CAPITAL FLOWS AND THE INTEGRATION OF INTERNATIONAL FINANCIAL MARKETS

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ABSTRACT

As financial markets become more integrated, factors other than purely domestic policies will affect macroeconomic performance. This study attempts to empirically assess how capital flows have affected domestic interest rates, real money demand, real consumption demand, and real investment demand in the Philippines using quarterly data from 1982 to 1995. Dynamic simulations are used to obtain the time paths of interest rates and money demand assuming no inflows, which are then compared to the actual. Incorrect attributions of changes in these variables to capital flows could lead to incorrect policies. The possible effects of capital flows on real consumption demand and real investment demand are examined, distinguishing between real FDI flows and real portfolio flows.

Key words: Capital flows, financial integration, macroeconomic performance, dynamic simulations

1. INTRODUCTION

The Philippines, one of several so-called 'emerging markets', experienced large capital inflows beginning in 1989.[1] At its maximum, these inflows amounted to over 7% of GDP. While the return to private international credit markets was generally welcome, as foreign savings could become available to finance projects in pursuit of growth objectives, policymakers soon faced several critical concerns. The large volume and potential for sudden reversal of these flows could imperil

[1] There was a large increase in the capital account in the second quarter of 1985 but it did not persist. This temporary phenomenon coincided with a tight money policy to control inflation in the previous two years, during which the country experienced its largest postwar recessions. More frequent capital inflow surges began in late 1989.

the stability of the domestic financial system. These capital inflows have been blamed for real currency appreciation and the widening of current account deficits, accumulations of international reserves by the Central Bank, and undesirable increases in the money supply. Where sterilization was resorted to in order to rein in the money supply, the possibility of incurring a large quasi-fiscal cost arising from the Central Bank's exchanging high-yielding domestic securities for low-yielding foreign assets emerged.

While there is extensive literature on the underlying causes of these capital inflows to developing countries, there is no unanimity on the matter. Some attribute the surges in capital inflows to external factors. In their study of Latin American countries, for example, Calvo, Leiderman, and Reinhart (1993) attribute the surge in capital inflows to low US interest rates. Fernandez-Arias (1994) and Frankel and Okongwu (1995) also find evidence to support this view. On the other hand, Schadler, Carkovic, Bennet, and Khan (1993) challenge this view on the grounds that changes in the external factors did not coincide exactly with the surges in capital flows. Indeed, for some countries, these external factors postdated the surges in capital flows. Empirical evidence to support the view that internal factors, such as improvements in economic fundamentals in developing countries, were the more important causes of capital inflows is provided by Ghosh and Ostry (1993) and Chuhan, Claessens, and Mamingi (1993).

The difficulty of deciphering whether external or internal factors are largely responsible for the surge in capital inflows to developing countries is complicated by the fact that many of these countries were in the midst of undertaking economic liberalization and structural reforms at about the time of these inflows. It becomes more difficult for policymakers to adopt correct policies when macroeconomic performance is incorrectly attributed to being the result of capital inflows. A successful domestic program to reduce inflation, for example, could lead to declines in the interest rate and an increase in the demand for money. To the extent that the monetary authorities accommodate this, the money supply will increase. An incorrect attribution of the increase in the money supply to capital inflows could lead to incorrect policies to counter capital inflows.

This study attempts to empirically assess the extent to which capital inflows have affected macroeconomic performance in the Philippines using quarterly data from 1982 to 1995.[2] Specifically, it looks at the effects of capital inflows on interest rates, money demand, and consumption and investment demand in the Philippines. If capital inflows significantly affect interest rates and the domestic money supply, the time paths for these would be different from those in a world without capital inflows. This would also suggest that financial markets have become more integrated as factors other than purely domestic policies affect a

[2]In 1982, interest rate decontrol began a year earlier was completed. In 1992, the foreign exchange market was likewise liberalized. Official pronouncements by the Central Bank stated that the exchange rate was henceforth to be determined by market forces.

country's macroeconomic performance. It is also important to examine the effects of capital inflows on consumption and investment because one of the concerns of policymakers is that these flows be used to finance long-term investment. Aside from its positive effect on growth, long-term investment is seen to be less reversible than short-term portfolio flows and, therefore, less destabilizing. If these inflows primarily finance consumption instead, to the extent that the spending falls on non-traded goods, the latter's relative price will increase and the domestic currency will appreciate in real terms.

The study is organized as follows: Section 2 is a review of the literature on tests of financial market integration; Section 3 describes features of macroeconomic performance in the Philippines in relation to capital flows; Section 4 discusses the empirical methodology; Section 5 presents the empirical results; and Section 6 presents the summary and conclusions of the study.

2. TESTS OF FINANCIAL INTEGRATION

The usual way in which the proposition that greater capital mobility leads to greater financial integration across countries is tested is to see whether real interest rates among financial assets located in different regions converge. In general, most of the empirical work fail to find convergence of real interest rates despite greater capital mobility. Throop (1994), for example, finds no tendency for real interest rates between the US and that in a bilateral industrial country to converge in the 1980s, when barriers to capital mobility had largely been eliminated. Also, the responses of both short-term and long-term real interest rates to one another have become weaker despite greater capital mobility. Frankel and Okongwu (1995) find that capital inflows from the US to Argentina, Chile, Mexico, the Philippines, and Korea in the 1987-1994 period did not lead to interest rate convergence between those in the US and those in these countries due to the presence of a currency premium. The interest rate differential in favor of the domestic country is seen as compensation for fears of future depreciation.

In contrast, Hutchison and Singh (1993) obtain results favorable to interest rate convergence. They point out that real interest rates are equal across countries only in the absence of deviations from purchasing power parity (PPP) and uncovered interest parity (UIP), and that greater capital mobility implies smaller deviations in UIP. Real interest rates fail to convergence over shorter-term horizons because PPP holds only in the longer-run and substantial deviations from it exist in the short-run. Employing cointegration methods which allow adjustment between US and Japanese interest rates in a long-run equilibrium setting, they find a high degree of interest rate linkage between Japan and the US in the 1980s. Chinn and Frankel (1995) also use cointegration techniques to test the degree to which long-run real interest parity holds for US, Japanese, and Pacific Rim countries. Their results also show bilateral interest rate linkages and real interest parity upheld for US-Singapore, US-Taiwan, and Japan-Taiwan interest rates.

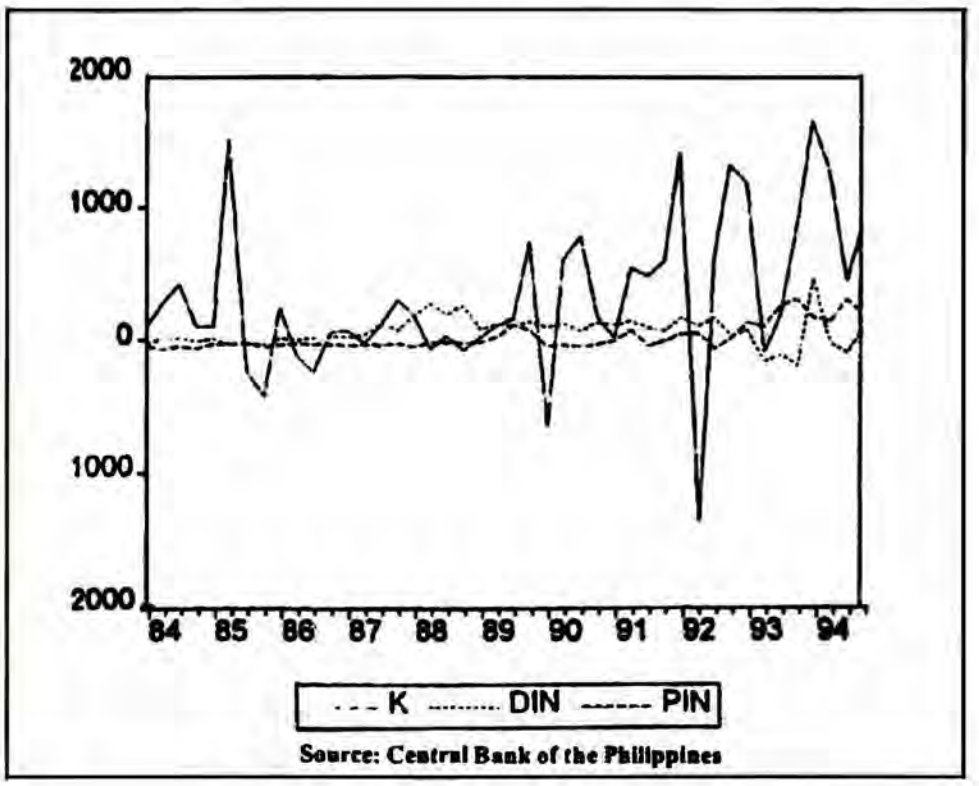
In theory, capital inflows should lower domestic interest rates. Frankel and Okongwu (1995) point out that sterilization moves by the monetary authority could raise domestic interest rates above their position prior to the capital inflow. However, this is unlikely to occur in the standard model if capital inflows are caused by external factors such as a decline in world interest rates, an increased demand for portfolio diversification among US investors, or the removal of barriers to capital inflows. Domestic interest rates could be expected to rise if primarily domestic factors cause the capital inflows. For example, successful debt-reduction, an investment boom as a result of deregulation, or an increase in the demand for money in light of a successful program to control inflation would raise domestic interest rates.

This study examines the effects of capital flows on interest rates and money demand by using counterfactual simulations as to what the time paths of these variables would have been relative to actual, in the absence of capital flows. The rationale for this is that greater financial integration should allow capital flows. The rationale for this is that greater financial integration should allow capital flows to have significant effects on macro variables.

3. CAPITAL FLOWS AND MACROECONOMIC PERFORMANCE

The Philippines experienced more frequent surges in capital inflows beginning in the fourth quarter of 1989. From US$189 M in the third quarter of 1989,

Chart 1
K = Capital Inflows; DIN = Net Direct Investment Inflows; PIN = Portfolio Investment Inflows
(US Million Dollars)



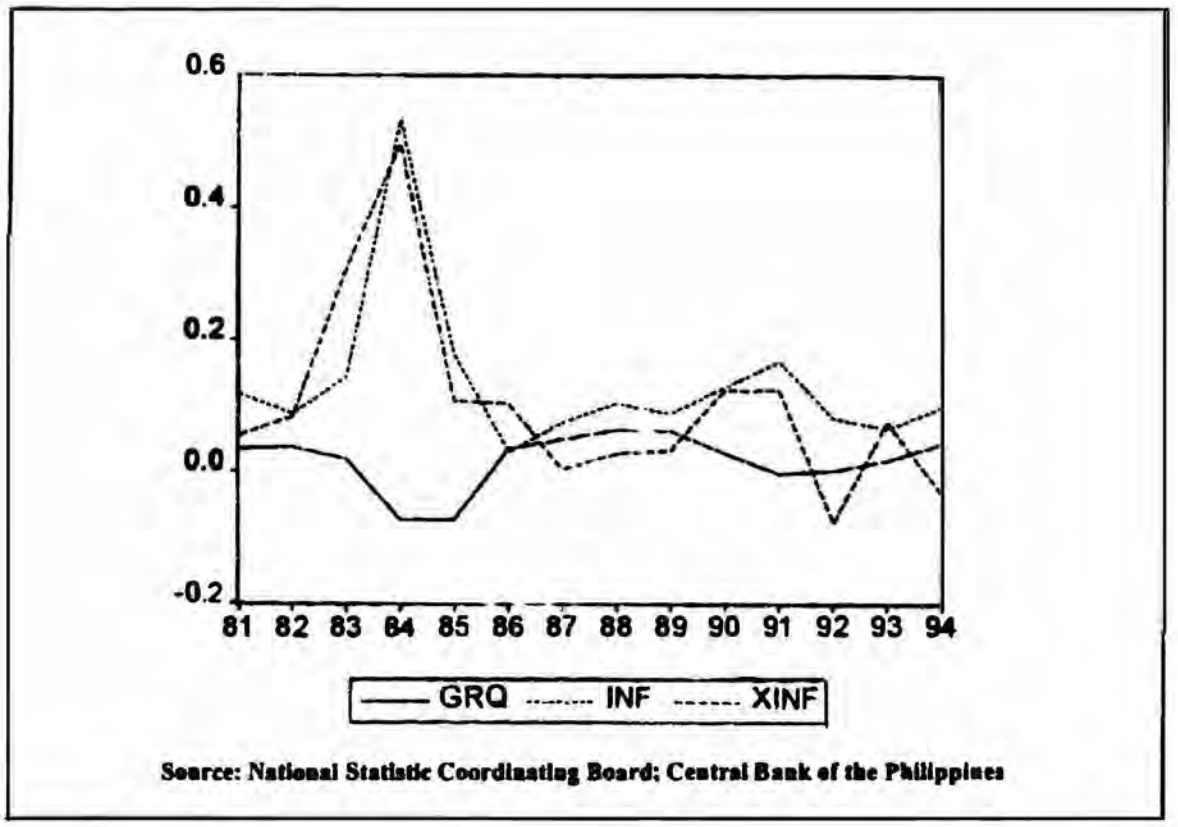
the capital account ballooned to US$768 M in the fourth quarter of 1989. Capital flows peaked in the third quarter of 1990, the first and fourth quarters of 1992, and the first quarter of 1994. It is apparent that in general, the capital account was larger and more volatile in the 1990s as shown in Chart 1. Portfolio inflows have increased in the more recent period as these exceeded direct investment inflows in the third quarter of 1989 for the first time. From US$55 M in the second quarter of 1989, portfolio inflows more than doubled to US$ 160 M in the third quarter of 1989. Since the fourth quarter of 1992, portfolio investments have been larger than direct investment inflows, with the exception of the first quarter in 1994. As a percentage of GDP, from 1.23% in 1988, capital inflows rose to 3.43% of GDP in 1989, and then further to 6.85% in 1991. In 1994, these inflows surged once more to 7.4% of GDP.

Both 'push' factors, such as low interest rates in the US, and 'pull' factors, such as the economic reform measures undertaken, presumably played a part in the resurgence of private capital inflows to the Philippines. The country overcame the debt crisis and regained its financial credibility. Foreign debt service fell from almost 36% of total exports of goods and services in 1986 to 17% in 1993. (de Dios, 1995 p. 140) The liberalization of foreign exchange transactions began in 1992, the year when portfolio inflows began to dominate foreign investment flows. Beginning in 1992, authorized banks could sell foreign exchange without prior approval from the Central Bank, except for certain foreign loan and investment transactions. Banks could also relend foreign currency loans with Central Bank approval.

While financial liberalization began in 1981 with the lifting of interest rate controls, many of the other financial sector reforms, such as the liberalization of foreign exchange transactions (1992), and allowing the entry of some foreign banks (1994) occurred after the initial surge in capital inflows in 1989. Hence, these reforms cannot be responsible for all of the surge episodes, particularly the more recent cases. In this regard, it is important to point out that domestic interest rates were high in the third quarter of 1989 relative to interest rate levels in the previous two years, as shown in Chart 4B, and coincided with large inflows. Interest rate levels in 1987 and 1988 ranged from 11.5% to about 16%. Interest rates in the third quarter of 1989 rose to 20.3% from 16.3% in the second quarter and remained at levels over 20% up to the first quarter of 1991. Note that the third quarter of 1989 coincides with the initial surge in portfolio inflows. Other 'pull' factors include the improved macroeconomic condition of the country. In 1989, the inflation rate declined to 1.22% from 8.76% in the previous year. Output growth had also recovered from the major recessions of 1984-1985. These are shown in Chart 2.

In the late 1980s and 1990s, the Philippine also exhibited many of the macroeconomic developments consistent with the theoretical literature on the effects of large capital inflows. The peso had been appreciating in real terms between 1988 and 1989, from P23.67 to the dollar to P23.13 to the dollar. The next

Chart 2
GRQ = GDP Growth; INF = Inflation Rate; XINF = Depreciation Rate
1985=100



Source: National Statistic Coordinating Board; Central Bank of the Philippines

significant real appreciations occurred in 1992 and 1994, relative to the immediately preceding years. Again, 1994 is a year when capital flows as a percentage of GDP surged. The current account deficit as a percentage of GDP widened from 3.42% in 1989 to 5.87% in 1990 and then again to 5.64% in 1993. Domestic savings as a proportion of GDP declined in the 1990s and are similar to those in Latin America. These and other relevant data are shown in Table 1. By logic of BOP accounting, the difference between capital inflows and current accounts deficits imply an accumulation of official foreign reserve assets. The change in international reserves as a percentage of GDP increased during the periods of capital inflow surges. It increased to 1.04% in 1989 from 0.16% in the previous year; to 5.35% in 1991 from – 0.77% in 1990; and to 1.9% in 1994 from 0.98% in 1993.

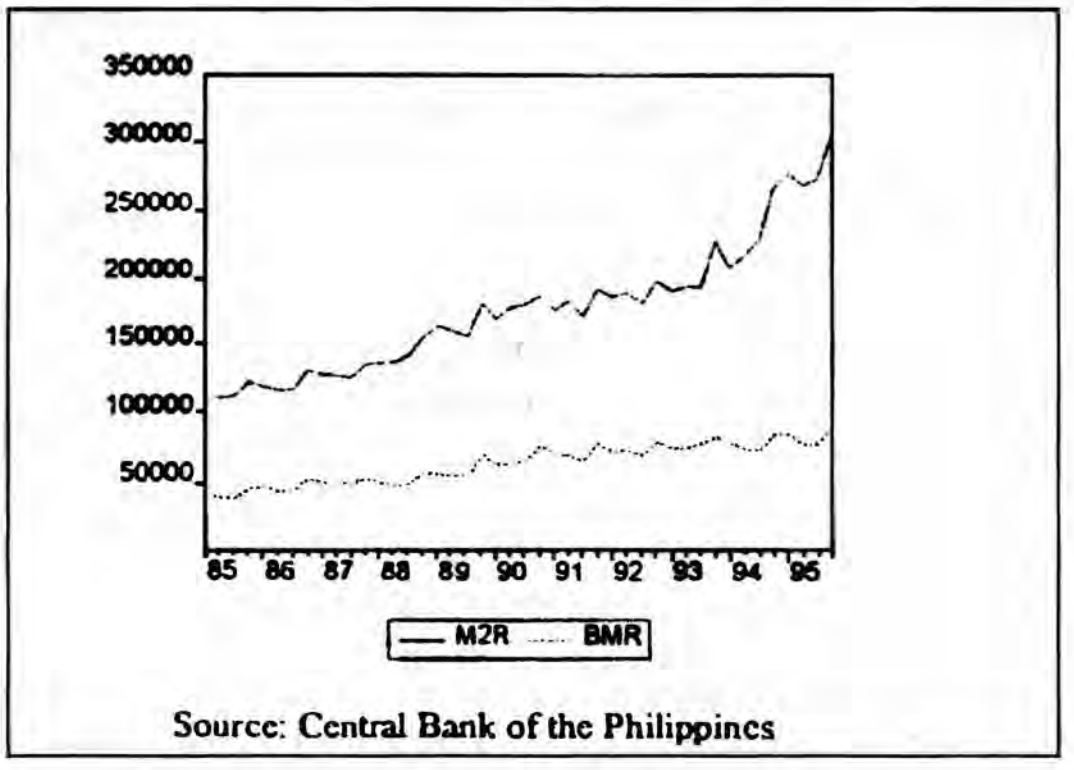
Chart 3 shows that real M2 has been on a rising trend since 1989, with sharp increases in 1994-1995, coinciding with the most recent capital inflow surge. The same chart also shows that real base money has remained fairly stable throughout the period in question. The extent to which capital inflows are responsible for the increase in money is not immediately evident. Glick and Moreno (1994) have documented the sterilization measures undertaken by the monetary authorities. In some cases, sterilization attempts were not immediately undertaken. Moreno and Glick's study date sterilization measures as beginning in 1992. As shown in Chart 4A, the largest rate of international reserve accumulation occurred in 1991 to 1992 and 1994, yet real M2 levels have been on a rising trend since at least 1989. This

Table 1. Gross Domestic Capital Formation (GDCF), Domestic Savings, and Current Account (As Percent of GDP)

	Private GDCF	Public GDCF	Total GDCF	Domestic Savings	Current Account
1981	17.13%	9.66%	26.80%	26.00%	-5.82%
1982	18.64%	8.54%	27.18%	24.33%	-8.60%
1983	18.76%	10.18%	28.94%	25.68%	-8.41%
1984	12.40%	9.88%	22.28%	20.09%	-3.28%
1985	9.77%	6.69%	16.47%	16.43%	-0.33%
1986	10.56%	5.51%	16.08%	17.16%	3.21%
1987	11.29%	5.19%	16.49%	20.51%	-1.33%
1988	12.92%	5.04%	17.96%	21.86%	-1.03%
1989	14.43%	5.70%	20.13%	20.47%	-3.42%
1990	14.75%	8.20%	22.94%	18.49%	-5.87%
1991	13.62%	6.19%	19.80%	18.14%	-1.93%
1992	13.72%	8.67%	22.39%	17.68%	-1.61%
1993	13.17%	9.18%	22.36%	15.67%	-5.64%
1994	14.41%	8.60%	23.01%	18.45%	-4.61%
1995	15.28%	7.81%	23.09%	21.32%	

Source: National Statistical Coordinating Board
Central Bank of the Philippines

Chart 3
M2R = Real M2; BMR = Real Base Money
1985 = 100



Source: Central Bank of the Philippines

suggest that if capital inflows led to increases in the money supply, ways other than reserve accumulation and monetary base expansion may be responsible.

Chart 4B shows that with the exception of 1989 to 1990, interest rates were declining between 1991 and 1994, consistent with the theoretical proposition that capital inflows tend to lower domestic interest rates. The latter period was also one in which inflation was declining and real M2 was rising.

4. EMPIRICAL METHODOLOGY

Following Kamin and Wood (1996), an attempt is made to gauge the impact of capital inflows on the demand for money.[3] First, an interest rate reaction function for the monetary authority is specified in which the interest rate is set in response to inflation, output growth, and capital flows[4]. A conventional money demand equation is specified, with the interest rate and real income as arguments. The impact of capital flows on money demand can then be calculated using a two-stage procedure. The fitted values of the interest rate equation are submitted into the interest rate in the money demand equation. The impact of capital flows on money demand occurs indirectly, via interest rates:

$$\frac{M}{P} = L(r, \hat{Q})$$

$$r = r(\hat{P}, \hat{Q}, K)$$

where M/P is real money balances, r is the nominal interest rate, $\hat{Q}$ is output growth, $\hat{P}$ is the inflation rate, and K is capital flows.

Several assumptions are made. Increases in inflation lead authorities to raise nominal interest rates in order to keep real interest rates from declining. Increases in output growth lead the authorities to raise nominal interest rates to stabilize the cyclical behavior of output. Increases in capital inflows lead authorities to lower nominal interest rates because capital inflows increase the reserve holdings of the authorities and reduce the need for more inflows. Also by lowering nominal interest rates, future inflows are reduced and cost of sterilization declines.

Quarterly data from 1982-1995 are used and error correction versions of the static money demand and interest rate equations are estimated. The most general specification of both equations are estimated, with explanatory variables with non-significant coefficients removed progressively. Two different measures of capital flows are used: the capital account, which measures net capital inflows to the

[3]Kamin and Wood stress that while capital inflows directly affect the supply of money in theory, the linkages between capital flows and the money supply are not likely to remain constant over time. Hence, they attempt instead to estimate the impact of capital inflows on the demand for money.

[4]Gochoco (1991) finds evidence for the equivalence between interest rate targeting and exchange rate targeting.

Chart 4A
D(BGIRX) = Change in Gross International Reserves of the Central Bank
K = Capital Inflows
(US Million Dollars)

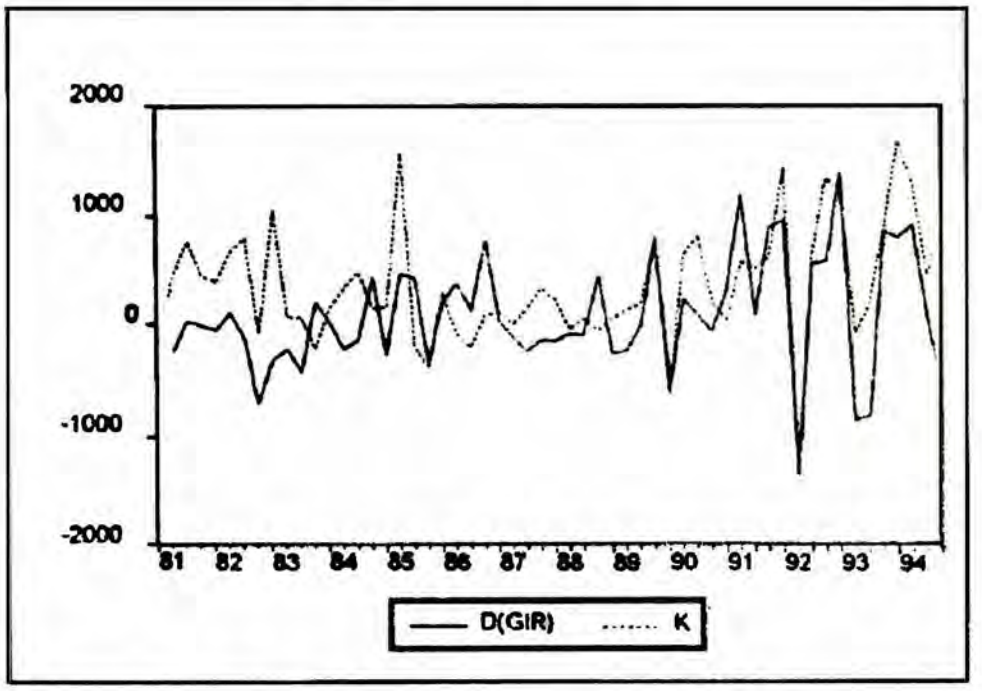
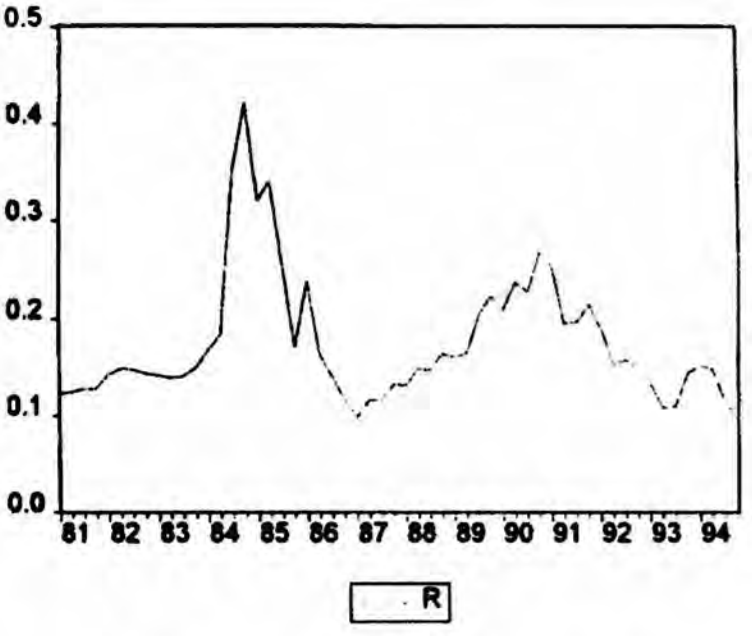


Chart 4B
R=91-day Treasury Bill Rate (Nominal)



Source: Central Bank of the Philippines

Philippines, and the change in international reserves, which reflects the impact of capital flows on base money without sterilization. Both of these are scaled by lagged nominal M2. The interest rate used is the 91-day Treasury bill rate. The inflation rate used is the log change in the consumer price index.

Simulations of counterfactual paths for interest rates and money demand are made, assuming that no capital inflows took place. To do this, the capital flow variable in the interest rate equation is set to zero. Two alternative measures of capital flows are used, namely, the capital account, and the change in international reserves. The results are compared to the actual paths of interest rates and money demand in order to determine whether capital flows matter for interest rates and money demand.

A second estimation strategy is to include the variable for capital flows directly in the money demand equation. This estimation strategy is more general than the first one since the effects of capital flows on money demand include but are not restricted to their effects via interest rates. Capital flows may affect money demand directly by raising foreign currency deposits without necessarily affecting rates on peso-denominated assets. The counterfactual simulation experiments described above are repeated.

To examine the effects of capital inflows on consumption and investment, the following equations are estimated:

$$C=C\left(Q,i,\frac{M}{P},K\right)$$

$$I=I\left(Q,\hat{Q},i,\bar{K},I_{-n}\right)$$

where C is real consumption, I is real investment, Q is real output, $\hat{Q}$ is real output growth, i is real interest rate, M/P is real money balances, and K is capital flows.

Error-correction models of each of these equations are estimated. In the real consumption equation, it is assumed that consumption demand is negatively affected by the real interest rate, positively affected by real output, and positively affected by the availability of bank credit, proxied by real money balances. It is also assumed that investment demand is positively affected by real output, real output growth, and capital flows, and negatively affected by the real interest rate and by lagged investment.

5. EMPIRICAL RESULTS

5.1 Interest Rates, Real M2, and Capital Flows

The first column of Table 2 shows the results of estimating the basic interest rate equation without the capital flow variables. The lagged interest rate is significantly negative as expected, while lagged inflation and lagged changes in inflation are significantly positive as expected, except for the first lag of the change in inflation. The second column shows the results when the capital account is in-

Table 2. Estimation Results for the Interest Rate Rection Function[7]
Dependent Variable: Change in the 91-day Treasury Bill Rate

	Basic Equation	With Capital Account	With Change in Intl. Reserves	With Both	With Capital Account (IV)	With Change in Intl. Reserves (IV)
Constant	-0.011	-0.004	-0.005	-0.004	-0.004	-0.005
	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)
Inflation(-1)	0.339	0.295	0.299	0.295	0.295	0.299
	(0.163)	(0.157)	(0.131)	(0.133)	(0.153)	(0.131)
Change in Treasury	-0.335	-0.279	-0.284	-0.276	-0.279	-0.284
Bill Rate (-1)	(0.137)	(0.134)	(0.111)	(0.116)	(0.134)	(0.111)
Change in	-0.356	-0.418	-0.363	-0.397	-0.418	-0.363
Inflation(-1)	(0.157)	(0.146)	(0.127)	(0.127)	(0.146)	(0.127)
Change in	0.995	1.053	0.896	0.943	1.053	0.896
Inflation(-3)	(0.168)	(0.156)	(0.137)	(0.139)	(0.156)	(0.137)
Change in	0.551	0.648	0.561	0.617	0.648	0.561
Inflation(-4)	(0.201)	(0.187)	(0.162)	(0.163)	(0.187)	(0.162)
Capital Acct.(-1)		-0.183		-0.077	-0.183	
		(0.075)		(0.071)	(0.075)	
Change in		-0.107		-0.065	-0.107	
Capital Account (-2)		(0.047)		(0.042)	(0.047)	
Change in			-0.355	-0.292		-0.355
Intl. Reserves (-1)			(0.068)	(0.076)		(0.068)
Adjusted R^2	0.46	0.56	0.65	0.72	0.56	0.65
DW Statistic	1.86	1.73	1.87	1.77		

[7]Note: In this and succeeding Tables, standard errors are in parentheses.

cluded in the equation. Both the lagged value of the capital account and the second lag of the change in the capital account have a significantly negative effect on the change in the interest rate. The third column shows that when the lagged change in international reserves is used as the capital flow variable, there is also a significantly negative effect on the change in interest rates, and the *t*-statistic is larger than those for the capital account. This is consistent with the proposition that capital inflows reduce the interest rate target either by reducing the need for the monetary authority to build up its holdings of international reserves or by reducing pressure for the domestic currency to depreciate. The fourth column of the Table shows the results when both measures of capital flows are used. The lagged change in international reserves continues to be significantly negative while the effect of the capital account becomes insignificant. This suggests that international reserves may have a structural relationship with the interest rate while the

capital account may only affect the interest rate directly, via international reserves. This is consistent with a monetary authority who cares about the level of international reserves and not about other effects of capital inflows.

The first column in Table 3 is the basic money demand equation. The interest rate coefficient is significantly negative while that on the log of output is significantly positive.

Chart 5 shows the results of the counterfactual simulation of the effect on interest rates and real money M2 levels assuming that the capital flow variable, the capital account in this case, is set to zero. In Chart 5A, the simulated path of the interest rate, indicated by the dashed line, shows that interest rates would have been higher than they actually were, shown by the solid line, in the absence of capital flows. This suggests that capital inflows to the Philippines reduced domestic interest rates below what they otherwise would have been.

Chart 5B shows the effect on real M2 assuming that the capital account in the interest rate equation is set to zero. The counterfactual simulation of the effect

Table 3. Estimation Results for the M2 Demand Function Including the Capital Flow Variable
Dependent Variable: Log of Real M2

	Basic Equation	With Capital Account	With Intl. Reserves	With Both	With Capital Account (IV)	With Intl. Reserves (IV)
Constant	-5.203 (0.689)	-4.923 (0.707)	-5.180 (0.711)	-4.907 (0.749)	-4.859 (0.708)	-5.154 (0.754)
91-day Treasury Bill Rate	-0.163 (0.092)	-0.202 (0.094)	-0.171 (0.095)	-0.188 (0.097)	-0.226 (0.096)	-0.169 (0.101)
Log of Real Output	0.698 (0.082)	0.711 (0.083)	0.699 (0.085)	0.687 (0.088)	0.716 (0.083)	0.694 (0.090)
Log of Real M2 (-1)	0.736 (0.040)	0.698 (0.044)	0.733 (0.042)	0.722 (0.046)	0.688 (0.045)	0.735 (0.044)
Capital Acct. (-1)		0.210 (0.110)		-0.176 (0.120)	0.236 (0.111)	
Capital Acct. (-2)		0.210 (0.106)			0.242 (0.108)	
Capital Acct.(-3)		0.265 (0.107)			0.299 (0.109)	
International Reserves (-1)			-0.007 (0.124)	-0.090 (0.136)		-0.010 (0.130)
Adjusted R^2	097	0.96	096	0.96	0.96	0.97
DW Statistic	1.46	1.42	1.46	1.43		

Chart 5A
Capital Account set to zero in interest rate eqn.
R = actual 91-day Treasury Bill Rate; RZZ = Simulated R

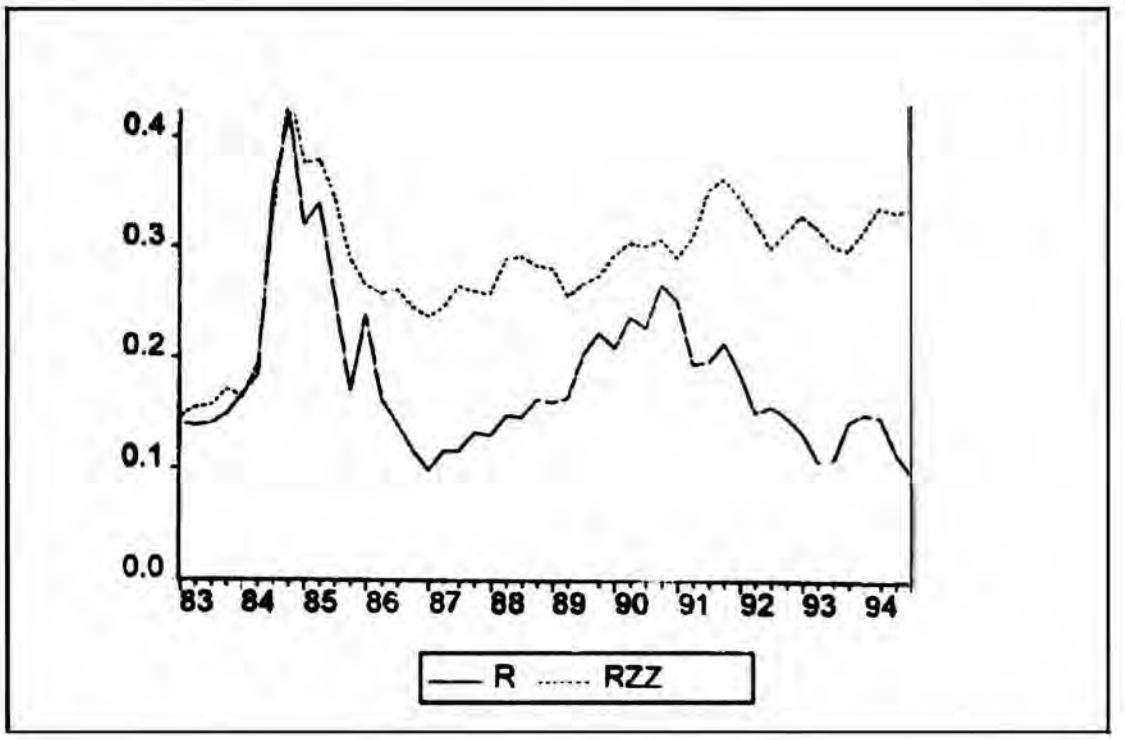
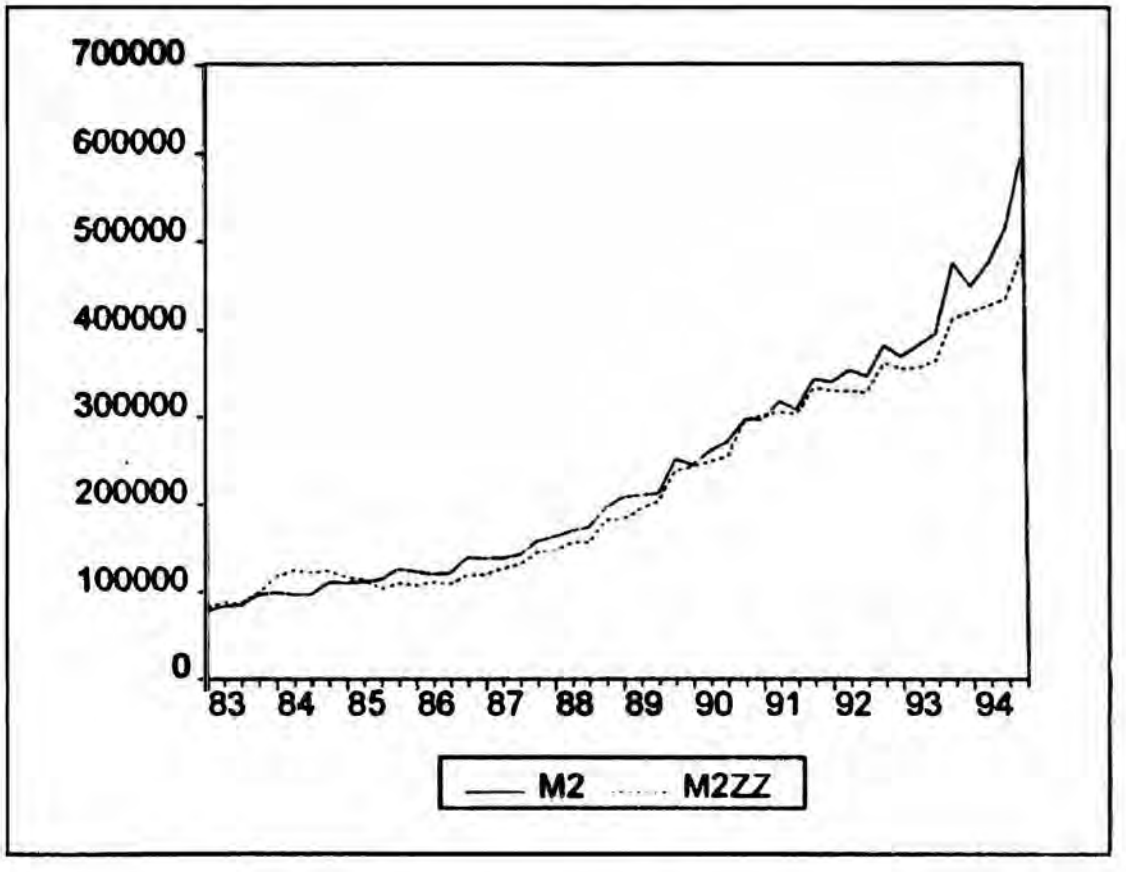


Chart 5B
Capital Account set to zero in interest rate eqn.
M2 = Actual M2; M2ZZ = Simulated M2



on real M2 shows that real M2 levels would have had a rising trend even in the absence of capital flows. This is more pronounced in the 1992 to 1994 period. These findings suggest that other economic developments, such as the decline in interest rates between 1985 and 1989 and 1991 to 1994 along with the decline in the rate of inflation, may have increased money demand, with corresponding increases in money supply. While the actual and simulated real M2 paths do not differ much from each other from 1990 to 1991, in general, rapid monetary growth in the 1990s cannot be attributed to capital inflows.

Similarly, Chart 6 shows the results of the counterfactual simulation on interest rates and M2 levels assuming that the capital inflow variable, the change in international reserves, is set to zero in the interest rate equation. Chart 6A shows that interest rates would have been higher without capital flows, with the rise in interest rates being of a greater magnitude than that obtained when the capital account is used as the capital flow variable.

Chart 6B shows the effect on real M2 assuming that the change in international reserves in the interest rate simulation is set to zero. The counterfactual simulation shows, as in the previous case, that real M2 levels would have had a rising trend even in the absence of capital inflows.

The simulations above only allow for an indirect effect of capital inflows on real M2, via the interest rate. To account for a direct channel in addition to this, the capital inflow variable was also directly included in the money demand equation. The results are shown in the second column of Table 3. The first through third lags of the capital account variable are significantly positive.

When the lagged change in international reserves is used as the capital flow variable, the coefficient is negative and insignificant as shown in the third column. In the fourth column, both the lagged capital account and the lagged change in international reserves are included in the money demand equation. Although still positive, the lagged capital account becomes insignificant, although its t-statistic is larger than that for the change in reserves. The latter remains insignificantly negative.

The results obtained using the interest rate equation, in which reserves changes are more important than the capital account, are different from those obtained for money demand, in which the opposite is generally true. They suggest that the capital account affects money variables in ways other than through reserve accumulation and increases in monetary base. It is consistent with Chart 3, in which real M2 increased over time even as base money remained stable. While there is always the danger that the present results may be spurious, it is possible that the channels through which the capital account influences monetary conditions changed in the 1990s.

A counterfactual simulation in which the capital account is set to zero in the interest rate equation when the money demand equation includes the capital account variable is shown in Chart 7A. The results show that interest rates would have been higher in the absence of capital inflows. Chart 7B unambiguously

Chart 6A
Change in International Reserves set to zero in interest rate eqn.
R = actual 91-day Treasury Bill Rate; RYY = Simulated R

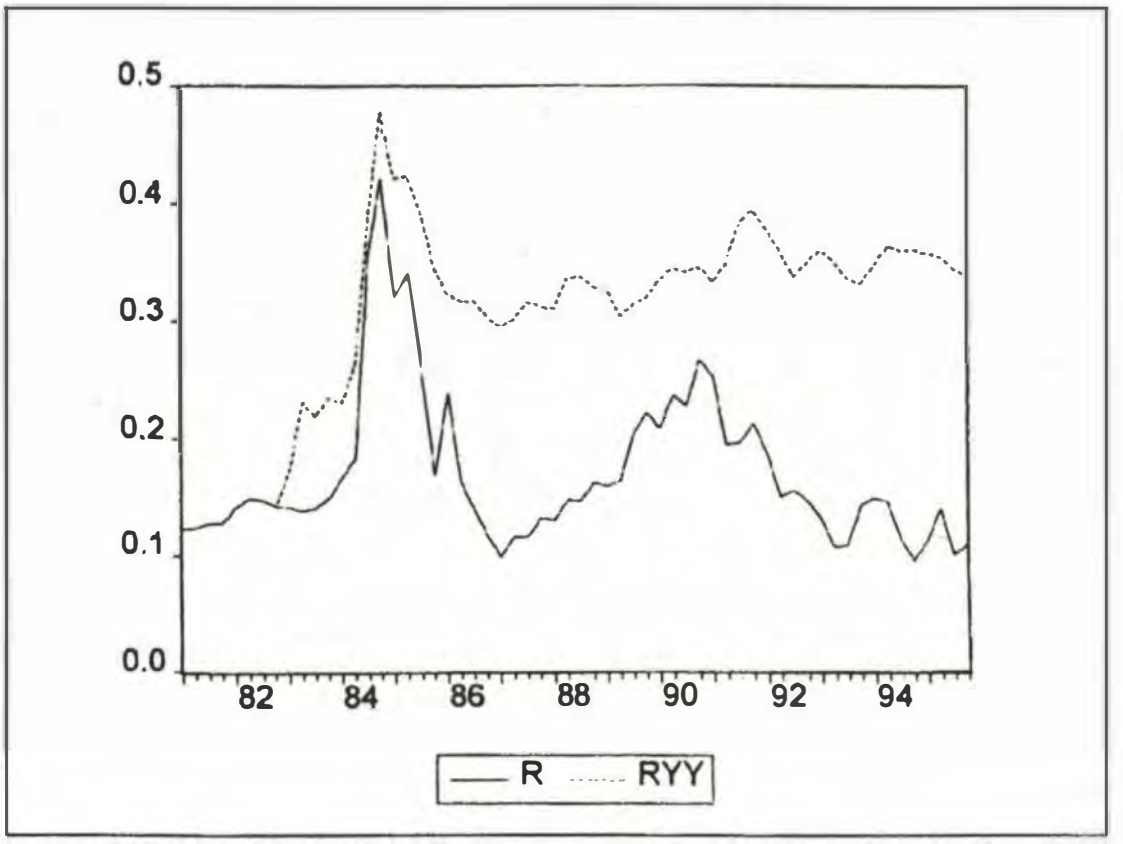


Chart 6B
Change in International Reserves set to zero in interest rate eqn.
M2 = actual M2; M2YY = Simulated M2

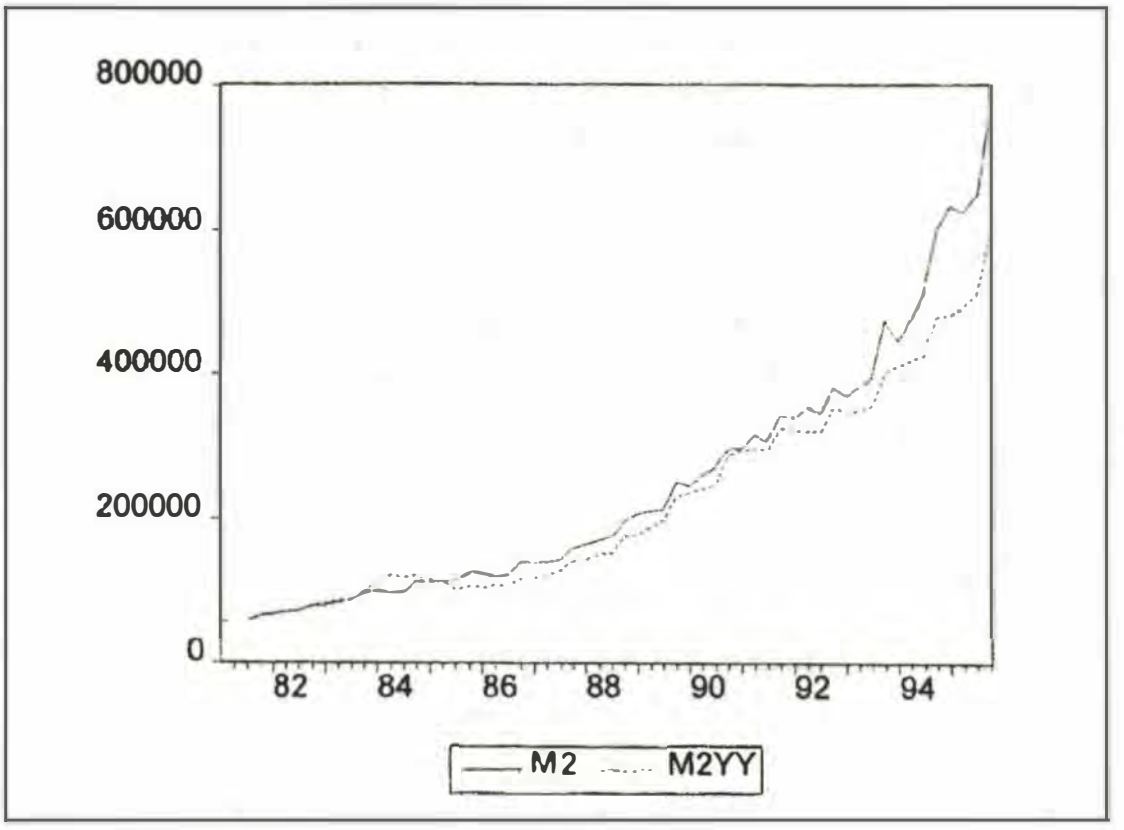


Chart 7A
Capital Account set to zero in interest rate eqn.; with capital variable in M2 Demand Function
R = actual 91-day Treasury Bill Rate; RXX = Simulated R

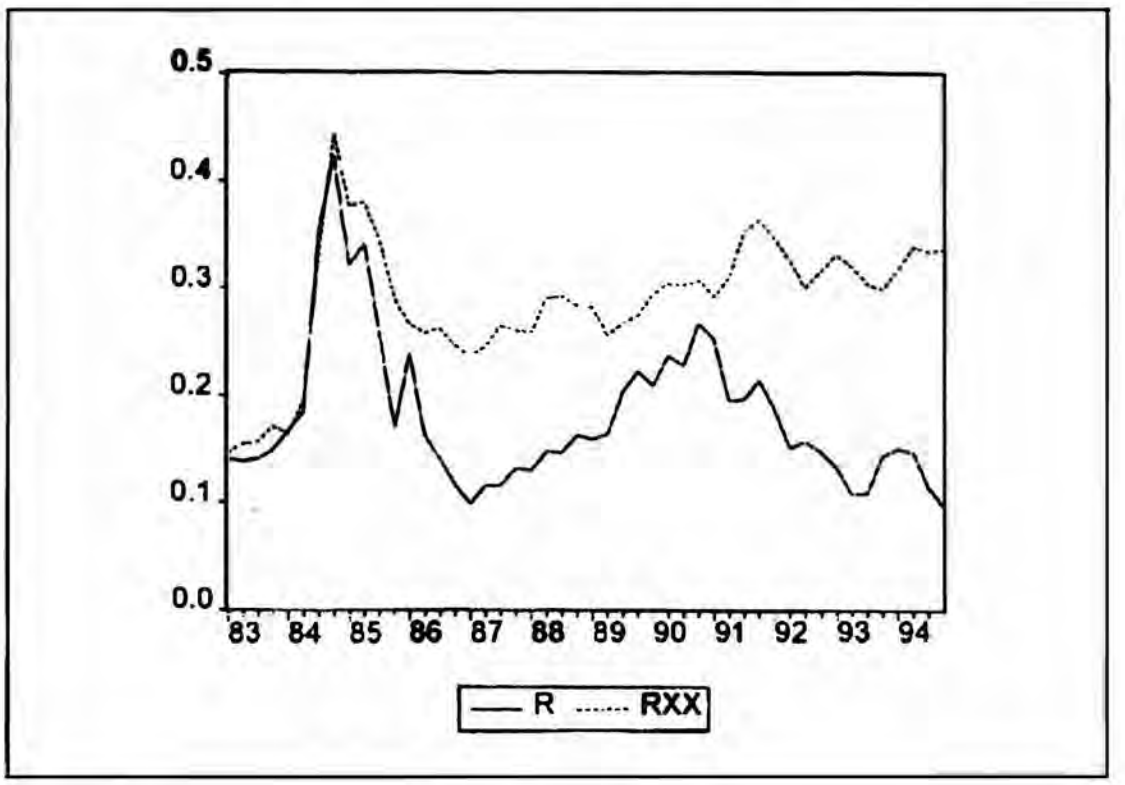
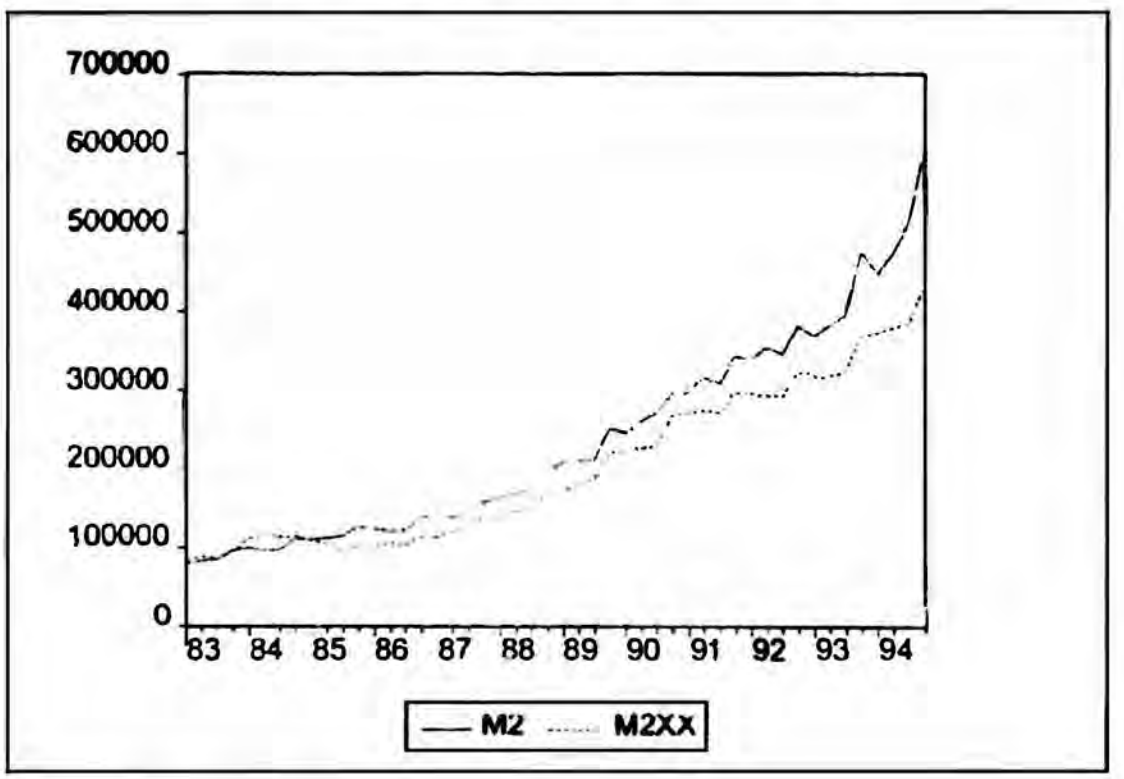


Chart 7B
Capital Account set to zero interest rate eqn.; with capital variable in M2 Demand Function
M2 = Actual M2; M2XX = Simulated M2



shows that real M2 demand would have been larger even in the absence of capital inflows.

Questions may be raised to simultaneity bias arising from the interest rate in the money demand equation and from the possible endogeneity of capital flows with respect to the domestic interest rate. The equations in the second and third column of Tables 2 and 3 were re-estimated using instrumental variables. The results are shown in the fifth and sixth columns of Tables 2 and 3. The results for the interest rate are identical while those for money demand show slightly larger coefficient magnitudes with no changes in their degree of significance.

5.2 Real Consumption Demand and Capital Flows

The estimation results for the real consumption function are shown in Table 4. The first column of Table 4 shows the estimation results for the basic equation, when the capital flow variables are excluded. The coefficient on the real interest rate is negative as expected but insignificant, while that on output growth is significantly positive as expected.[5] The next column shows the results when the lagged real capital account is included, excluding the real interest rate as it is insignificant. The capital flow viable is scaled by lagged nominal M2 as in the previous cases. The lagged real capital account surprisingly enters negatively, as does the change in the real capital account, although neither of these is statistically significant.

Since different types of capital may have different effects on consumption demand, the types of capital flows were included separately in the consumption function. The third column in Table 4 shows the effects of real FDI on consumption. The coefficients on these are negative but insignificant. The theoretical presumption is that to the extent that FDI finances investment and imports of capital goods, FDI would not significantly affect present consumption. In contrast, portfolio inflows are thought to increase consumption demand as they tend to increase bank deposits and hence, bank loans and consumption. The fourth column in Table 4 shows that lagged real portfolio inflows have a positive and near significant effect on real consumption demand.

In the effect of capital flows on consumption demand works primarily through an availability of bank credit channel, this would have the effect of reducing the coefficient on the capital account and portfolio investment. In Table 5, real M2 is sued as a proxy for credit availability in the consumption equation. Lagged real M2 is significantly positive as expected. When the real interest rate is dropped from the equation as it is insignificant, the growth of real M2 is still significantly positive. The second column of Table 5 shows the results when the real capital

[5]The real interest rate used here is ex-post, calculated as the difference between the nominal interest rate and the actual rate of inflation.

Table 4. Estimation Results for the Real Consumption Demand Equation
Dependent Variable: Log of Real Consumption

	Basic Equation	With Capital Account	With Real FDI	With Real Portfolio Inflows
Constant	0.340 (0.051)	0.634 (1.108)	-0.174 (0.907)	0.921 (1.05)
Change in Real Interest Rate	-0.101 (0.324)			
Real Interest Rate (-1)	0.220 (0.318)			
Real Output Growth	0.789 (0.104)	0.763 (0.106)	0.852 (0.104)	0.846 (0.102)
Log of Real Output (-1)	0.147 (01.77)	0.133 (0.184)	0.365 (0.221)	0.398 (0.212)
Log of Real Consumption (-1)	0.819 (0.121)	0.809 (0.133)	0.641 (0.176)	0.512 (0.180)
Growth in Real Consumption (-1)	-0.258 (0.086)	-0.230 (0.087)	-0.172 (0.090)	-0.119 (0.909)
Real Capital Account (-1)		-0.117 (0.174)		
Change in Real Capital Account		-0.232 (0.121)		
Change in Real FDI (-1)			-0.300 (1.170)	
Change in Real FDI (-1)			-0.268 (1.358)	
Real Portfolio Inflows (-1)				2.247 (1.221)
Change in Real Portfolio Inflows				2.137 (1.743)
Adjusted R^2	0.87	0.87	0.90	0.91
DW Statistic	1.84	2.06	2.04	1.92

account variable is included in a consumption function with a variable for the availability of credit. The coefficients on the capital account variables are still insignificant, but including real M2 does reduce slightly the size of the coefficient on the lagged capital account variable. The third column shows the results when FDI is included in the consumption function. The coefficients on FDI are positive

Table 5. Estimation Results for the Real Consumption Demand Including a Credit Availability
Dependent Variable: Log of Real Consumption

	Basic Equation	With Capital Account	With Real FDI	With Real Portfolio Inflows
Constant	5.012 (1.831)	5.190 (1.866)	4.748 (1.501)	4.481 (1.473)
Change in Real Interest Rate	-0.060 (0.356)			
Real Interest Rate (-1)	-0.033 (0.358)			
Real Output Growth	0.379 (0.173)	0.351 (0.162)	0.611 (0.135)	0.633 (0.134)
Log of Real Output (-1)	-0.425 (0.250)	-0.424 (0.269)	-0.031 0.(213)	0.080 (0.219)
Log of Real Consumption (-1)	0.714 (0.125)	0.633 (0.134)	0.186 0.(193)	0.184 (0.194)
Growth in Real Consumption (-1)	-0.197 (0.096)	-0.162 (0.087)	0.033 (0.098)	0.034 (0.098)
Log of Real M2 (-1)	0.288 (0.106)	0.352 (0.124)	0.368 (0.095)	0.344 (0.108)
Growth in Real M2	0.381 (0.202)	0.403 (0.183)	0.222 (0.174)	0.220 (0.165)
Real Capital Account (-1)		-0.172 (0.165)		
Growth in Real Capital Account		-0.197 (0.112)		
Change in Real FDI (-1)			0.571 (1.055)	
Change in Real FDI			0.261 (1.231)	
Real Portfolio Inflows (-1)				0.215 (1.282)
Change in Real Portfolio Inflows				0.688 (1.651)
Adjusted R^2	0.89	0.87	0.92	0.92
DW Statistic	1.61	1.62	1.55	1.59

but statistically insignificant. The fourth column shows the results when portfolio flows are included in the consumption equation. The coefficients on portfolio inflows are positive but not statistically significant.

Overall, the results in Tables 4 and 5 show that in general, capital flows do not have a direct and significant effect on consumption demand. While portfolio inflows have a near significant positive effect on consumption demand, this effect appears to work through the availability of credit channel proxied by real M2, as real M2 consistently shows a significantly positive effect on consumption demand. In fact, the near significance of portfolio inflows in the consumption demand equation disappears when real M2 is included in the equation. FDI flows do not tend to raise consumption demand.

5.3 Real Investment Demand and Capital Flows

Table 6 shows the results of estimating an equation of real investment demand.[6] In the first column, no capital flow variables are included. Output growth and lagged output growth are significantly positive. The real interest rate enters negatively but is not significant. Lagged investment is significantly positive, in contrast with theoretical predictions. The second column shows the results when the lagged real capital account and the growth in the real capital account are included. They both have significant positive coefficients. The third column shows the effects of lagged changes in real FDI and the growth of real FDI on investment demand. While both have positive coefficients, neither of them is significant. The fourth column shows that portfolio inflows do not have a statistically significant effect on investment, and they have unexpected negative signs. Overall, the results show that level for the lagged real capital account and real capital account growth significantly affect investment demand in a positive manner. However, it is unclear whether this is through FDI or portfolio inflows as both of these variable are statistically insignificant. Given the incorrect negative sign on the portfolio inflows variable, it is more likely that the overall positive effect of capital inflows on investment demand comes form real FDI growth.

6. SUMMARY AND CONCLUSIONS

This study attempts to empirically assess the extent to which capital inflows have affected macroeconomic performance in the Philippines using quarterly data from 1982 to 1995. It examines the effects of capital inflows on interest rates, real money demand, real consumption demand, and real investment demand. The empirical methodology follows Kamin and Wood (1996) and estimates the impact of capital inflows on money demand indirectly, via interest rates, as well as directly.

[6]The investment data used here include both private and public gross capital formation as the data for gross private capital formation alone are not available on a quarterly basis.

Table 6. Estimation Results for the Real Investment Demand Equation
Dependent Variable: Log of Real Investment Demand

	Basic Equation	With Capital Account	With Real FDI	With Real Portfolio Inflows
Constant	-8.478	-13.029	-18.155	-18.988
	(2.800)	(3.548)	(2.896)	(3.519)
Real Interest Rate (-1)	-0.350	-0.995		
	(0.890)	(0.972)		
Change in	0.202	-1.004		
Real Interest Rate	(0.870)	(0.954)		
Growth in Real Output	1.452	1.664	1.734	1.790
	(0.233)	(0.236)	(0.204)	(0.216)
Log of Real Output (-1)	1.042	1.565	2.252	2.296
	(0.292)	(0.392)	(0.325)	(0.367)
Log of Real	0.612	0.442	0.135	0.169
Investment (-1)	(0.111)	(0.146)	(0.121)	(0.121)
Growth in Real	0.013	-0.004	0.027	0.040
Investment (-1)	(0.124)	(0.119)	(0.101)	(0.099)
Real Capital Account (-1)		1.210		
		(0.492)		
Growth in		0.991		
Real Capital Account		(0.305)		
Change in			3.035	
Real FDI (-1)			(2.983)	
Change in			1.831	
Real FDI			(0.531)	
Real Portfolio				-2.296
Inflows (-1)				(3.018)
Change in Real Portfolio				-6.579
Inflows (-1)				(4.419)
Adjusted R^2	0.76	0.79	0.85	0.86
DW Statistic	2.05	2.06	2.22	2.20

Error correction versions of the money demand and interest rate equations are estimated. To the degree that capital flows significantly affect interest rates and money demand, the simulated paths of these, assuming no capital inflows, would be different from the actual. This would provide evidence that financial markets have become more integrated as factors other than purely domestic policies affect macroeconomic performance. In the Philippines, large capital inflows occurred

beginning in late 1989. Consistent with the theoretical literature on the effects of large capital inflows, the Philippine peso appreciated in real terms, and the current account generally deteriorated in these periods.

The results show that the capital account has a significantly negative effect on changes in the domestic interest rate. The same result is obtained when the change in international reserves is used as the capital flow variable. These results imply that interest rates would have been higher in the absence of capital inflows.

In contrast, the simulation results show that real M2 demand would have continued its rising trend even in the absence of capital inflows, using the capital account as the capital flow variable. This finding suggests that factors other than capital flows per se, such as successful domestic reform measures which lowered inflation, may be responsible for increased money demand and the expansion of monetary aggregates.

While the results suggest that reserve changes have a structural relationship with interest rates, it appears that the demand for money is influenced by the capital account, although not primarily by increasing reserves. This seems to be consistent with the data that show that in the face of large capital inflows, the Central Bank accumulated large amounts of reserves without causing any large increases in the base money, indicating that these flows were sterilized. There may be other channels of influence from the capital account to money demand and the importance of these may have changed over time. The return to voluntary capital markets, reductions in the public sector deficit, financial liberalization, and changes in the money multiplier may have become more important.

Capital flows do not have a significant effect on real consumption demand. While real portfolio inflows have a nearly significant positive impact on real consumption demand, this effect appears to work through the availability of credit channel. The lagged level of the real capital account and real capital account growth significantly affect real investment demand in a positive manner, more likely through real FDI growth rather than real portfolio inflows.

The results also lend support to the notion that FDI flows are preferable to portfolio inflows from a growth perspective, as the former tend to be channeled to real investment demand rather than real consumption demand. In the final analysis, policymakers cannot attribute macro performance to capital flows alone. While the importance of external factors on domestic macroeconomic performance in an integrated world is heightened by capital flows, the effects of these also depend on the degree to which the monetary authorities can control the money supply or the availability of credit.

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