dynamic, incorporating into the model the assumption of a partial adjustment mechanism between actual and desired money balances. Thus the two models tested are as follows:

$$\text{Static model} \quad M_t = a_0 + a_1 y_t + a_2 r_t + e_t$$

$$\text{Dynamic model} \quad M_t^* = b_0 + b_1 y_t + b_2 r_t + v_t$$

$$M_t - M_{t-1} = k(M_t^* - M_{t-1}) + w_t$$

Where

$M$  = demand for money (either  $M_1$  or  $M_2$ )

$M^*$  = desired demand for money

$y$  = income (GNP)

$r$  = euro-dollar interest rate

$e, v, w$  = error terms.

#### IV. Empirical Results

Our estimation procedure abstracts from the complete IS-LM model and is based on a partial equilibrium model where one equation is sufficient.<sup>6</sup> In this way our functional relationship identifies a demand function. Both money and income are expressed in real terms and on a *per capita* basis, while all variables are expressed in logarithmic terms, which causes the parameters to be elasticities. The model is applied on a sample of fourteen countries in the period 1957 (2) - 1971 (4). With 59 observations per country, the pooled sample<sup>7</sup> yields a total of 826 observations. With such a basis the usual bias which arises from the lagged money stock being used as an independent variable vanishes. This is of paramount importance if the rest of the derived elasticities are to be taken as reliable. The results obtained are as follows:

<sup>6</sup> According to this assumption, perpetual shifts of the curve identify a demand curve and hence all money stock observations refer to the demand for money. Thus the use of one equation is legitimate. Nevertheless, we could have used a more complete (*i. e.*, a general equilibrium) approach, where both the demand for, and the supply of money, as well as the rest of the economy appears in equation form. Such an approach would be a formidable task as we are dealing with fourteen countries. It so happens, however, that the results from the one equation approach and the equations system approach differ very little {see *Laidler (1969)*}. Hence the simultaneity bias that arises when using only one equation is not a severe problem.

<sup>7</sup> The pooling technique and the econometric implications are explained in *Kouris (1976)* and in an abridged form in *Frowen and Kouris (1977)*.

Static model  $\hat{M}_{1t} = 1.1287 y_t - 0.1799 r_t \quad R^2 = 0.959$   
 (33.9) (10.2)

$\check{M}_{2t} = 1.1992 y_t - 0.0983 r_t \quad R^2 = 0.964$   
 (45.3) (7.0)

Dynamic model  $\hat{M}_{1t} = 0.1629 y_t - 0.0479 r_t + 0.9085 M_{t-1} \quad R = 0.996$   
 (10.8) (8.4) (87.3)

$\hat{M}_{2t} = 0.2096 y_t - 0.0354 r_t + 0.8558 M_{t-1} \quad R = 0.993$   
 (10.7) (5.9) (61.1)

One of our basic arguments has been that when we group a number of countries together in order to arrive at the world concept, the differences between them are important and ought to be screened out. We therefore quote the dummies for the last equation below:<sup>8</sup>

USA	- 0.7455 (9.9)	W. Germany	- 0.1079 (9.0)	Norway	- 0.0335 (4.6)
Canada	- 0.0354 (5.9)	Italy	0.0996 (6.5)	Denmark	- 0.0398 (5.3)
Japan	- 0.0769 (7.7)	Belgium	- 0.0596 (5.5)	Austria	- 0.1372 (8.9)
UK	0.0606 (5.7)	Netherlands	- 0.0727 (7.6)	Ireland	0.0874 (8.5)
France	0.0095 (1.3)	Sweden	0.1124 (9.3)		

As the empirical results show, during the fixed exchange rate period for which we estimate our functions, a world demand for money is well defined. Whether the specification chosen is static or dynamic, the interest rate effect proves very significant. On theoretical grounds one would, of course, find the hypothesis of adjustments between actual and desired cash balances more appealing and hence the dynamic formulation would have to be regarded as a complete model. The main reason for using the naive static model is that in many studies it is usually neglected through its being too simple or giving unsatisfactory results. Whenever used in our case, however, it yielded plausible results despite its lack of sophistication.

The dynamic model confirms prior expectations that the  $M_2$  money concept ought to be less sensitive to interest rate variations (thus having

<sup>8</sup> The results were quite similar in all cases but statistically more significant in the static model.

a smaller interest rate elasticity because it contains interest-bearing time deposits. Both  $M_1$  and  $M_2$  measurements of money indicate a rather slow adjustment of the discrepancy between the actual and the desired demand for money — in fact 10 per cent and 15 per cent per quarter, respectively. The long-run elasticities implied are in the case of the  $M_1$  equation 1.78 for income and  $-0.52$  for the interest rate: for the  $M_2$  equation the long-run income elasticity is 1.45, while the interest rate elasticity is  $-0.24$ . Thus we find that in the longer term, after adjustments have been made, the income elasticity is that of a luxury good. On the other hand, the interest elasticity, although statistically significant, is less than unity in the long run. The differences between countries, as indicated by the dummies for each case, are statistically very significant<sup>9</sup> suggesting that it is wrong indiscriminately to aggregate a number of countries in order to arrive at the world level. If (through pooling) the differences between countries are allowed for — even in a simple way such as the introduction of a dummy variable — the results obtained are significantly more reliable.

## V. A Stability Test

After having tested for the existence of a world demand-for-money function and finding that this concept has empirically strong support, we move to the gist of our study which is to examine the stability of this function. In other words, how the income and interest elasticities vary as we move into different time periods. Clearly, econometric models have more validity the more stable they are, because then they can be used for forecasting. If the various parameter estimates are in one period drastically different from succeeding periods, then any predictions based on such parameters can be widely inaccurate.

The simplest — and perhaps less disputable — way of testing the stability of a function is to estimate it in two distinct time periods. In line with this reasoning, we split our sample into two periods 1957 (2) to 1964 (3) (sample size 420 observations) and 1964 (4) - 1971 (4) (sample size 406 observations). The results of estimating the static and dynamic models in these sub-periods are as follows:

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<sup>9</sup> According to our specification the dummy variables are measured as deviations from the constant term which is represented by the USA. Whether one tests the coefficients of each dummy individually or the difference from the constant, the result is that both the coefficients and the differences are statistically significant.



Static model 1957 (2) - 1964 (3)

$$\hat{M}_{1t} = 1.0302 y_t - 0.0605 r_t \quad R^2 = 0.985$$

(32.5)            (2.78)

$$\hat{M}_{2t} = 1.1337 y_t - 0.0496 r_t \quad R^2 = 0.979$$

(36.5)            (2.32)

1964 (4) - 1971 (4)

$$\hat{M}_{1t} = 0.7033 y_t - 0.0631 r_t \quad R^2 = 0.969$$

(12.8)            (2.75)

$$\hat{M}_{2t} = 0.8518 y_t + 0.0025 r_t \quad R^2 = 0.975$$

(20.9)            (0.15)

Comparing the two sets of elasticities we see that in the second period 1964 (4) - 1971 (4) the income elasticity drops by about 30 per cent whatever the definition of money used. As for the interest rate elasticity, when  $M_1$  is used, it shows a surprising stability. Nevertheless when the  $M_2$  definition is employed, the elasticity turns out to be positive in the second period.

Turning to the dynamic specification, which is probably a more realistic explanation of money demand behaviour, we obtained the following results:

Dynamic model 1957 (2) - 1964 (3)

$$\hat{M}_{1t} = 0.3542 y_t - 0.0690 r_t + 0.7311 M_{1t-1} \quad R^2 = 0.996$$

(13.9)            (6.25)            (34.2)

$$\hat{M}_{2t} = 0.3434 y_t - 0.0674 r_t + 0.7541 M_{2t-1} \quad R^2 = 0.996$$

(13.8)            (6.87)            (38.9)

1964 (4) - 1971 (4)

$$\hat{M}_{1t} = 0.0921 y_t - 0.0238 r_t + 0.9546 M_{1t-1} \quad R^2 = 0.997$$

(4.43)            (3.19)            (57.6)

$$\hat{M}_{2t} = 0.1656 y_t - 0.0092 r_t + 0.8233 M_{2t-1} \quad R^2 = 0.991$$

(8.13)            (0.17)            (40.3)

The function fitted in the two sub-periods tells us two entirely different stories. The short-run income elasticity drops to about one fourth (in the case of  $M_1$ ) and to about half (in the case of  $M_2$ ) in the second period compared with the first. The results are roughly the same for the interest rate elasticity and the  $M_1$  definition. However,

when the  $M_2$  definition is used this elasticity drops to one seventh of the first period and also becomes statistically insignificant. In the second period the lagged term completely dominates the explanatory power of the model, implying very slow adjustment. One way of looking at these results is that as we approach the 1970s, both the income and interest rate effect become less significant with the function being primarily explained by the growth of the money stock over time. Clearly, if the world demand for money in the latter period depends heavily on the money stock lagged one period, which is after all the variable that we are trying to explain, then it seems to us that we do not really have such a function. It is true, of course, that if we look at each period individually and use the  $M_1$  definition, the world demand-for-money function passes the statistical criteria. In the 1957 (2) - 1964 (3) period the lagged money term implies a 27 per cent speed of adjustment per quarter which means that in less than a year the gap between actual and desired cash balances will be made good. This is quite plausible on economic grounds. In the 1964 (4) - 1971 (4) period, although both income and the interest rate play a significant role in the function, the lagged dependent variable implies a 5 per cent speed of adjustment per quarter. This means that it will take five years (!) before the discrepancy between the actual and desired money stock will be filled. This evidence to us means that a world demand for money estimated prior to the mid-60s has a meaning in both statistical and economic terms. On attempting to estimate the same function after the mid-60s and up to the beginning of the floating exchange rate period, the results reveal a drastic deterioration of the income and interest rate effect. Most of the variation of the dependent variable is absorbed by the lagged term, thus yielding implausible results.

Given that our results challenge both the stability as well as any meaningful existence of a world demand for money in the late 60s, we take a closer view of the various elasticities over the time span 1957 (2) to 1971 (4). Having found that lagged adjustments are important in explaining the demand-for-money function, we will be discussing our results — concerning the stability of the function — with reference to the dynamic model only.

Our point of departure is the first half of our sample period 1957 (2) to 1964 (3). We will increase this initial sample in steps of 56 observations which correspond to adding one extra year over 14 countries. Thus our primary objective is not to perform an alternative stability

Table 3: Movement of Elasticities over Time

Period	Short-run elasticities					Long-run elasticities						
	$M_1$		$M_2$			$M_1$		$M_2$				
	$\tau$	$\gamma$	$M-1$	$\gamma$	$\tau$	$\gamma$	$M-1$	$\tau$	$\gamma$			
1957 (2) - 64 (3)	-0.0690 (6.25)	0.3542 (13.9)	0.7311 (34.2)	0.3434 (13.8)	-0.0674 (6.87)	0.7541 (38.9)	0.9962	-0.2566	1.3172	0.9956	-0.2741	1.3965
1957 (2) - 65 (3)	-0.0725 (7.15)	0.3257 (14.1)	0.7620 (40.2)	0.3184 (14.1)	-0.0680 (7.59)	0.7789 (44.9)	0.9964	-0.3046	1.3685	0.9958	-0.3076	1.4401
1957 (2) - 66 (3)	-0.0642 (7.32)	0.3011 (13.7)	0.7906 (46.1)	0.2991 (14.1)	-0.0574 (7.54)	0.7987 (50.6)	0.9964	-0.3066	1.4380	0.9960	-0.2851	1.4858
1957 (2) - 67 (3)	-0.0618 (7.73)	0.2765 (13.6)	0.8090 (51.9)	0.2799 (14.3)	-0.0536 (7.83)	0.8139 (56.5)	0.9964	-0.3236	1.4476	0.9962	-0.2880	1.5040
1957 (2) - 68 (3)	-0.0595 (7.72)	0.2490 (12.7)	0.8326 (56.8)	0.2527 (13.4)	-0.0471 (7.24)	0.8350 (61.2)	0.9963	-0.3554	1.4875	0.9961	-0.2855	1.5315
1957 (2) - 69 (3)	-0.0539 (8.32)	0.2214 (11.7)	0.8571 (62.7)	0.2249 (10.4)	-0.0458 (7.13)	0.8578 (55.4)	0.9962	-0.3772	1.5493	0.9945	-0.3221	1.5816
1957 (2) - 70 (3)	-0.0524 (8.69)	0.1937 (10.9)	0.8839 (72.1)	0.2434 (10.8)	-0.0390 (6.00)	0.8327 (53.1)	0.9960	-0.4513	1.6684	0.9932	-0.2331	1.4549
1957 (2) - 71 (3)	-0.0479 (8.40)	0.1629 (10.8)	0.9085 (87.3)	0.2096 (10.7)	-0.0354 (5.87)	0.8558 (61.1)	0.9961	-0.5235	1.7803	0.9936	-0.2455	1.4535

test but to search for any abnormal period up to 1971 which would reveal a "jump" in the values of the elasticities. As seen in Table 3, both short-run interest rate and income elasticities are diminishing in size as we approach 1971. Again the variation over time tends to be absorbed by the lagged term. This implies that the long-run elasticities should increase over time, which indeed is the case. Where  $M_2$  is used, the long-run interest elasticity shows a significant stability. At first sight this might be taken to contradict our previous results, which confirmed that the world demand for money is highly unstable. The reason is, of course, that in doing this search over time we have built a strong stability into the computed elasticities because of the great overlap. From period to period the sample increases on the average by about 10 per cent. Hence most of the "base", out of which our results are computed, remains virtually unaltered. On these grounds it is surprising to observe any changes at all. In consequence, the main conclusion from this comparison is that with small sample changes over the years, the resulting change in magnitude of the elasticities is sizeable. Nevertheless, there are no grounds to advocate that any particular year from 1964 to 1971 showed any abnormalities in the sense that it had any significant effect on the elasticities derived. Thus in the time span for which the world demand-for-money function has been estimated *no* year is critical enough to constitute on its own a break in the function. Such a break, however, is clearly noticeable if the entire period is split into two distinct sub-periods which in our view constitutes a true stability test. For convenience we summarise our empirical findings below:

*Short-run elasticities*

	Interest rate $M_1$	Income	Interest rate $M_2$	Income
1957 (2) - 1964 (3)	- 0.069	0.354	- 0.067	0.343
1964 (4) - 1971 (4)	- 0.024	0.092	- 0.009	0.166

*Long-run elasticities*

	Interest rate $M_1$	Income	Interest rate $M_2$	Income
1957 (2) - 1964 (3)	- 0.357	1.317	- 0.274	1.397
1964 (4) - 1971 (4)	- 0.524	2.028	- 0.052	0.937

## VI. Conclusions

Our methodological approach has been a simple one in the sense that we have used only one equation instead of a system of equations; we tested for only two definitions of money  $M_1$  and  $M_2$  and our dynamic specification takes into account only a partial adjustment hypothesis. On the basis of our empirical findings and by adopting these fairly standard formulations, we can claim that the world demand for money is not a stable function over time. It is possible, however, under different specifications, that one could obtain conflicting results. Nevertheless we believe that if an econometric relationship does not pass simple and plausible tests it is unlikely that it will be proved to be valid when more sophisticated models are employed.

Although a world demand for money, when estimated over the entire period, produced the right signs and statistically significant coefficients, its explanatory variables show considerably divergent coefficients when estimated for different sub-periods. Using either  $M_1$  or  $M_2$  the short-run elasticities are becoming smaller and smaller through time, the variation being accounted for primarily by the lagged term. This, in turn, implies that the function disintegrates over time, albeit in a smooth way, since no significant "jumps" were observed in the elasticities over the years.

In all cases — whether using a static or dynamic model — the inclusion of an interest rate variable was found to be very important in explaining the world demand for money, which in turn implies that the role of fiscal policy becomes rather important. This particular finding contrasts with the results of some monetarists who are anxious to find no relationship between interest rates and the money stock thus maintaining that money only matters.

After making sure that causality between world aggregate inflation and domestic inflation exists in the long run, we proceeded to testing the stability of the world demand-for-money function. Our findings imply that the proposition that inflation is a monetary phenomenon, which according to the monetarists' view holds at the national level, seems doubtful to us when extended to the world level. We do find that a world demand for money significantly depends on both income and interest rate but that in the period from the mid-1960s to 1971 this function has changed "shape". Thus the elasticities which determine this function are not stable and predictions based on them would therefore be unreliable. On the other hand, one might argue that there

are a number of additional determinants that ought to be included in the world demand-for-money function in the period close to the 1970s. Hence if these influences are not included in the function, we are bound to get unstable elasticities. The answer here is that economic relationships which rely on different independent variables during different time periods are just as unstable and for any practical purposes equally useless. All these findings point to the policy implication that it is highly doubtful whether world inflation can in fact be controlled by simply controlling world money supply.

Furthermore, we even challenge the interpretation of the function in the late 1960s and early 1970s. The fact that a simple autoregressive scheme can explain so much implies that it is not economic criteria which govern the function. (This, of course, springs from the fact that the lagged money stock is not a truly explanatory variable as it is simply included in an effort to capture a long-run behaviour.) If a lagged endogenous variable ends up by absorbing the greatest portion of the dependent variable's variation, the whole function boils down to being determined by an autonomous growth. Through this process, the world demand-for-money function evaporates.

### References

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## Zusammenfassung

### Inflation und die Welt-Geldnachfragefunktion

In dieser Studie wollen wir auf internationaler Ebene für die Zeit von 1957 bis 1971 die Behauptung untersuchen, daß — in Übereinstimmung mit der monetaristischen These zur Inflation (d. h. das Verhältnis zwischen Geldzuwachs und Inflation) — die internationale Inflation durch die Steuerung des internationalen Geldangebotes kontrolliert werden kann. In diesem Zusammenhang untersucht die vorliegende Studie

- a) die Hypothese, daß in einem festen Wechselkurssystem die nationalen Inflationsraten konvergieren, indem sie sich systematisch sowie vorhersehbar mit der Kaufkraftparität bewegen und
- b) die Geldnachfragefunktion auf der Grundlage von 14 Industriestaaten (repräsentativ für die übrige Welt).

Die hier vorliegende Arbeit baut auf den von den Verfassern bereits in früheren Ausgaben von *Kredit und Kapital* (1977 und 1979) publizierten Untersuchungen auf und erweitert diese.

Die Ergebnisse zeigen, daß die internationale Geldnachfragefunktion erheblich sowohl vom Einkommens- als auch vom Zinsniveau abhängt; sich aber ihre Form während der Mitte der 60er Jahre und 1971 änderte. Folglich sind die Elastizitäten, die ihre Funktion bestimmen, instabil und die auf ihnen beruhenden Vorhersagen wären demnach ungenau. Natürlich könnte man behaupten, daß es noch einige zusätzliche Determinanten gibt, die in internationalen Geldnachfragefunktionen, die sich auf die Jahre vor 1970 beziehen, berücksichtigt werden müßten. Somit erhalten wir instabile Elastizitäten, wenn diesen Einflüssen in der Funktion nicht Rechnung getragen wird. Als politische Konsequenz resultiert aus dieser Analyse für eine Anti-Inflationspolitik, daß es höchst zweifelhaft ist, ob die internationale Inflation tatsächlich durch einfache Steuerung der internationalen Geldnachfrage vorhersehbar kontrolliert werden kann. (Dies bedeutet aber nicht, daß eine verringerte

Wachstumsrate des internationalen Geldangebots keine positiven Auswirkungen auf die internationale Inflation hätte.)

Weiterhin wird in dieser Studie die Interpretation der Geldnachfragefunktion in den späten 60er und frühen 70er Jahren angezweifelt. Die Tatsache, daß ein einfaches (auf sich selbst zurückgreifendes) autoregressives Schema soviel erklären kann, läßt darauf schließen, daß die Funktion nicht durch ökonomische Kriterien bestimmt wird. Wenn eine verzögerte endogene Variable mit der Absorption des größten Anteils der Abweichung der abhängigen Variablen permanent reduziert wird, läuft es darauf hinaus, daß die ganze Funktion durch ein autonomes Wachstum bestimmt wird. Durch diesen Prozeß wird eine internationale Geldnachfragefunktion hinfällig.

## Summary

### **Inflation and the World Demand-for-Money Function**

The aim of this study is to test at world level for the period 1957 to 1971 the contention that, in accordance with the monetarist inflation thesis (i. e. the money growth-inflation relationship), world inflation can be controlled by controlling the world money supply. In this connection the present paper investigates (a) the hypothesis that under a fixed exchange rate regime, national inflation rates converge, moving in a systematic and predictable fashion consistent with purchasing power parity, and (b) the demand-for-money function at the level of the aggregate of fourteen advanced countries (as a proxy for the world). The work presented here is an extension and integration of previous research by the authors published in earlier issues of *Kredit und Kapital* (1977 and 1979).

The results indicate that the world demand-for-money function significantly depends on both income and interest rates but that its form changed between the mid-1960s and 1971. Thus the elasticities determining this function are unstable and predictions based on them would therefore be unreliable. One might argue, of course, that there are a number of additional determinants that ought to be included in any world demand-for-money function relating to the period close to the 1970s. Hence if these influences are not included in the function, we are bound to get unstable elasticities. The resulting policy implication of this analysis for the design of an anti-inflation policy is that it is highly doubtful whether world inflation can in fact be controlled in a predictable fashion by simply controlling the world money supply. (This is not to say that a reduction in the rate of increase of the world money supply would have no beneficial effect on world inflation.)

The paper further challenges the interpretation of the function in the late 1960s and early 1970s. The fact that a simple autoregressive scheme can explain so much implies that it is not economic criteria which govern the function. If a lagged endogenous variable ends up by absorbing the greatest portion of the dependent variable's variation, the whole function boils down to being determined by an autonomous growth. Through this process, the world demand-for-money function evaporates.



## Résumé

### L'inflation et la fonction mondiale de la demande monétaire

Par la présente étude, nous voulons examiner au plan international pour la période 1957 à 1971 l'affirmation selon laquelle — en concordance avec la thèse monétariste de l'inflation (c. à d. la relation entre l'accroissement de monnaie et l'inflation) — l'inflation internationale peut être contrôlée par la maîtrise de l'offre internationale de monnaie. Dans ce cadre, l'étude examine

- a) l'hypothèse qui veut que dans un régime de parités fixes de change, les taux nationaux d'inflation convergent, parce qu'ils se meuvent systématiquement et prévisionnellement avec la parité du pouvoir d'achat, et
- b) la fonction de demande monétaire dans 14 pays industrialisés (représentatifs du reste de l'univers).

La présente étude s'appuie sur les recherches des mêmes auteurs publiées dans des numéros antérieurs de *Kredit und Kapital* (1977 et 1979) et les amplifie. Les résultats tendent à prouver que la fonction internationale de demande monétaire dépend considérablement tant du niveau des revenus que de celui des taux d'intérêt; mais sa forme a changé au milieu des années 60 et en 1971. Par conséquent, les élasticités qui définissent sa fonction sont instables et les prévisions en découlant sont inexactes. L'on pourrait évidemment prétendre qu'il existe certaines autres déterminantes complémentaires à prendre en considération dans les fonctions internationales de demande monétaire relatives aux années précédant 1970. Car l'exclusion de leurs influences sur la fonction engendre des élasticités instables. Comme conséquence politique, il résulte de cette analyse en faveur d'une politique anti-inflationniste qu'il est hautement improbable que le simple direction de la demande monétaire internationale soit réellement en mesure de contrôler par anticipation l'inflation internationale. (Ceci ne signifie pas pour autant qu'une réduction du taux de croissance de la demande monétaire internationale n'exerce pas d'action positive sur l'inflation internationale).

L'étude met ensuite en doute l'interprétation de la fonction de la demande monétaire dans les dernières années 60 et dans les premières années 70. Le fait qu'un simple (se référant à lui-même) schéma autorégressif puisse expliquer tant de choses permet de penser que la fonction n'est pas déterminée par des critères économiques.

Lorsqu'une variable endogène différée est en permanence réduite par l'absorption de la plus grande partie de l'écart des variables dépendantes, cela revient à dire que la fonction toute entière est déterminée par une expansion autonome. Ce processus frappe de caducité une fonction internationale de la demande monétaire.