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Capital Mobility for Developing Countries May Not Be So High

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ABSTRACT

International capital flows to developing countries have taken on considerable policy importance in recent years. There is disagreement, however, about whether financial capital mobility has become so high that developing countries have little ability to sterilize capital flows. This paper reviews several popular methods of estimating the degree of capital mobility for developing countries and shows that they are subject to potentially important upward biases due to inappropriate assumptions concerning the roles of domestic inflation and sterilization. Corrections for these factors can cut estimates of capital mobility by one half or more.

JEL Classification: F3, O1, G0.

Key Words: Sterilization, Capital Mobility, Developing Countries.

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1. Introduction

The degree of international capital mobility facing developing countries has been a major topic of recent research. This is not surprising, since it has important implications for a wide range of policy issues including the ability of countries to follow autonomous monetary policy in the short run under pegged exchange rates. While the results of individual studies vary, the most common conclusion is that for many developing countries international capital mobility is high and growing.

The purpose of this paper is to question this emerging consensus concerning high international capital mobility and developing countries. We argue in the following section that many recent empirical studies have suffered from seriously flawed methodologies.[1] The use of covered interest parity tests is of limited value. While deviations from parity are clear evidence of limited capital mobility, the converse does not hold. Thus covered parity is a necessary but not sufficient condition for perfect capital mobility. Finding that covered parity holds is equally consistent with either high or low capital mobility.

Edwards and Khan's (1985) suggested formulation appropriately focuses on uncovered rather than covered parity. It attempts to measure the degree to which domestic rate movements are the result of external influences. However, its specific formulation can lead to an upward bias in estimates for high_inflation countries because it attributes the correlation between expected depreciation and domestic interest rates to external factors. To the extent that the Fisher open

[1] We do not consider criticisms of the widely discussed approach suggested by Feldstein and Horioka which focuses on national savings_investment correlations. For recent surveys of this literature, see Frankel (1992), Montiel (1994), Obstfeld (1995) and Tesar (1991).

model holds and domestic inflation is a significant determinant of both domestic nominal interest rates and the expected rate of depreciation, the Edwards_Khan approach will overestimate international capital mobility.

An even greater upward bias is generated by the innovative extension of the Edwards_Khan approach pioneered by Haque and Montiel (1991) and extended by Dooley and Mathieson (1994). The Edwards_Khan approach requires data on market_clearing domestic interest rates. For many developing countries such data were not available until very recently, leaving few degrees of freedom for estimation. Haque and Montiel therefore suggest an approach based in effect on estimates of the difference between market_clearing rates with and without capital flows. While a valuable extension, its implementation was based on the implicit assumption that there was no sterilization of capital flows. There is considerable empirical evidence, however, that many developing countries engage in substantial partial sterilization of capital inflows. We show that failure to take sterilization into account can lead to an upward bias in estimates based on the Haque_Montiel methodology. In Section 3 we consider the likely empirical magnitude of this bias, and find it to be substantial.

2. Some Popular Measures of Capital Mobility

2.1 Covered Interest Parity

One widely used measure of the degree of international capital mobility is the covered interest differential.[2] Indeed, Chinn and Dooley (1995) refer to the "magnitude of the covered interest differential" as "the most common measure of capital market integration" (p. 3). Studies using this measure tend to conclude that the degree of capital mobility facing the developing as well as

[2] For recent studies examining covered interest parity in developing countries, see Chinn and Frankel (1994), Chinn

industrial countries is quite high (Dooley and Chinn 1995). Chinn and Dooley make the important point that such results may be misleading as a general characterization of capital mobility for developing countries because it can be applied only to countries where forward rate quotes are available, and these will be the countries where financial liberalization has progressed the most. Furthermore, they point out that even where international arbitrage is high for some classes of domestic financial assets, this may be of little usefulness in measuring the overall degree of openness of repressed financial markets since there may be only limited arbitrage opportunities between the open and repressed sectors domestically.[3]

There is an even more fundamental difficulty, however, with the use of covered interest differentials as a measure of capital mobility or financial market integration. The presence of a covered interest differential is a valid indicator that capital mobility is less than perfect. The absence of a covered interest differential gives absolutely no indication of the degree of international capital mobility. This is easily demonstrated with the use of the diagrammatic analysis developed in the so_called "modern" theory of foreign exchange which became popular in the 1960s and 1970s.[4]

Essentially, the modern theory combined the covered interest parity and speculative theories of the forward rate. According to the covered parity theory, some combination of the spot and forward exchange rates and domestic and foreign interest rates will adjust to eliminate any incentives for profitable covered interest arbitrage. According to the speculative theory, the forward rate will equal the expected future spot rate, the criterion for simple financial market

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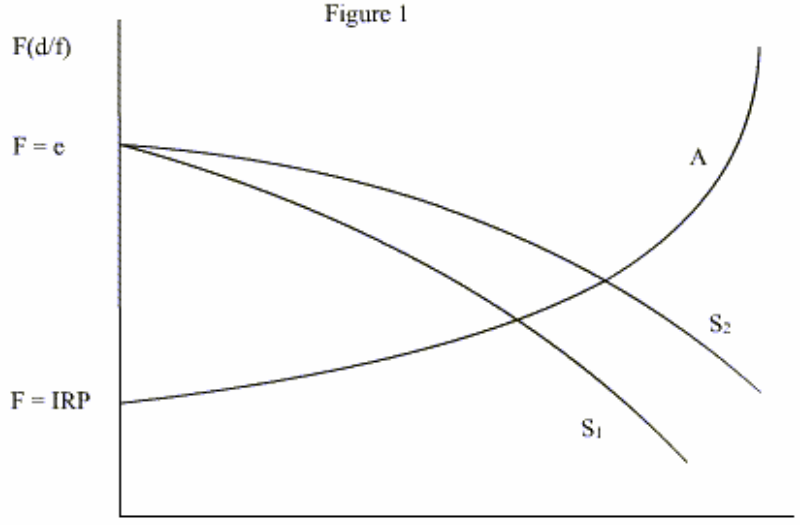
and Dooley (1995), Dooley and Chinn (1995) and Goldstein and Mussa (1993).

[3] See, for example, Marston (1994). A similar point holds with respect to the high degree of integration within the Eurocurrency markets. There are virtually never significant deviations from covered interest parity within these markets, but there have often been substantial deviations between onshore and offshore interest rates, indicating a lack of full integration among many national financial markets.

[4] For recent examples of its use, see Hallwood and MacDonald (1994) and Levi (1983).

efficiency with risk neutral agents. In the covered parity theory, covered arbitrage dominates and most, or all of, the adjustment can fall on the forward premium or discount, leaving the interest differential unchanged. In the speculative theory, speculation, i.e. uncovered interest arbitrage, dominates and interest differentials will be forced to conform to speculative expectations. Then uncovered parity implies covered parity but not vice versa. The modern theory took both views as special cases, showing that the forward rate would be determined by the positions and relative elasticities of the covered arbitrage and speculative schedules as illustrated in Figure 1.

Figure 1



Forward purchase of f by arbitrageurs = sales of f by speculator, corresponds to spot capital flows.

For expositional convenience we assume that the net demand for forward exchange to cover trade related payments and receipts is zero and the spot rate is fixed. The speculative schedule, S, relates the quantity of forward exchange offered by speculators (Q_{fs}) to the difference between the forward and expected future spot rates and hence is downward sloping. Where S crosses the vertical axis, the speculative demands for forward exchange are zero. This is where the forward rate, *F*, equals the expected future spot rate, *e*. The covered arbitrage

schedule, *A*, relates the forward rate to the demand for forward exchange by arbitragers (Q_{fa}) to cover their spot market investments, and is a function of the covered interest rate differential. *A* slopes upward. It crosses the vertical axis where *F* equals the interest rate differential, *ID*, i.e., where the covered interest rate differential is zero. The intersection of the *S* and *A* schedules determines the forward rate and the amount of capital flow (Q). The condition for covered interest parity to hold is that the speculative schedule intersects the covered arbitrage schedule where the latter is perfectly elastic, hence, its association with perfect capital mobility. Portfolio theory suggests, however, that while in the absence of controls the covered arbitrage schedule should be perfectly elastic at the point of zero net capital flows, after some point it should begin to become progressively less elastic as increasing percentages of portfolios are invested abroad.[5]

The actual amount of capital that flows is a function of both the arbitrage and speculative schedules. Where speculators are highly risk averse or constrained in the size of the open positions they could take, then the speculative schedule becomes inelastic, as illustrated in Figure 1. In such circumstances the speculative schedule (*S*) could intersect the covered arbitrage schedule (*A*) close to the origin. As a consequence, the covered interest parity condition could be met even though capital flows in response to interest differentials were quite small. Paradoxically, an increase in the elasticity of the speculative schedule from S_1 to S_2 would lead to a larger deviation from covered parity, but would also lead to larger capital flows. Using the criterion of the magnitude of deviation from covered parity thus would give the false signal that capital mobility had fallen rather than risen.

In summary, substantial deviations from covered interest parity are a good indication that capital mobility is less than perfect. Among the industrial countries, periods of substantial

[5] See Officer and Willett (1970).

deviation from covered interest parity have usually coincided with the use of capital controls during major speculative attacks under pegged exchange rates. Thus, looking at covered interest differentials can sometimes provide useful information. Finding that covered interest parity holds, however, is consistent with either high or low capital mobility, and there is no good reason to presume that the magnitudes of deviations from interest parity will provide a reasonable proxy for the degree of international capital mobility.

2.2 Uncovered Interest Parity and the Edwards-Khan Approach

In terms of the modern theory, the appropriate measure of capital mobility is the extent to which uncovered rather than covered interest parity holds. Uncovered interest parity theory assumes that both the speculative and arbitrage schedules are perfectly elastic. Therefore capital would continue to flow until the two schedules were brought together by the adjustment of domestic interest rates so that the interest rate differential would equal the implied change in the forward rate. In an influential paper, Edwards and Khan (1985) make use of the uncovered interest parity approach to estimating capital mobility. Their basic idea is the construction of an index to indicate the extent of international influence on domestic interest rates. With perfect capital mobility, the domestic market-clearing interest rate, i, will equal the foreign interest rate i^f, adjusted for the expected change in the spot exchange rate,e dot ; that is

i `` = `` i sup f + ``e dot (1)

$$= i^* \qquad (2)$$

(for notational simplicity).

The criterion of capital mobility becomes in effect the degree to which domestic interest rates are determined by the uncovered interest parity conditions, specifically,

i `` = `` psi i sup * + `` (1-psi) ` i sup ϒ (3)

where i^{Υ} is the domestic market-clearing interest rate which would occur if there were no international capital flows, and $0 \leq P \leq 1$. Hence the extreme value of P=1 indicates perfect capital mobility, while P=0 indicates a completely closed capital account. As P increases from zero to one, so does the degree of financial openness of the economy. In general, *i* is a linear combination of i^* and i^{Υ}, and as such, *i* could be smaller or larger than i^*. However, for developing countries it is almost always true that $i > i^*$ where the relevant foreign country is an industrial country financial center such as the U.S., U.K., or Japan.

In what follows below, it will be useful to consider the two alternative forms of (3)

i `` - `` i sup * = `` (1-psi) ` (i sup ϒ - ` i sup *)

or

psi `` = ``{i`-`i sup ϒ} over {i sup * - ` i sup ϒ} (4)

Note that

{∂ psi} over {∂{∂ psi} over {∂ i sup ϒ} = ` {(i sup ϒ - ` i sup *) ` - `(i sup ϒ - `i)} over {(i sup ϒ - ` i sup *) sup 2} = {(i - ` i sup *)} over {(i sup ϒ - ` i sup *) sup 2}

Trivially, an increase in i^{Υ} increases P, as long as the numerator of P increases more than the denominator. This will always be the case as long as $i > i^*$. Hence for most developing countries an increase in i^{Υ} reflects a higher degree of financial openness as a result of i^{Υ} (and *i*) moving towards i^* (see (3) above).

Haque and Montiel (1991) extended this approach by developing a way to estimate domestic market_clearing interest rates where direct data are not available. Reisen and Yeches (1993) suggested a further amendment for use where domestic interest rate data are available, but

only for a different class of assets than those which are commonly internationally arbitraged. Dooley and Mathieson (1994) also draw upon Haque and Montiel's approach, but use a broader definition of the demand for real money balances, including expected inflation, proxied by the one_period_ahead actual rate of inflation, and use the rate of interest on time deposits as a measure of the return on close substitutes to narrow money.

All of these applications share a common difficulty which leads to an overestimate of capital mobility for countries where domestic inflation is high. The problem comes from attributing the expected change in the exchange rate to purely international forces. In considering the contrast between interest rate determination in closed and open economies, Edwards and Khan discuss the Fisher effect and assume that domestic nominal interest rates will be a function of domestic (expected) inflation. However, they go on to argue that "[in] the extreme case of a fully open economy, domestic monetary conditions will have no direct effect, and the inflation rate will depend solely on foreign inflation and the (actual) rate of devaluation" (p. 395).

This is a questionable generalization, however. Under a fixed exchange rate this could be true, but we would not expect it to be correct under a flexible exchange rate or a regime of frequent exchange rate adjustments such as a crawling peg. Surely under such regimes domestic monetary developments would have a strong effect on the expected rate of depreciation. Indeed, under the purchasing power parity assumptions of the Fisher Open Model, the expected rate of depreciation would depend entirely on the degree to which domestic monetary expansion generated a different rate of inflation from that abroad. Of course, the empirical evidence does not confirm the strong form of the Fisher Open Model,[6] but there can be little doubt that for

[6] See, for example. Chinn and Frankel (1994), Goldstein and Mussa (1993),and Isard (1995). For a recent analysis of UIP showing that the no_arbitrage condition implies that the forward rate should differ from the expected future spot rate by a term premium which may be influenced by uncertainty see Frachot (1996).

countries where inflation is significant, this will tend both to raise nominal interest rates and increase the expected rate of depreciation.

To the extent that this effect is important, domestic influences on the domestic interest rate would be falsely ascribed to international arbitrage in the Edwards_Khan approach, leading to an upward bias in the estimated degree of capital mobility. This bias would be greater, the higher is domestic inflation. When we compare Haque and Montiel's estimates of capital mobility with the average rates of inflation in those countries, we find a positive, albeit not statistically significant, correlation (see Table 1). While not entirely free of problems of its own, one method of avoiding the inflation bias is to focus on real interest rate linkages.[7] This is similar to attributing the correlation between proxies for expected inflation and expected depreciation to domestic inflation.[8]

3. The Haque_Montiel Extension

As noted above, Haque and Montiel extended the Edwards_Khan approach to make it applicable to countries where data on domestic market_clearing interest rates were not available. The basic idea is to estimate money supply and demand functions to calculate in effect the unobserved domestic market_clearing interest rate. This is a valuable innovation. There is a major problem,

[7] See, for example, Chinn and Frankel (1994), Frankel and Okongwu (1995). and Glick and Hutchison (1990). Glick and Hutchison (1990) report results for some of the more highly liberalized Pacific Basin countries consistent with greater real interest rate linkages in liberalized markets. Chinn and Frankel (1994, 1995) find sensible results for the relative influence of U.S. and Japanese interest rates on developing countries in the Pacific. Frankel and Okongwu (1995), however, find substantially greater than one to one effects of changes in U.S. real interest rates on those of a number of developing countries, suggesting that studies of real interest rate linkages should be treated with considerable caution.

[8] One major problem with the empirical implementation of this approach has been the difficultly of finding good proxies for expected depreciation. Forward rates, themselves far from an ideal proxy, are available for only a few developing countries. The most common practice has been to use ex post realizations of the change in the spot rate, but as several writers have noted this is especially problematic under adjustably pegged rates because of the well-known peso problem. A promising approach has recently been used by Chinn and Frankel (1994) and Frankel and Okongwu (1995) based on survey data for a number of developing countries.

however, with how Haque and Montiel, and following them, Dooley and Mathieson, implemented this approach.[9]

Without explicitly noting it, Haque and Montiel assumed that the domestic monetary authorities follow a policy of complete non-sterilization so that capital flows cause an equivalent change in the domestic money supply. However, there is considerable empirical evidence that many developing countries engage in considerable short_run sterilization, thus dampening the impact of capital flows on the domestic money supply.[10] Failure to take sterilization into consideration leads to a substantial upward bias in estimates of capital mobility.[11]

Haque and Montiel define the money supply as follows:

$$\begin{aligned} M &\Leftarrow R + D \\ &\Leftarrow R_{-1} + D +)R \\ &\Leftarrow R_{-1} + D + CA + KA_G + KA_P \end{aligned} \qquad (6)$$

where M is the (domestic) money stock, R is the domestic currency value of foreign exchange reserves, D is the stock of domestic credit, and CA, KA_G, and KA_P are the domestic currency values of the current account, public sector capital account, and private sector capital account respectively. *In the absence of sterilization* there is a one to one relationship between changes in international reserves and the domestic base. Furthermore, assume that there is no interdependence among the three components of the balance of payments. In this case the

[9]On the costs of sterilization and the policy problems caused by financial capital flows, see the analysis and references in Calvo (1991), Calvo, Leiderman, and Reinhart (1994), and Dean (1996).

[10] See, for example, Dean (1996), Fry (1994), Joyce (1991), Kwack (1994) and Spiegel (1995).

[11]With the exception of Myanmar, Dooley and Mathieson found estimates of P to be close to one for all of the countries in their sample: .97 for Indonesia, .95 for Korea, .91 for Malaysia, 1.11 for the Philippines, and .76 for Sri Lanka. They suggest that for many countries in their sample the measured degree of capital mobility seems implausibly high and suggest that the results may be distorted by the failure to identify a suitable reaction function for the monetary authority (p. 70). Our analysis shows that their concern was well taken.

hypothetical and non-observable *money stock in the absence of private capital flows*, M^{Υ}, equals

$$M^{\Upsilon} \Leftarrow M - KA_P$$

$$\Leftarrow R_{-1} + D + CA + KA_G \qquad (7)$$

Haque and Montiel's major contribution was to modify Edward and Khan's analysis for the situation where data on domestic market-determined interest rates are unobservable. First Haque and Montiel postulate a standard money demand function.

ln({M sup d} over P) `` = `` alpha sub 0 + `` alpha sub 1 i `` + `` alpha sub 2 ln `` y + `` ln (M over P) sub {-1} (8)

i^{Υ} is then defined as that interest rate which clears the money market in the sense that

ln {M sup Υ} over P ``=``ln {M sup d} over P .

Next, solving the resulting equation for i^{Υ}

i sup Υ = `` - `` {alpha sub 0} over {alpha sub 1} `` + `` 1 over {alpha sub 1} `` ln ``{M sup Υ } over P `` - ``{alpha sub 2} over {alpha sub 1} `` ln y `` - `` {alpha sub 3} over {alpha sub 1} `` ln (M over P) sub {-1} (9)

and substituting (9) into equation (3) eliminates the unobservable variable i^{Υ} . *i* is now a function of the foreign interest rate plus forward premium and the variables of the money demand equation. In the final step, *i* is substituted into the money market equation resulting in the following estimable equation:

ln {M over P} `` = ``pi sub 0 + `` pi sub 1 i sup * `` + pi sub 2 ln ``{M sup $\Upsilon$} over p `` + pi sub 2 ln ``y ``+ `` pi sub 4 ln ``(M over p) sub {-1}

where the Bs are functions of the underlying money demand parameters $\forall$ and P, which are

retrieved using nonlinear instrumental variable estimation.

Now consider the effects of central bank policies to sterilize the effects of international reserve flows on the domestic money supply. The coefficient of sterilization 2, say, may run from 0 (no sterilization) to 1 (complete sterilization). Incorporating 2 into (7) above then results in

$$M^{\gamma} \leftarrow M - (1-2)\, KA_P \qquad (7')$$

Since the Haque-Montiel approach operates through the effects of capital flows on the money supply, any breaking of this linkage through even partial sterilization can substantially affect the empirical estimates. Since i^{γ} is a function of M^{γ}, and M^{γ} is a function of the coefficient of sterilization (*2*) by the central bank, we have

psi `` = ``{i sup ϒ`(2)``-`i} over {i sup ϒ``(2) - ` i sup *}(12)

Using equation (7') and total differentiating (9), we obtain:

d ` i sup ϒ=``1 over {alpha sub 1} ({dM sup ϒ} over {M sup ϒ}``-``{dp over p}) `` - `` {alpha sub 2} over {alpha sub 1} {dy} over y ``- `` {alpha sub 3} over {alpha sub 1} [({dM} over M) sub {-1}``-``({dp} over p) sub {-1})]

=``1 over {alpha sub 1} ({dS} over {M sup ϒ}``-{dKA sub p} over {M sup ϒ}`` -``{dp over p}) `` - `` {alpha sub 2} over {alpha sub 1} {dy} over y ``- `` {alpha sub 3} over {alpha sub 1} [({dM} over M) sub {-1}``-``({dp} over p) sub {-1})](13)

Note that here we have assumed $dM^{\gamma} = dM - dKA_p = dS - dKA_p$.

Therefore, the effect of sterilization on i^{Υ} and on the estimate of the degree of capital mobility is as follows:

{∂ psi} over {∂2} `= `` {∂ psi} over {∂ i sup ϒ} * {∂ i sup ϒ} over {∂ M sup ϒ} * {∂ M sup ϒ } over {∂ 2}

= {(i - ` i sup *)} over {(i sup ϒ - ` i sup *) sup 2} * 1 over {alpha sub 1 M sup ϒ} * KA sub p

= {(i - ` i sup *)} over {(i sup ϒ - ` i sup *) sup 2} * {KA sub p} over {M sup ϒ} * 1 over {alpha sub 1} ``< ``0 (14)

Hence an increase in the sterilization coefficient will increase the estimate of the degree of capital mobility relative to its true value. As equation (14) shows, the larger the interest rate spread, the higher the ratio of private sector capital flows to the money supply, and the lower the (semi) interest rate elasticity in the money demand function, the larger the effect of a change in the sterilization coefficient on the index of capital mobility.

The economic intuition is as follows. In effect, Haque and Montiel's assumption of no sterilization exaggerates the effect of capital inflows on the domestic money supply by the amount of sterilization. This leads to an overstatement of the difference between the observed money supply and that which would have been obtained with no capital flows. In turn, this increases the implicit difference between the actual domestic interest rate, *i*, and the interest rate that would have been obtained in a closed economy, i^{Υ}, thus exaggerating the implied influence of external consideration on the domestic interest rate and then biasing the estimate of P upward.

For a given coefficient of sterilization, the difference in the implied domestic money supply in the absence of capital flows would be higher, the greater was the actual amount of capital movement. The difference in the counter-factual money supply would have a bigger effect on the difference between i and i^{Υ}, the lower the semi-interest elasticity of the demand for money.

While the sign in equation (14) is clearly negative, we have yet to show that the effect is economically significant. It is only in that case that our results potentially explains why so many studies have found large values of P even for countries where one would not have expected so a priori. Hence the crucial question is how the combination of the interest rate spreads, the ratio of the private sector capital account to the money stock in the absence of private capital flows, and the (semi) elasticity of interest rates in a money demand function empirically work together.

Reviewing a large body of literature for developed countries, Laidler (1993) reports estimates of $\forall_1$ in the -0.12 and -0.15 range for short term interest rates, and -0.17 to -0.20 for long term interest rates, using a narrow money supply concept. The following tables show the effect on the degree of capital mobility using various combinations of the three ratios. The ranges for the interest rate differential and capital flows to money supply ratios were chosen after reviewing data for a number of developing countries. For the interest rate differential we alternatively assumed a low (0.04), medium (0.08) and high (0.12) value. For the ratio of capital flows to money supply, the values are low (0.02), medium (0.1) and high (0.2). Finally, we calculated the product of the three ratios for the two values of $\forall_1$ -- 0.1 (Table 2) and 0.15 (Table 3). The results appear somewhat disappointing at first glance. Even for a low $\forall_1$ of -0.10, the maximum effect would only be 0.24. For a country that went from no sterilization to fifty percent sterilization, this would lower a P of 0.9 to about 0.78. This would make a noticeable, but not a substantial difference.

However, estimates of $\forall_1$ for developing countries are typically considerably lower than those reported by Laidler (1993). For example, Haque and Montiel (1991) list estimates for 15 developing countries. The maximum value for these countries is -0.041 (Indonesia) and the average value is quite low (-0.014). However, only two of the coefficients are significantly different from zero (Indonesia and Morocco). Clearly from (14) above, the lower the interest rate coefficient, the larger the effect of a change in the degree of sterilization on the degree of capital mobility. Using the maximum and average coefficient in the two tables above drastically changes the impact of sterilization on P (see Tables 4 and 5 below). Hence assuming a sterilization rate of 0.5, a quite common estimate, the index of capital mobility would be lowered by as much as 0.86 for the case of the average value of $\forall_1$ for the developing countries analyzed by Haque and Montiel.[12] Thus, for example, an estimate of P of 0.9 would fall to 0.04. Clearly, this suggests the likelihood of a very substantial upward bias in estimates of capital mobility using the Haque and Montiel method without adjusting for the degree of sterilization. It also raises the possibility that estimates of capital mobility using this method would vary over time with changes in the degree of sterilization as well as changes in the degree of capital mobility.[13]

4. Concluding Remarks

Our analysis suggests that capital mobility facing developing countries is not as high as some recent studies have concluded. In particular, taking sterilization into account sharply lowers estimates of capital mobility using the extension of Edwards and Khan's approach pioneered by

[12]For Korea (1971-1991), Ahn (1997) finds estimates of P that drop from 0.741 if no sterilization is assumed, to 0.428 with 50 percent sterilization, and to 0.151 with 80 percent sterilization. Estimates of sterilization coefficients for Korea have ranged from -0.63 to -0.93. See Joyce (1991), Kim (1990), Kwack (1994), and Lee (1984).

Haque and Montiel. This in turn helps explain why many developing countries appear to have been able to engage in substantial short_run sterilization of capital flows.

Our analysis does not challenge the conclusion that interest rate developments in the industrial countries can have a substantial impact on financial conditions in many developing countries or that financial liberalization has led to substantial increases in international capital flows. It does support the view, however, that many developing countries still retain scope for considerable short_run monetary autonomy which may be used for better or for worse. It is important to remember that substantial capital mobility and perfect capital mobility are not synonymous.

[13]On time varying estimtes of capital mobility see Reisen and Yeches (1993).

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