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ABSTRACT

Facing massive capital inflows that put downward pressure on the real exchange rate, some economists have recommended a liberalization of capital outflows. Empirically, however, the removal of capital outflow controls has been shown to stimulate a net inflow of capital in several experiences, such as Britain in 1979, New Zealand in 1984, and Yugoslavia in 1990. Numerous measures to liberalize capital outflows in Chile during the 1990s do not appear either to have had a noticeable effect on stemming net capital inflows.

How can we explain the apparent paradox that reducing controls on capital outflows can actually increase net capital inflows? Our theoretical model provides one such explanation. A liberalization of capital outflows, understood here as a reduction in the minimum capital repatriation period for foreign investment, reduces the degree of "irreversibility" of the decision to invest in a given country. This, in turn, lowers the option value of waiting until uncertainty about a possible change in the rules of the game that affect investment in domestic assets is resolved, because foreign investors have the time to react before the tax is put in place. Thus, a reduction in the period of time that foreign investment is required to stay in the country is likely to increase --not decrease-- net foreign investment.

This result has an important policy implication. Liberalizing capital outflows may have significant benefits. But it may not be the appropriate policy to defend the real exchange rate in the presence of massive capital inflows, because it is likely to strengthen those very capital inflows.

1. INTRODUCTION

To the surprise of most analysts, Latin America has experienced a massive inflow of private capital since the end of the 1980s. This is in sharp contrast to the situation observed in the region during most of the 1980s, when almost no private capital flew into the region. Capital returned to Latin America in many different forms. Foreign direct investment, short and long term syndicated loans, public and private bond emissions in foreign financial markets, equity sales in foreign stock exchanges, and even repatriation of capital held by locals abroad all increased significantly during this period.

The sharp increase of capital inflows into the region since the late 1980s has resulted from the combination of a number of external and internal factors. Among the former are low international interest rates, poor economic performance in the industrial countries, and higher availability of international capital. On the internal front there are a number of political and economic developments which have been translated into a reduction of the risk premium that domestic and foreign investors require to hold Latin American securities (see, for example, Williamson (1991), Calvo et al (1992), and Culpeper and Griffith-Jones (1992)).

This renewed access to international capital markets provides a number of potential benefits to the region --e.g., increased availability of resources to finance capital formation in the region, and the possibility to sustain a more stable consumption path--, but also poses a number of policy dilemmas. Among the latter stands the difficulty of maintaining a reasonable degree of autonomy in monetary policy, without introducing excessive volatility to the nominal and --in presence of short term price and wage rigidity-- to the real exchange rate.

A growing empirical evidence suggest that an excessive instability of the real exchange rate has a depressive impact on exports (Caballero and Corbo, 1990) and on private real investment (Larraín and Vergara, 1991). On theoretical grounds, Krugman (1979), has shown the negative (and permanent) effect that a transitory appreciation of the real exchange rate, as a response to short run stabilization policy and other transitory shocks, can have on the tradable sector. Tornell (1990) has shown that

excessive instability in the real exchange rate and/or the real interest rate caused by short run speculative capital flows can have a negative impact on productive investment and, thus, on economic growth.

This paper is centered on the reaction of economic authorities in recipient countries to these increased capital inflows. In particular, it addresses the issue of whether a liberalization of capital outflows is an effective device to offset (at least partially) the inflow of capital. The paper is organized as follows. Section 2 discusses the policy reactions to capital inflows that are currently observed and recommended. The next section develops a theoretical model to assess the main question posed above. A conclusion closes the paper.

2. POLICY REACTIONS TO INCREASED CAPITAL INFLOWS

Calvo et al. (1992) have presented evidence showing that the massive inflow of capital into Latin America has led to a significant appreciation of real exchange rates, thereby deteriorating the competitiveness of the tradable sector in a number of countries in the region. This has happened precisely as many of these countries were implementing economic reforms to foster export led growth. Aimed at preventing a further real appreciation of the exchange rate, these countries have reacted by accumulating important amounts of international reserves. The monetary effect of this reserve accumulation has been (at least partially) sterilized, thus preventing a more rapid reduction of domestic interest rates and causing significant operational losses to central banks.

Other policy options have been recommended as well by economists to prevent a sharp real appreciation of the exchange rate. Among them, two figure prominently: increasing controls on capital inflows and liberalizing capital outflows. We turn to them now.

Stepping up controls on inflows

Some analysts have suggested the introduction of additional restrictions on short term speculative capital inflows. Others have criticized this position, basing their argument on the presumption that free capital mobility is optimal and that the capacity of regulators to impose capital inflow controls is low in an economy which is increasingly integrated to the rest of the world in goods, services, and finance.

Free capital mobility is clearly desirable in a world without distortions, with perfectly functioning markets and fully flexible prices and wages. The violation of these assumptions, however, gives a second-best justification for the use of capital controls. In fact, several economists have argued

in favor of some sort of capital controls (e.g., Tobin (1978), Krugman (1979), Giavazzi and Giovannini (1988)).

In a well-known 1978 article, Tobin argued that it was necessary "to put some sand in the wheels" of the extremely efficient international capital markets because financial flows--especially short term-- provoke wide exchange rate fluctuations which adversely affect the real sector. Thus, Tobin favored taxing short term capital flows. Krugman (1979) has argued in favor of protecting the tradable sector from transitory shocks which can lead to a transitory over-appreciation of the domestic currency, for example, with the application of controls on short-term capital inflows. Behind this recommendation lies the belief that a transitory appreciation of the real exchange rate can have a permanent depressing impact on exports and on efficient import substitution (e.g., due to the presence of hysteresis, which may arise as a result of dynamic comparative advantages). Summers (1988) suggests that taxes of various kinds are justified in the presence of speculation. Tornell (1990) has shown that Tobin taxes on short term international capital movements can improve welfare in the presence of irreversible investment¹. Calvo et al (1992), discussing different policy reactions to capital inflows, concludes that the least damaging option may be some form of capital control.

Liberalizing capital outflows

As noted, a number of specialists have opposed the use of controls on capital inflows. Some of them have argued in favor of an asymmetric liberalization of the capital account, moving faster in the relaxation or removal of controls on capital outflows than on inflows. Others have suggested that the

¹ Tornell's model, however, assumes that the only source of instability is external.

authorities should rely only on a more aggressive and widespread elimination of controls on capital outflows. They argue that liberalizing capital controls goes in the right direction, and liberalizing outflows first will help to reduce downward pressure on the real exchange rate. The argument, however, rests on two crucial assumptions: first, that controls are effective; and second, that liberalizing outflows effectively promotes a net capital outflow.

It is indeed more difficult for capital controls to be effective in a context of increasing globalization of capital markets, as the experience of industrialized countries, and especially that of Spain during 1987-89, suggests². But there is a long way from this to the assertion that capital controls are totally ineffective, as Williamson (1991) has argued. Furthermore, as it has become more difficult to implement controls on capital inflows, it has also become tougher to control outflows. Thus, the export of capital can be **de facto** liberalized even before restrictions are lifted. Thus, a removal of controls on capital outflows is no guarantee that there is going to be an increase (decrease) in net outflows (inflows).

Also, as Viñals (1990) has shown for Spain in 1987-89, when a substantial rate of return differential favors local currency assets, controls on inflows may be binding while controls on outflows may not be, even if capital outflows are more heavily restricted than inflows at the time. Thus, the relaxation or removal of controls on capital outflows may do little to increase the incentive to export capital, as may well have been the case in several Latin American countries (particularly in Chile) during the early 1990s.

² See, for example, The Economist (1992), and Viñals (1990).

Williamson (1991) has pointed out that the removal of capital outflow controls can stimulate a net inflow of capital, as it actually happened, for example, in Britain in 1979, New Zealand in 1984, and Yugoslavia in 1990. This apparent paradox may be the result of a decline in the degree of "irreversibility" of the decision to invest in a given country and/or an increase in a country's credibility not to engage in distortionary taxation, with a more open capital account³.

The case of Chile in the early 1990s⁴

Chile's experience during the early 1990s is an interesting case in point. Substantial inflows of capital came into the country after 1989. On average, net annual inflows of capital represented almost 7% of GDP during the period 1989-92; the peak was in 1990, when capital coming into the country added up to 11.8% of GDP in net terms. This massive inflow of resources was attracted by the consolidation of economic and political reforms in Chile, and by a wide gap between local and foreign interest rates. Not surprisingly, the real exchange rate suffered a significant appreciation of almost 9% both in 1991 and 1992.

Economic authorities reacted first by sterilizing capital inflows through bond emissions by the Central Bank. This affected the Bank's balance sheet, which was accumulating foreign exchange reserves and --at the same time-- building up domestic liabilities. The gap between domestic and foreign interest rates increased the operating loss of the Bank.

³ Nevertheless, as Sargent (1983) and Hanson (1992) suggest, investors should internalize that a country has substantial incentives to deviate from a regime of flexible exchange rates and capital mobility, to extract an inflation tax from its residents. The capacity of overcoming this time-inconsistency problem is one of the most important benefits that countries such as Chile and Mexico could expect from a free-trade agreement with the U.S.

⁴ For a detailed analysis of the Chilean experience with capital movements in the early 1990s, see Labán and Larraín (1993).

Sterilization was thus proving expensive, and also tended to perpetuate the interest rate differential, which in turn attracted further capital from abroad. Thus, in June 1991 the authorities decided to try capital inflow controls. They introduced a reserve requirement of 20% on all foreign credits, except those granted to exporters, which was increased to 30% in August 1992.

In addition to reserve requirements on capital inflows, the authorities also tried several measures to liberalize capital outflows. Some of them affected external credits, others were directed to foreign investment, and still others applied to trade. So far, these measures have not had a noticeable effect in offsetting net capital inflows.

Capital outflow liberalization in Chile has taken many different forms, among them those outlined below:

- i. Chilean commercial banks became authorized to invest abroad up to 25% of their foreign exchange deposits in March 1991.
- ii. Capital repatriation on foreign investments made through debt-equity swaps was allowed ahead of schedule after payment of a fee to the Central Bank (April 1991). Repatriation was further liberalized in October 1991 and then again in May 1992.
- iii. Exporters became allowed to keep a fraction of their export proceeds in April 1991 (before this they were required to surrender all proceeds to the Central Bank at the official exchange rate). This fraction was increased from 5% to 10% in March 1992.

- iv. Commercial banks became authorized to grant trade credits in other Latin American countries under the terms of the ALADI agreement⁵.
- v. Administrators of Pension Funds (AFPs) became allowed to invest abroad up to 1.5% of the value of their fund in May 1992, a limit that was raised to 3% in August of that year.
- vi. The capital repatriation period for regular foreign investments under D.L 600 (as different from debt-equity conversions) was reduced from 3 years to 1 year in March 1993.

⁵ ALADI is the Latin American Association for Integration (Asociación Latinoamericana de Integración).

3. IS A LIBERALIZATION OF CAPITAL OUTFLOWS AN EFFECTIVE DEVICE TO OFFSET CAPITAL INFLOWS? A THEORETICAL APPROXIMATION

In this section we present a minimal model to show that, under certain conditions, a relaxation of controls on capital outflows can lead --perhaps paradoxically-- to an increase in net capital inflows. If this is the case, such a policy will not be appropriate to defend the real exchange rate in the presence of massive capital inflows.

Before proceeding, however, it is important to stress that the analysis is not invariant to the type of restriction that is lifted. The relaxation of certain specific capital outflow controls is bound to lead to an increase in net capital outflows, such as Chile's decision to allow a portion of pension funds to be invested abroad. Liberalization of capital repatriation controls for foreign investment, however, is more likely to create a net inflow of capital. Let us now turn to the model.

Assume that initially capital inflows are fully liberalized but neither capital nor interest earnings on foreign investment can be repatriated before two years inside the country.

In period 1 the returns on a foreign riskless asset and on a domestic risky asset are r^* and r_h , respectively. Suppose, too, that the government will impose a tax on domestic capital in period 2 with probability $(1-q) < 1$, and thus the return on this asset is $r_1 = r_h - t$, where $t > 0$ is the tax on domestic capital⁶. If the tax is not imposed, local assets will perceive a return equal to that of period 1. Thus, there is less than full credibility on the sustainability of a stable tax regime for domestic investment⁷.

We assume that there are a continuum of risk neutral foreign investors maximizing the

⁶ Any other source of non diversifiable risk (e.g., expropriation risk) will lead to equivalent results.

⁷ This is a partial equilibrium model in which the tax rate and the rate of return on capital are independent of the stock of domestic capital accumulated. We also assume that the probability of policy reversion is exogenous. But it may well be the case that this probability decreases with the stock of domestic capital (see Rodrick (1989), Eaton and Gersovitz (1989), and Labán and Wolf (1993)).

expected present discounted value (EPDV) of their initial wealth, which is assumed to be one unit of the foreign asset at the beginning of period 1. We assume that returns satisfy the following restriction: $0 \leq r_1 < r^* < r_h$. Initially, if foreign investors decide to invest in domestic assets in period 1, they will have to remain holding the assets in period 2. Thus, although the domestic asset may be "liquid", the presence of capital outflow controls makes the decision of investing in domestic assets irreversible⁸.

Let V_1 be the EPDV of investing one unit of wealth in domestic capital at the beginning of period 1, and V_{0n} the EPDV associated with the decision of waiting given that holding the liquid foreign asset allows deferring commitment until the uncertainty concerning the tax regime is resolved. Defining $\beta > 0$ as the discount factor, assuming returns to be small and ignoring residual value, the values of these two assets (common to all foreign investors) under capital outflow controls are given by:

$$(1) \quad V_1(q) = r_h + b[qr_h + (1-q)r_1],$$

$$(2) \quad V_{0n}(q) = r^* + b[qr_h + (1-q)r^*],$$

where, if the restrictions on returns are satisfied, it is an equilibrium strategy to enter (not enter) in period 2 if the program is maintained (collapses). At the beginning of period 1, each investor's optimization program is given by:

$$(3) \quad V_n^*(q) = \max[V_1(q), V_{0n}(q)],$$

⁸ For a formal presentation of irreversible investment models and their implications, see Bernanke (1983), Dixit (1990), and Pindyck (1991).

This equation implicitly defines the threshold level of q that will render investment in domestic assets the preferred option before uncertainty about the tax regime is resolved, $[V_n^*(q_n^0) = V_1(q_n^0) = V_{0n}(q_n^0)]^9$. Thus if the likelihood of policy continuity is smaller than this level (i.e., $q < q_n^0$) investors will prefer not to exercise the option to wait-and-see, and will remain holding foreign liquid assets. The opposite is true for $q > q_n^0$. In this model the arbitrage condition, for period 1, is given by

$$(4) \quad r_h = r^* + \beta(1 - q_n^0)(r^* - r_f) > r^*,$$

which has a positive "front-end" risk premium $a = \beta(1 - q_n^0)(r^* - r_f) > 0$, even in the presence of risk neutral investors. Thus foreign investors require a "premium" equal to a over the international interest rate to be indifferent between holding foreign or domestic assets. This risk premium is consistent with Bernanke's (1983) bad news principle: an increase in the expected spread between r^* and r_f (i.e., an increase in the expected value of bad news) will increase the front-end premium that foreign investors require to invest at home during the "noisy" period. On the other hand, an increase in the expected spread between r_h and r^* will have no effect in the investment criterion, since foreign investors, by not investing at home in period 1, do not lose the option to do so at the beginning of period 2 if distortionary taxes on capital are not imposed.

We claim that the presence of uncertainty about the future tax treatment on domestic capital, coupled with the assumption that investment opportunities do not disappear if not undertaken immediately, and that investment at home is irreversible¹⁰, confers a non-negative (call) option value to

⁹ For $q_n^0 > 0$, we need that $V_1(q=0) < V_{0n}(q=0)$, implying that $r_h - r^* < \beta(r^* - r_f)$, which we will assume to hold. The restrictions on asset returns ensure that $q_n^0 < 1$. Thus for $0 \leq q < q_n^0$, it will be optimal not to invest in domestic assets at period 1, and for $q_n^0 < q \leq 1$, it will be optimal to invest at home in the first period.

¹⁰ In this model the irreversible nature of investment in domestic assets is not a technical restriction, but a legal one.

foreign liquid assets even in the presence of risk neutrality, for all q .

This option value¹¹ can be computed by comparing $V_n^*(q)$ with the maximum value of wealth attainable under equivalent conditions but without the possibility of deferring precommitment, $V_c^*(q)$. In this case, investors remaining liquid in period 1 must decide how to allocate their portfolios in period 2 before the uncertainty regarding the future tax structure is resolved. Thus, the value of the not-entering-in-period 1 strategy and the optimization program are given by,

$$(5) \quad V_{0c}(q) = r^* + \beta \max [q r_h + (1-q) r_l, r^*],$$

$$(6) \quad V_c^*(q) = \max [V_1(q), V_{0c}(q)]$$

Solving for $V_c^*(q) = V_1(q) = V_{0c}(q)$, gives the threshold value for q without the deferment option (q_c^0). In order to determine the sign of $[q_n^0 - q_c^0]$, we compare $V_{0n}(q)$ with $V_{0c}(q)$, for all q , which is equivalent to comparing $\Omega = [q r_h + (1-q) r^*]$ with $\text{argmax} [q r_h + (1-q) r_l, r^*]$, for any given likelihood of policy reversion. It is straightforward to show that $\Omega > r^*$ and $\Omega > q r_h + (1-q) r_l$, since, given the assumed restrictions on assets returns, it is optimal to invest in domestic (foreign) assets if distortionary taxes on domestic capital is not imposed (imposed) in period 2.

Thus, $V_{0n}(q) \geq V_{0c}(q)$ for all q (i.e., foreign liquid assets are more valuable when they allow deferment of precommitment), implying that $q_n^0 > q_c^0$: if waiting were possible at q_c^0 , it would be optimal to do so. Without the deferment option, foreign investors will require a smaller front-end premium in order to invest in domestic assets.

The option value conferred to the liquid asset under capital outflow controls, $OV(q) = V_n^*(q) - V_c^0(q) \geq 0$, is illustrated in Figure 1, where ABC and ADC represent $V_n^*(q)$ and $V_c^*(q)$,

¹¹ For a more detailed derivation of this option value, see Dornbusch (1989), Van Wijnbergen (1989), and Labán (1991).

respectively. We thus have that

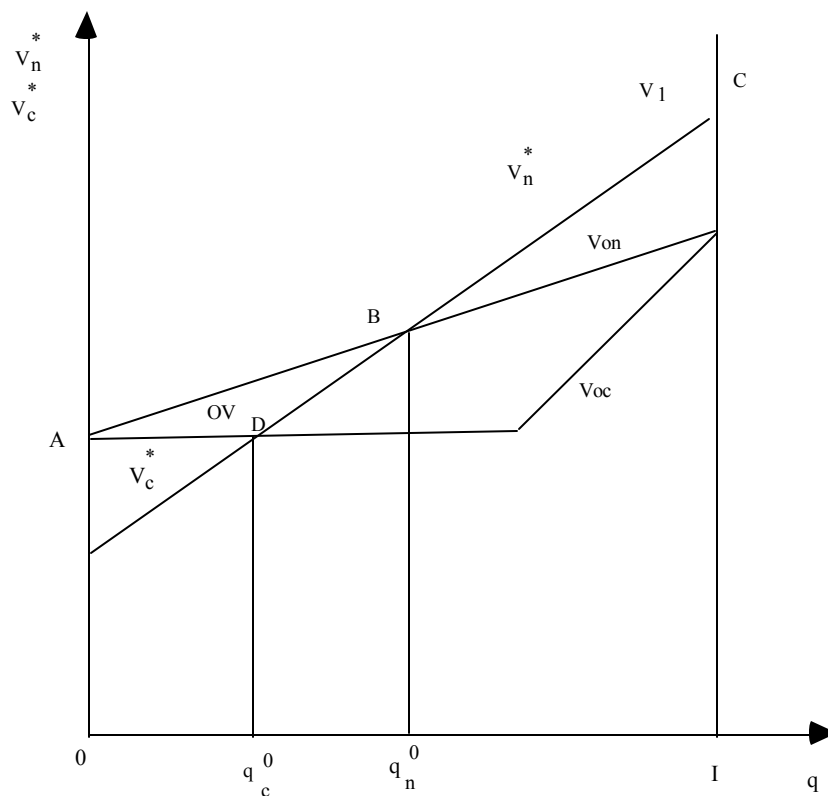
$$(7) \quad OV(q) = V_n^*(q) - V_c^*(q) = \begin{cases} V_{0n}(q) - V_{0c}(q) & \text{if } 0 \leq q < q_c^0 \\ V_{0n}(q) - V_1(q) & \text{if } q_c^0 \leq q < q_n^0 \\ 0 & \text{if } q_n^0 \leq q \leq 1 \end{cases}$$

Hence $OV(q)$, corresponding to the area ABD, is non-negative for all q . In the range $[0, q_c^0)$ remaining liquid in period 1, is the preferred option with and without the deferment possibility. In the range $[q_c^0, q_n^0)$, investment in domestic assets in the noisy period is non-optimal is deferment is possible, but is optimal without this possibility. Finally, in the range $[q_n^0, 1]$, the option is worthless since foreign investors will optimally invest in domestic capital in period 1, regardless of the deferment possibility.

Let us assume now that capital outflow controls are relaxed, and capital is allowed to be repatriated in just one year time from the moment it enters. In this case the EPDV associated with the decision of investing one unit of wealth in domestic assets at the beginning of period 1 ($V_1(q)$) is given by,

$$(8) \quad V_1(q)' = r_h + \beta [q r_h + (1-q) r^*]$$

FIGURE 1
THE OPTION VALUE OF WAITING WITH CONTROLS ON CAPITAL OUTFLOWS



It is easy to see that $V_1(q)' > V_{0n}(q)$, for all q , so that it will always pay investors to enter at the beginning of period 1 even without any risk premium, and to repatriate their capitals if a distortionary tax on domestic capital were to be implemented. In this case the option value conferred to the foreign liquid assets will be worthless, since the opening of capital outflows eliminates the irreversibility of investing in domestic assets.

4. SUMMARY AND CONCLUSIONS

The return of private capital to Latin America in the 1990s has been due to a combination of external factors (low international interest rates, poor economic performance in the industrial countries) and domestic elements (economic restructuring and --in some cases-- the consolidation of democracy). Significant net capital inflows provide important benefits, such as the opportunity of financing higher levels of capital formation, which are necessary for sustained and higher growth rates. Yet, at the same time, they pose important policy dilemmas. Among the latter stand the difficulty of maintaining autonomy in monetary policy without introducing excessive volatility to the nominal and the real exchange rate. Massive capital inflows are also bound to appreciate the real exchange rate, which may jeopardize an export-led development strategy.

Aimed at preventing a further real appreciation of the exchange rate, countries have reacted by accumulating important amounts of international reserves and sterilizing their monetary impact. Sterilization, however, has prevented a more rapid reduction of domestic interest rates and has caused significant operational losses to central banks. Thus, countries have turned to other policies, such as increased controls on capital inflows and liberalization of capital outflows.

A lot has been written on the issue of capital inflow controls and --especially-- on Tobin taxes, both at a theoretical and empirical level. Comparatively very little has been said about the liberalization of capital outflows as an alternative device. This paper has attempted to fill part of this gap. In particular, it has studied whether a liberalization of capital outflows is an effective device to offset (at least partially) an inflow of capital.

At an empirical level, the removal of capital outflow controls has been shown to stimulate a net inflow of capital in several experiences, such as Britain in 1979, New Zealand in 1984, and Yugoslavia in 1990. Numerous measures to liberalize capital outflows in Chile during the 1990s do not appear either to have had a noticeable effect on stemming net capital inflows.

How can we explain the apparent paradox that reducing controls on capital outflows can actually increase net capital inflows? Our theoretical model provides one such explanation. A liberalization of capital outflows, understood here as a reduction in the minimum capital repatriation period for foreign investment, reduces the degree of "irreversibility" of the decision to invest in a given country. This, in turn, lowers the option value of waiting until uncertainty about a possible change in the rules of the game that affect investment is resolved, because foreign investors have the time to react before the tax is put in place. Thus, a reduction in the period of time that foreign investment is required to stay in the country is likely to increase --not decrease-- net foreign investment.

This result has an important policy implication. Liberalizing capital outflows may have many significant benefits for a country. But it may not be the appropriate policy to defend the real exchange rate in the presence of massive capital inflows because it is likely to strengthen those very capital inflows.

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