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**Article**

## Inflationary Expectations and the Demand for Money: The Greek Experience "A Comment and Some Different Results" – A Rejoinder

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# **Inflationary Expectations and the Demand for Money: The Greek Experience “A Comment and Some Different Results” – A Rejoinder**

By Dimitris Panayotopoulos, Athen

In a very recent paper in this Journal *Himarios* (1983) casts doubts on the results reached by *Brissimis-Leventakis* (B-L) (1981) in their paper on the Demand for Money in Greece, narrowly defined, published in the same Journal.

*B-L* have argued in their paper that “the market for  $M_1$  in Greece is segmented from the market for either financial or real assets, a feature which is unique to the Greek experience” (p. 568). *Himarios* shows that “the interest rate has been an important explanatory variable in the demand for  $M_1$  for the whole period under consideration, as one would theoretically predict” (p. 261). B-L in their reply (1983) contradict the conclusion reached by *Himarios* since “our conclusions that the market for  $M_1$  is segmented from the market for either financial or real assets, . . . are based on the results for the subperiod 1964 - 1978 and not for the whole period 1955 - 1978”.

The point of disagreement between *B-L* and *Himarios* is neither on the specification of the Demand for  $M_1$  specified in nominal terms or in real terms or in real per capita terms, nor on the incorporation of the Dummy variable for 1967, but rather on the sample period. B-L estimates are for the period 1964 through 1978 while *Himarios*' estimates are for the period 1955 through 1978.

The purpose of my participation in the debate concerning the segmentation or not of the market for  $M_1$  in Greece is the following:

First, to show that the samples used by *B-L* and *Himarios* to estimate the demand for  $M_1$  function for Greece are not the proper ones.

Second, to show that the assertion of *B-L* that “there appears to be no shift in the parameters of the demand for  $M_1$  function during the inflationary period 1973 - 1978” is completely unfounded (p. 564). Third, to present some of the major underlying factors which are responsible for the shift of the demand for  $M_1$  in Greece after 1973. Fourth, to question the incorporation by

*Himaros* of a dummy variable in the demand for  $M_1$ . Fifth, to show that the estimation of the demand for  $M_1$  function utilizing an extended sample covering the period up to 1981 is more revealing of the non segmentation of the market for  $M_1$  in Greece and of the shift that takes place in the parameters of the demand for  $M_1$  function after 1973, and Sixth, to express some general thoughts concerning the estimation of the demand for  $M_1$  and  $M_2$  functions when yearly observations are used and to argue that the decomposition of  $M_1$  and  $M_2$  to their components reveals information that cannot be obtained otherwise.

### I. Estimation

The equation used in the estimation of the demand for  $M_1$  is of the form:

$$(1) \quad m = a_0 + b_1 y + b_2 ITT + b_3 m_{t-1}$$

where  $m$  = real money balances,  $y$  = real income and  $ITT$  = interest paid on saving deposits with the commercial banks. The consumer price index was used instead of the GNP deflator. Equation (1) was modified and the real per capita income replaces  $y$ , i. e.:

$$(2) \quad m = a_0 + b_1 yk + b_2 ITT + b_3 m_{t-1}$$

where  $yk$  = real per capita income.

Equations (1) and (2) were reestimated using the interest paid on time deposits ( $ITD$ ). The data for  $M_1$  used in the estimation are end of period figures.

The results of the estimation of the demand for  $M_1$ , equations (1) and (2), are presented in the following Table 1. Specifically, in Table 1 the estimation of the demand for  $M_1$  function are presented for the same sample periods used by *B-L*. It is evident from the Table 1 that both contentions of *B-L* are totally unfounded. Specifically, their first argument, i. e., "there appears to be no shift in the parameters of the demand for  $M_1$  function during the inflationary period 1973 - 1978. This conclusion is reached by breaking the period 1964 - 1978 into two sub-intervals 1964 - 1972 and 1973 - 1978 and applying again the Chow test" (p. 564), is not substantiated. Comparison of the results of the estimation of the demand for  $M_1$  function for the period 1964 - 1972 to those for the period 1973 - 1978 indicates that the parameters have undergone a very significant shift. (The underlying factors are presented below.)

Table 1

Sample Period	$a_0$	$y$	$yk$	ITT	ITD	$m_{t-1}$	$R^2$	D-W	SEE
1964 - 1978	-1.43 (2.81)	.865 (3.87)**		-.159 (1.52)		.299 (1.68)	.987	2.08	.040
	-1.33 (2.73)	.800 (3.73)**			-.155 (1.73)	.361 (2.00)*	.987	2.21	.039
	-6.30 (3.25)		.933 (3.50)**	-.135 (1.23)		.308 (1.59)	.985	1.99	.042
	-5.90 (3.15)		.871 (3.38)**		-.141 (1.49)	.367 (1.86)*	.986	2.14	.041
1964 - 1972	-2.39 (1.23)	.942 (2.07)*		.415 (.46)		.184 (.44)	.970	2.33	.051
	-3.94 (2.98)	1.051 (3.41)**			1.410 (2.10)*	-.038 (.13)	.983	1.36	.038
	-6.89 (1.57)		.913 (1.86)*	.421 (.44)		.258 (.61)	.967	2.38	.054
	-9.47 (3.24)		1.070 (3.26)**		1.528 (2.16)*	-.005 (.02)	.982	1.34	.039
1973 - 1978	-.74 (.54)	1.059 (3.49)**		-.251 (1.24)		-.051 (.12)	.935	2.01	.033
	-.59 (1.45)	.670 (7.17)**			-.334 (6.04)**	.454 (3.72)**	.994	2.79	.010
	-9.75 (3.44)		1.389 (3.76)**	-.229 (1.22)		.056 (.15)	.943	2.11	.039
	-6.44 (8.51)		.903 (9.96)**		-.320 (7.84)**	.500 (5.90)**	.996	2.62	.007

The numbers in parentheses are t-statistics.  
 \* Significant at 90 % level. \*\* Significant at 95 % level.

Their second argument i. e., the market for  $M_1$  in Greece is segmented from either the market for financial or real assets (p. 568), is invalid. The non statistical significance of the coefficient of the interest rate (period 1973 to 1978) cannot invalidate the fact that the market for  $M_1$  is non segmented. As it is presented later, in this paper, the estimation of the demand for  $M_1$  function for the period 1973 - 1981, proves the non segmentation of the market for  $M_1$  in Greece. On the other hand, *Himaros* results, though revealing of the shift in the parameters (see his Table 3), cannot be accepted on the ground that the data for the period 1955 - 1978 cannot be pooled, since the Chow test does not permit pooling of the data.

Furthermore, another contention of *B-L* is not supported as well. Specifically, they argue that “the influence of the interest rate on money demand is known to be reflected on the income velocity of circulation. Over the period 1955 - 1963 the velocity of  $M_1$  declined at a steady rate which is consistent with the monetisation of the economy . . . [and] this probably differentiates the behavior of the money demand function after 1964” (p. 564). This is partially true. The velocity did not stop declining up to 1963 but it continues to decline up to 1966, and since then it did not remain flat.<sup>1</sup>

The Greek economy has undergone, since the early 1960's dramatic changes, which are considered important in understanding the frame within which the economic agents are acting.

The 1960's can be characterized as a period of massive industrialization, surplus labor and “inflation proof”. Since 1973, the picture changed dramatically. Industrialization came to a halt, the unemployment rate has been stabilized around 3%, and double digit inflation succeeded the “inflation proof” years of the 60's.<sup>2</sup> Up to 1974 the Drachma is fixed to U.S. dollar. Since then has fluctuated and has been devalued severely against U.S. dollar as well as the major European currencies.<sup>3</sup>

Apart from these domestic developments the international economy during the 1960's possesses considerable stability. The foreign exchange markets are calm and the prices of all the primary commodities are low and stable. But with the adoption of flexible exchange rates by almost all the industrial nations in 1973, the oil price hike, and the rise in the prices of the primary commodities the international economy was upset.

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<sup>1</sup> *D. Panayotopoulos*, “The Secular Behavior of the Income Velocity: The Greek Experience”.

<sup>2</sup> See “The First Fifty Years of the Bank of Greece”, Bank of Greece, Athens, 1978, pp. 623 - 625, and *D. Panayotopoulos*, “The Phillips Curve: The Greek Experience”.

<sup>3</sup> On the impact of the flexible exchange rate system on the inflation rate, in Greece, see *D. Panayotopoulos*, “The Vicious Circle” Hypothesis: The Greek Case”.

With the above consideration in mind it is not easy to accept *B-L* contention that the differentiation of the behavior of the money demand function is only between the subperiods 1955 - 1963 and 1964 - 1978 and not between 1964 - 1972 and 1973 - 1978. *Himaros* estimation of the demand for  $M_1$  separately for the period 1955 - 1972 and 1964 - 1978 does reveal the shift in the behavior of the demand for  $M_1$  (p. 262, Table 3, and p. 261). However, *Himaros* findings would have been acceptable had he estimated the demand for  $M_1$  separately for the period 1955 - 1972 and 1972 - 1978, for the reasons given above.

*Himaros* introduces a dummy variable as argument in the estimation of the demand for  $M_1$  function for the year 1967 because, as he argues, "plotting the data reveals a positive 'blip' in the money supply ( $M_1$ ) for 1967 . . . The source of such an 'influential data point' can easily be traced to the coup-d'état that took place in early 1967" (p. 257). *Himaros*, however, should have introduced a dummy variable in the estimation of the demand for  $M_1$  function not only for the year 1967, the year the coup-d'état took place, but also for the year 1974. Plotting the data for  $M_1$  a negative "blip" point is revealed for the year 1974, which can be attributed, among other factors, to the fall of the military regime, the oil price hike, and the, subsequent, fall in the country's economic activity. It seems, though, that this issue is emphasized more than its actual impact on the estimation of the demand for  $M_1$  function.

In Table 2 the results of the estimation of the demand for  $M_1$  function, equations (1) and (2), are presented using an extended sample to cover the period up to 1981.

It is evident from these results that both contentions of *B-L*, namely that the market for  $M_1$  in Greece is segmented from either financial or real assets and that the demand for money function differentiates only after 1964 (and not after 1973) due to the fact that "over the period 1955 to 1963 the velocity of  $M_1$  declined at a steady rate . . . and remained relatively flat after that period" (p. 564), are unfounded.

Comparing the results of the estimation of the demand for  $M_1$  function for the whole period 1956 - 1981 with those of the subperiods 1964 - 1981 and 1973 - 1981 reveal a substantial shift in the demand for  $M_1$  function. (Table 1, period 1964 - 1972 and Table 2, period 1973 - 1981). Thus, it can be inferred that the market for  $M_1$  in Greece is not segmented. On the contrary, the interest rate is an important parameter in the decision making process of the economic agents.

It is surprising that the real partial adjustment model, estimated by *B-L* in their reply (1983) to *Himaros* criticisms, with the introduction of a dummy

Table 2

Sample Period	$a_0$	$y$	$yk$	ITT	ITD	$m_{t-1}$	$R^2$	D-W	SEE	$Q$
1956 - 1981	-.75 (2.00)	.489 (3.27)**		-.250 (5.78)**		.670 (7.29)**	.996	2.11	.039	.322
	-.60 (1.62)	.419 (2.90)**			-.216 (5.54)**	.713 (7.99)**	.996	2.14	.040	.369
	-3.08 (2.41)		.469 (2.78)**	-.218 (5.44)**		.709 (7.53)**	.995	2.06	.041	.385
1964 - 1981	-2.77 (2.25)		.425 (2.63)**		-.195 (5.47)**	.734 (8.14)**	.995	2.11	.042	.376
	-1.43 (3.09)	.875 (4.34)**		-.248 (4.44)**		.326 (2.16)**	.987	2.13	.037	
	-1.28 (2.70)	.793 (3.88)**			-.215 (4.06)**	.385 (2.48)**	.986	2.14	.039	
1973 - 1981	-6.60 (3.80)		.976 (4.11)**	-.187 (3.61)**		.297 (1.79)*	.987	2.04	.039	
	-6.22 (3.55)		.921 (3.84)**		-.167 (3.42)**	.335 (1.97)*	.986	2.15	.040	
	-.98 (1.51)	1.045 (5.72)**		-.274 (5.54)**		.029 (.16)	.939	2.38	.023	
	-.39 (.65)	.875 (5.11)**			-.230 (5.33)**	.103 (.57)	.935	2.30	.023	
	-10.09 (5.44)		1.455 (6.36)**	-.243 (5.79)**		-.014 (.08)	.950	2.17	.021	
	-7.78 (3.78)		1.187 (4.57)**		-.198 (4.46)**	.081 (.40)	.922	2.17	.026	

The numbers in parentheses are t-statistics.  
 \* Significant at 90 % level. \*\* Significant at 95 % level.

variable for the year 1967, produces different result to those presented in Table 1 for the period 1964 - 1978.

A shortcoming of the time series published on the Greek economy is the availability of GNP data on a quarterly basis only after 1975. Consequently, the empirical estimation of a functional relationship that includes GNP as argument can be estimated only on a yearly basis for a sample of observations that cover the period before 1975. The only alternative for the researcher is to “construct” his own time series for GNP on a quarterly basis for the period before 1975. That is why, so far, the existing studies on the Demand for Money in Greece use yearly data in their empirical part. The use of yearly observations in the estimation of the Demand for Money surpresses information.

There exist only two studies of the Demand for Money in Greece, one by the author,<sup>4</sup> who use quarterly observations of the GNP. The quarterly observations of GNP for the period before 1975 have been “constructed”.

The non decomposition of the money stock and the statistical estimation separately of its components surpresses, as well, information and gives wrong results.

Specifically, *B-L* conclusion that “the expected rate of inflation . . . , is significant and carries the expected negative sign during the period 1964 - 1978 which includes the inflationary period 1973 - 1978” (p. 569) is completely wrong.

In my study it is shown exactly the opposite, i.e., during the highly inflationary period, 1973 and there after, the expected rate of inflation carries a positive, and statistically significant, sign. The explanation reads as follows: Due to the non existence of money market and the underdevelopment of the capital market in Greece there is not any other investment opportunity left to the individual but to deposit his money balances with the Commercial Banks and/or the Specialized Credit Institutions in his effort to hedge against inflation. That is why savings and time deposits have been kept rising, at very fast rates, during this highly inflationary period.

## II. Conclusion

The estimation of the demand for  $M_1$  function in Greece, based on the results of this study, shows the following:

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<sup>4</sup> *D. Panayotopoulos*, “The Demand for Money in Greece: Empirical Estimation using quarterly observations, 1962 - 1981”.



- (1) The Demand for Money has been shown here to be highly unstable between 1964 - 1972 and 1973 - 1978 or 1973 - 1981. The instability of the demand for  $M_1$  function is better founded if the estimation is done separately for these two subperiods and not in the way *B-L* and *Himarios* have undertaken their tests.
- (2) *B-L* conclusion reached in their paper i.e., the market for  $M_1$  is segmented, is totally unacceptable.
- (3) *Himarios* is wrong in introducing a dummy variable for 1967 only. If a dummy variable is to be introduced as an argument in the demand for  $M_1$  function then it has to be introduced for both-years, 1967 and 1974.

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### Zusammenfassung

**„Ein Kommentar und einige abweichende Ergebnisse“ zu  
„Inflationserwartungen und Geldnachfrage: die Erfahrungen  
Griechenlands“ – Eine Erwiderung**

Beide Autoren, *B-L* und *Himarios*, haben die Nachfrage für die  $M_1$ -Funktion nicht korrekt geschätzt. Die Nachfrage nach  $M_1$  ist in Griechenland sehr instabil. Wenn man das Jahr 1973 als Schnittstelle nimmt, dann zeigt die Schätzung, daß sich die Parameter der Nachfragefunktion für  $M_1$  seit 1973 signifikant verändert haben.

## Summary

### **Inflationary Expectations and the Demand for Money: The Greek Experience “A Comment and Some Different Results” – A Rejoinder**

Both writers, *B-L* and *Himarios*, have not estimated correctly the demand for  $M_1$  function. The demand for  $M_1$  in Greece is highly unstable. Taking as a cut-off point the year 1973, the estimation shows that the parameters of the demand for  $M_1$  function have undergone significant shift since 1973.

## Résumé

### **Les attentes inflationnistes et la demande de monnaie: l'expérience grecque – « Un commentaire et quelques résultats différents » – Une réplique –**

Les deux auteurs, *B-L* et *Himarios*, n'ont pas estimé correctement la demande de la fonction  $M_1$ . La demande de monnaie  $M_1$  est extrêmement instable en Grèce. Remontant jusqu'à l'année 1973, l'estimation montre que les paramètres de la demande de la fonction  $M_1$  ont subi des changements significatifs depuis 1973.