A Survey of Literature on Controls
Over International Capital Transactions

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This paper reviews recent theoretical and empirical work on controls over international capital movements. Theoretical contributions reviewed focus on "second-best" arguments for capital market restrictions, as well as arguments based on multiple equilibria. The empirical literature suggests that controls have been "effective" in the narrow sense of influencing yield differentials. But there is little evidence that controls have helped governments meet policy objectives, with the exception of reducing the governments' debt-service costs, and no evidence that controls have enhanced economic welfare in a manner suggested by theory. [JEL F34, G15, G28]

The volume of international private capital transactions has increased dramatically in recent years, both for developed and developing countries. Technological improvements that have reduced the cost of international financial intermediation and reductions in government interference with such transactions have pushed private investors and borrowers into international markets.

The opening of international markets has presented important challenges for policymakers. Recent examples include the series of crises that have beset the European exchange rate mechanism (ERM) since 1992, the widespread capital inflows to emerging markets through early 1994, and, most recently, the turbulence in some developing country exchange and capital markets in late 1994 and early 1995 caused by the partial reversal of these inflows. These events have raised questions concerning the social costs and

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not a policy recommendation, however, as the actual effectiveness of such a program is an empirical question. An easy and perhaps wise way to avoid the empirical issue is to point out that it would be better to remove the existing distortion rather than introduce another to mitigate the damage inflicted by the first. The present paper will refrain from repeating this point even in cases in which it seems to be the obvious answer.

Not all arguments for government intervention in international capital markets are based on second-best considerations. A quite different exception to the general rule that government constraints on capital mobility are welfare reducing arises in cases in which stable multiple equilibria are predicted. If multiple equilibria are possible, it follows that the first-best equilibrium might be attained or maintained through government intervention in capital markets. This idea is a much more recent contribution to the debate concerning capital controls, and it is emphasized by proponents of capital controls to protect a fixed exchange rate regime during a transition to a monetary union. In reviewing these arguments below, the paper aims to clarify the very special circumstances under which such theoretical arguments are valid. The paper also reviews attempts to relate these models to recent experience in Europe.

The first step in determining whether capital controls have been used effectively is to see whether data support the proposition that controls have had a measurable effect on economic variables. There is an extensive literature on this issue, and recent contributions are reviewed below. It is concluded from this literature that both developed and developing countries have succeeded in driving wedges between domestic and international interest rates. Moreover, governments seem to have used controls in concert with various forms of financial repression—a term suggested by McKinnon (1973) to describe heavily regulated capital markets—to generate revenue and limit debt-service payments on domestic government debt. The power of capital control programs to affect other important economic variables, such as the volume or composition of private capital flows, changes in international reserves, or the level of the exchange rate, is, however, generally not supported by the data.

One important lesson that can be drawn from the considerable evidence presented in this work is that capital control systems have not prevented successful speculative attacks on fixed exchange rate systems. The obvious problem is that, in cases in which discrete parity changes are expected, yield differentials generated by control programs are much smaller than the capital gains available to private investors who correctly anticipate the parity changes. This outcome is fully consistent with the variety of theoretical models of speculative attacks surveyed below. There is some evidence that controls prolong the life of the exchange regime; unfortunately, very little
mechanisms are likely to welcome the protection from other investors who have not done so. Cairncross (1973), for example, argues that the British capital control system that evolved from a comprehensive system of exchange controls during the Second World War survived long after the original rationale had become irrelevant. Moreover, he argues that by the early 1970s the “bite” of controls was very uneven across investors because certain types of transactions were exempt from controls. Dornbusch (1986) argues in favor of controls in some circumstances but points to an example where the control system outlived its usefulness and became the problem rather than the solution.

There is a very large academic literature dealing with the economic effects of legal restrictions on private capital flows. This survey organizes this body of work according to the apparent objectives that might justify such restrictions. Section I of the survey examines models that relate controls to the ability of monetary and fiscal policy to stabilize output, prices, or the real exchange rate. The implicit assumption in this literature is that governments have good reasons for using these policy tools and that they do so in a welfare-improving manner. Section II considers a variety of distortions to a competitive equilibrium that might make a control program optimal. In these cases, control programs have been justified as a means of providing a tax base in an optimal fiscal regime, of counteracting distortions that limit domestic capital formation, and of insulating the economy from destabilizing capital flows. Section III considers a very different rationale for restrictions on capital flows. In the models in this section, multiple competitive equilibria are possible, and controls might be useful in maintaining a good equilibrium or in moving from a low- to a high-welfare equilibrium. Section IV considers the empirical evidence on the effectiveness of controls. It also examines recent work relating the use of controls to characteristics of individual countries. The paper closes with some conclusions.

I. Stabilization

Short-Run Stabilization of Output and Relative Prices

The classic framework for evaluating the implications of capital mobility and the effects of limiting capital mobility is the Mundell-Fleming model of a small, open economy. In commenting on Williamson’s (1993) review of the policy issues associated with recent private capital inflows, Branson (1993) notes, that while a description of the stylized facts is useful and interesting, it is difficult to evaluate the policy options in the absence of a generally agreed-upon theoretical framework. The framework suggested by Branson is the familiar Mundell-Fleming model. This paper
trols imply that the government faces constraints on the exercise of fiscal policy for stabilization. It follows that removal of capital controls may not be optimal unless the constraints on the effective utilization of fiscal policy are first eliminated.

The well-known arguments reviewed above start from the proposition that the failure of wages and prices to clear markets provides the rationale for stabilization policy. In an early attempt to better understand the nature of the sticky price distortion, Flood and Marion (1982) develop a model in which labor contracts generate inertia in wages. They then see whether capital controls in the form of a dual foreign exchange market can minimize the variance of employment in the face of a variety of shocks to the system. They also show that the labor contracts chosen by the private sector depend upon the policy regime in place, including the controls on capital flows. It follows that a full evaluation of the welfare implications of capital controls should consider the private reaction to the removal of controls. In some cases, the "preexisting" distortion may be an endogenous response to the controls themselves. This paper is one of a very few attempts in the literature to deal with the well-known Lucas critique of analyses that seek to predict the economic effects of policy changes without explicitly considering how the private sector's behavior is likely to change in response to the regime change.

Long-Run Stability of the Regime: Speculative Attack Models

The Mundell-Fleming model provides a rationale for manipulating domestic interest rates, but straightforward extensions of the model also suggest that the ability to pursue an independent monetary policy over time is strictly limited. The extensions taken up in this subsection show that effective capital controls alter the channels through which the private sector responds to government policy. Thus, effective controls alter the mechanism through which an inconsistent regime is forced to collapse, but they do not change the eventual result.

Krugman (1979) and Flood and Garber (1984) provide models of speculative attacks against inconsistent policy regimes when capital is internationally mobile. In order to finance a fiscal deficit, a government might set a rate of growth for the domestic assets of the central bank that is inconsistent with the fixed nominal exchange rate and the growth in the demand for money. With perfect capital mobility and purchasing power parity, the demand for real money balances is predetermined so that increases in the domestic part of the monetary base are instantly offset by changes in international reserves. When the central bank's international reserves fall to a certain level, it is known that the central bank will withdraw from the foreign exchange market and the currency will float freely. This regime comes
consistent policy setting causes a deterioration of the current account that eventually exhausts the government's stock of international reserves.

Gros (1992) also models speculative attacks but points out that, while capital controls can limit private sector speculation in most cases, governments are forced to augment the capital control program with domestic interest rates that are much higher or lower than would be the case in the absence of speculative pressure. An important aspect of this framework is that controls are effective but can be overcome at some cost to the speculator. In this setup, the government's commitment to maintain the peg can be easily monitored by the private sector because it is revealed in interest rate policy. When the government reveals that it is unwilling to sacrifice control over domestic interest rates, the private sector will know that a small speculative attack, and the associated low costs of avoiding the capital control program, will be successful. The welfare effects of controls are not well-defined in these models. The intuition, however, is clear: if the additional time during which the regime survives is used wisely, that is, if consistent policies are introduced, the measure of policy independence generated by the control program might be welfare improving.

The models reviewed above are designed to clarify the dynamics of a speculative attack on an inconsistent regime but do not provide insight as to why a rational government would pursue such a policy. Wyplosz (1986) develops a similar model and argues that capital controls that are only temporarily effective nevertheless make an adjustable peg regime viable. In this framework, the authorities operate a monetary policy that is inconsistent with permanently fixed exchange rates, but they overcome this potential inconsistency with discrete changes in the exchange rate peg. Wyplosz points out that capital controls play a crucial role in making such an adjustable peg system viable.

The key to the argument is that the volume of private capital flows in response to an expected profit opportunity is limited by the capital control system. In Wyplosz's paper, controls are set so that residents of the country cannot change their holdings of foreign assets or their financial liabilities to nonresidents. Nonresidents are assumed to hold domestic money, for transactions purposes, and are free to sell these against foreign currency at the commercial exchange rate. The crisis in this model comes when nonresidents believe that selling off all their holdings of domestic money will trigger a devaluation or revaluation of the nominal exchange rate. At this point, the central bank announces a discrete change in the parity. Wyplosz does not attempt to assess the optimality of such a system, but the desire to reduce the short-run variance of exchange rates, discussed in the subsection on the stabilization of relative prices, would provide a rationale.
Park (1994) provides a maximizing model in which households adjust their intertemporal consumption of goods and real money balances in order to maximize expected utility over an infinite planning horizon. He asks whether a liberalization of the capital account can generate an immediate speculative attack on a fixed exchange rate regime. The model suggests that initial conditions are crucial to the answer. If the domestic real interest rate is initially below the world interest rate, the initial result of liberalization is an incipient net capital outflow and a rise in the domestic real interest rate. Park’s model assumes that the increase in debt-service cost of the government’s domestic debt will be met by an increase in the growth of domestic assets in order to finance the resulting fiscal deficit.

If the liberalization is a surprise, foreign and domestic expected yields equalize immediately; if a speculative attack is expected to be successful, the private sector reduces its demand for real money balances because of the higher rate of inflation that follows the successful attack. The resulting sale of domestic assets to the central bank might exhaust its reserves and generate an immediate attack and a regime change. If the fixed exchange rate is initially sustainable, a secular fall in reserves is anticipated and, eventually, a successful speculative attack similar to those discussed in the previous subsection. Auernheimer (1987) compares the breakdown of inconsistent regimes in a maximizing model with and without capital controls. The model suggests that with capital mobility it makes no difference whether the government chooses an inconsistent exchange rate or monetary rule at the onset of the crisis. However, like Calvo, he shows that with capital controls the inconsistent regime generates lasting suboptimal real effects on the current account.

In general, the models of Park and Calvo reinforce the lessons from the partial equilibrium model discussed above. Even perfectly effective controls on private capital transactions can at best extend the life of an inconsistent policy regime. These models add the important conclusion that the path for consumption is suboptimal during the interval in which the regime survives and that this distortion continues after the inconsistent regime has ended.

Stabilization with Price and Wage Flexibility

An important extension of the Mundell-Fleming model introduces domestic price and exchange rate flexibility. In this version of the model, changes in the domestic money stock with perfect capital mobility and flexible exchange rates generate proportional changes in all nominal prices so that the stabilization role for monetary policy disappears, along with the associated arguments for capital controls.
Guidotti and Végh (1992) present a model of a large, open economy that adds a monetary sector to the model discussed above. They start from the proposition that, with perfect capital mobility, domestic monetary disturbances have no real effects, partly because the world money supply is immediately redistributed through international capital flows following a disturbance. With capital controls, money holdings can be redistributed only as the mirror image of current account imbalances. The real effects of these imbalances are felt at home and in the rest of the world. Their model also suggests that unanticipated and permanent changes in domestic monetary and fiscal policies affect consumption, real interest rates, and the real exchange rates.

Stabilization of Relative Prices

The impact of capital flows on relative prices or real exchange rates has been at the center of much of the literature concerning the economic effects of capital mobility. A stylized fact associated with liberalization of controls over capital flows among developing countries is that the resulting adjustment includes substantial appreciation of the real exchange rate. This appreciation, in turn, may be an undesirable feature of an open capital market if temporary relative price changes and associated allocations of productive resources are welfare reducing. Krugman (1987), for example, argues that temporary real appreciation of the exchange rate may permanently injure export industries if hysteresis is a feature of the correct dynamic model of the economy. Several authors have suggested that capital mobility should be limited until policies designed to offset the real exchange rate changes are in place. The obvious choice to combat the effects of a capital inflow, for example, would be a reduction in government spending. In this subsection, it is argued that the welfare implications of these models are far from clear. Moreover, formal explanations of a relationship between capital market liberalization and real exchange rate instability can be generated by very different models.

In the spirit of the sticky price framework, a way to understand a link between liberalization and real exchange rate appreciation is to appeal to a model in which nominal shocks generate overshooting of nominal exchange rates and, therefore, changes in real exchange rates. Sussman (1992) uses a version of the Dornbusch overshooting model to help explain an apparently unsuccessful liberalization of the capital account in Israel in 1977. Liberalization of the capital account in this model takes the form of eliminating controls supporting a tax on domestic asset yields and domestic bank loans. Sussman presents evidence that the controls in place generated large differentials between onshore and offshore lending and deposit rates in Israel, both before and after the brief experiment with liberalization.
of consumption can be magnified or mitigated by capital controls. The results appear to be model specific, but the general point may be important.

Anticipated changes in relative prices alter the "interest rate" relevant for intertemporal consumption and investment decisions. Capital controls also alter intertemporal consumption and sectoral investment decisions. The message is that real exchange rate changes associated with shocks to the system (for example, terms of trade shocks) might be an important part of a comprehensive evaluation of the effects of capital controls.

This idea is developed further by the introduction of a labor market distortion in the form of a minimum real wage. This distortion generates a variable and a suboptimal level of employment. Depending on a number of factors, a subsidy to foreign borrowing (or a tax on foreign lending) could tilt demand toward time periods during which unemployment is relatively high and, in turn, improve welfare. This model is interesting because it abstracts entirely from monetary phenomena yet still manages to find a second-best role for capital controls in promoting employment. However, the level of ingenuity to which the modelers have to resort to create an intertemporal distortion to consumption and employment that can be offset by another intertemporal distortion, capital controls, seems to make the practical importance of the argument remote.

Models of Partial Effectiveness

The idea that capital controls have important economic effects because they move adjustment into the international markets for goods and services has led many authors to consider mixed systems in which controls on capital movements are only partially effective. The intuition is that, because distortions of intertemporal trade and consumption are costly to the private sector, it is worthwhile to invest in techniques to avoid controls. It follows that the decision of how to model a capital control regime is an important issue in itself.

At one end of the spectrum are models that assume complete effectiveness. In these models, there is no arbitrage of international interest differentials. In dual exchange rate models, for example, the spread between the commercial exchange rate and the financial exchange rate adjusts to equalize expected yields on domestic and foreign bonds. An alternative specification is that controls are effective but can be avoided at a cost. This model is appealing because it seems to explain the empirical finding that the ability of controls to force a wedge between expected yields on securities issued in different countries appears to erode over time.

Bhandari and Decaluwe (1987) and Gros (1987 and 1988) have emphasized the endogenous response of speculators to the incentive to avoid exchange controls. Gros (1988) assumes an increasing onetime cost faced by
Considering liberalization of trade in goods and services. The distortions that have attracted attention in the context of structural reform include real exchange rate changes associated with liberalization of trade restrictions, slow adjustment of labor markets to changes in relative prices of traded and non-traded goods, and, finally, relative price changes generated by reforms that are expected to be temporary.

As argued above, distortions in relative prices owing to trade restrictions can generate a role for capital controls under some circumstances. But the sequencing issue is much more complicated. First, there is no very clear reason for the government to have to choose to liberalize one market at a time or to liberalize markets slowly. It is possible, however, that it will take some time to dismantle trade restrictions, perhaps because of administrative problems or because the government wishes to spread out the impact on protected sectors over time.

Similar constraints might also apply to capital markets, thus making it necessary to address the sequencing problem. It should be recalled, however, that the formal models do not provide a rationale for gradual decontrol. An early argument along these lines is found in McKinnon (1973). Relaxation of trade restrictions would, other things being equal, generate a depreciation of the real exchange rate, while relaxation of the capital account is assumed to call for an appreciation of the real exchange rate, given the capital controls’ effective limiting of desired inflows of capital. This “competition of instruments” problem is resolved by delaying liberalization of the capital account until trade and other distortions have been eliminated.

Edwards and van Wijnbergen (1986) develop two ideas that are useful in this area. First, they show in a static model that capital account liberalization in the face of trade distortions can be welfare reducing. The intuition is that tariffs can distort investment decisions and capital controls can, in principle, offset this distortion. They develop a two-period model in which capital inflows are constrained. In this case, gradual liberalization of the trade account generates expected changes in relative prices that can distort investment decisions.

Calvo (1988) develops the idea that any government policy that affects relative prices and is expected to be temporary is equivalent to a distortion of intertemporal relative prices. For example, temporary tariff reform implies that the relative prices of traded goods will change when the liberalization program is abandoned. In general, it follows that liberalization of the capital account is not a good idea if the government really has reformed but the private sector does not find its commitment credible.

Edwards (1989b) provides an excellent summary of this literature and a model that pulls together a number of distortions in order to provide some guidance for policy. Not surprisingly, it is difficult when working with mul-
optimal tax system. Their model assumes that the government must service
a domestic debt and must use a domestic tax on output that involves in-
creasing costs of collection. The capital control that Aizenman and Guidotti
have in mind is a tax on foreign capital income, and they assume that the
tax is not avoided.

An interesting feature of Aizenman and Guidotti's model is that the tax
base for the foreign income tax is not only the private sector's stock of for-
eign assets but also the entire domestic debt. The domestic debt is relevant
because the tax on foreign income drives a wedge between the foreign in-
terest rate and the domestic interest rate. Taxing foreign income, they argue,
is equivalent to taxing private holdings of government debt, but, unlike other
taxes, this one involves no collection costs. Aizenman and Guidotti show
that countries with large stocks of domestic debt tend to utilize capital con-
trols. Drazen (1989) shows that the inflation tax is an important source of
revenue for several European countries. He also shows that high inflation
rates are only part of the story as these countries also have unusually large
inflation tax bases in the form of bank reserve ratios. If residents of these
countries could freely utilize offshore financial intermediaries, this tax base
would erode. It follows that capital controls are an important part of a fiscal
system that relies heavily on the inflation tax. Drazen also argues that, while
such a system might allow the government to avoid even more distorting
taxes in the short run, taxing savings and investment will in general lead to
slower growth and reduced government revenues in the long run.

Brock (1984) provides an interesting counterargument. He points out
that, although opening the capital account can generate a decline in the in-
flation tax base, a government with a fiscal problem can offset this effect
and minimize the associated loss of revenue through reserve requirements
on capital inflows or through prior import deposit schemes. This is one of
the arguments for capital controls that seems quite sensitive to the assump-
tion that the existing shortcomings in the tax system are unrelated to the ex-
istence of the controls. In particular, it seems likely that a government that
imposes controls over capital outflows for some other reason will be
tempted to exploit the revenue from financial repression that the controls
make possible.

Taxation of Resident Capital Income

Another longer-run feature of some capital control programs is that they
are designed to limit secular private capital outflows. It is often argued that
countries with relatively low capital-labor ratios—developing countries
and countries in transition—should offset a variety of domestic distortions
that induce private investors to prefer foreign investments even when the
exceed the world rate of interest by a political risk premium. In this environment, the government should subsidize investments in traded goods industries, as these investments increase the vulnerability of the country to penalties for default and, therefore, increase the credibility of the government’s promise not to default.

A somewhat different argument is advanced by Dellas and Galor (1992). In their paper, households located in a number of small, open economies make saving and investment decisions that generate a stable but low steady state level of income and welfare. There is no incentive for capital flows among these economies because returns on capital are the same. A government that can accomplish transfers across generations can engage in external borrowing that can move the economy to another stable growth equilibrium and, through appropriate transfers, increase welfare in all generations.

As a part of the external borrowing program outlined in Dellas and Galor’s paper, it is also necessary to limit offsetting private capital outflows through a capital control program. The intuition behind this argument is appealing. The authors suggest that, because investment in growth benefits future generations, the present generation might invest at a suboptimal rate. However, if a government has the tools and wisdom, it might be able to attain a superior equilibrium by borrowing on international capital markets. During the transition it is necessary to prevent private capital outflows, which the current generation will find optimal.

Uncertain Property Rights

Another argument develops the idea that “property rights” are often poorly defined in developing countries and perhaps even more so in formerly planned economies undergoing massive privatization. In effect, this uncertainty about property rights allows interest groups of private residents to “tax” or appropriate the capital income of both resident and nonresident investors. In contrast, investments abroad by residents of these countries are difficult for other residents to detect and appropriate. This situation leads to overinvestment in the “technically inferior” foreign capital stock in order to avoid the political risk associated with investment in a poorly organized country. In such an environment, capital controls might be optimal. Tornell and Velasco (1992) develop a formal model in which poorly defined property rights imply that investors will prefer external investment even if domestic investments have a higher social but lower private expected return.

This model also demonstrates the less obvious point that capital controls may not improve welfare even if capital outflows are reduced because the threat of free capital mobility might reduce the amount of appropriation by
actions tax would discourage such speculation. The problem is that, even though such trading rules are based on short-horizon forecasts, profitable trading rules do not, in general, call for frequent transactions. It is not clear that higher transactions costs would tend to discourage these speculators more than those betting on fundamentals.

The assumption that speculation, or investment, based on fundamentals is associated with long holding periods is also suspect. The image of direct investment as factories that are difficult to move from country to country or long-term bonds that are held to maturity seems to provide the inspiration for linking motives and holding periods.

In fact, direct investors are not prevented by the nature of their assets from quickly responding to changes in market conditions. Because factories are clearly difficult to move and returns to physical assets depend upon economic and political conditions in the host country, direct investors can and do hedge this exposure. Borrowing from local credit markets is the most obvious hedge. If a direct investor must exit a country quickly, she simply leaves the factory and the local bank loan behind. Moreover, as trading in equity market indices and their derivatives has developed, it is now possible in most emerging markets to hedge risks common to equity positions in that country without engaging in credit market transactions.

Direct investment may be special for many reasons including, probably, the technology transfer aspect, but direct investors are not passive investors who ignore the market and focus on long-run fundamentals. To the contrary, they are often informed and enthusiastic participants in capital markets.

Claessens, Dooley, and Warner (1995) examine the volatility of different types of capital flows for a sample of industrial and developing countries. Their interpretation of the data is that the labels assigned to various types of capital flows are of no value in predicting their time-series behavior. Direct investment is no more persistent over time than is short-term capital. Perhaps more important, knowledge of the composition of capital flows is useless in predicting the time-series behavior of net capital flows.

It is not possible to directly examine the effects of transactions costs on observed exchange rate variability. There is clear evidence that transactions costs, as measured by bid-ask spreads in foreign exchange, are positively related to the volatility of spot exchange rates. Moreover, adjusting for volatility, there has been no apparent trend in transactions costs for foreign exchange under floating rates (Glassman, 1987). It would be foolish to argue that the increases in transactions costs caused the increase in volatility of exchange rates.

In other speculative markets, however, it is possible to evaluate the effects of changes in transactions costs. Roll (1989) studies equity markets in
Van Wijnbergen (1985) provides a more explicit link between variability of government policies and less-than-optimal domestic investment. The unnecessary variance in government policies causes underinvestment because investors will value the option of waiting until the uncertainty is resolved. Tornell (1990) develops a model in which the increased variance resulting from private capital transactions leads to less-than-optimal real investment because investors value the option of waiting until more-settled times before making irreversible real investments in a country. Finally, Aizenman and Marion (1993) provide some evidence that uncertainty has a measurable negative effect on capital formation in developing countries.

Domestic Capital Market Distortions

In the absence of a formal model involving capital controls, an often-discussed distortion in both domestic and international financial markets arises from government insurance of the liabilities of domestic financial intermediaries. The most obvious example of this is deposit insurance for banks; however, even in the absence of formal insurance, governments frequently intervene to protect creditors of institutions that are believed to be "too large to fail." The usual reason for such intervention is to prevent "contagion" of doubts about the solvency of large institutions from generating runs on solvent institutions and associated general declines in asset values.

Following the debt crisis of 1982, free deposit insurance extended to banks in newly liberalized financial markets was widely cited as a source of instability in financial markets (McKinnon and Mathieson, 1981; Hanson and de Melo, 1983; Diaz Alejandro, 1985; Corbo, de Melo, and Tybout, 1986; Baliño, 1991; McKinnon, 1991; and Velasco, 1991). Diaz Alejandro (1985, pp.17–8) summarizes the idea as follows:

Southern Cone domestic financial systems of the late 1970s and early 1980s ended up with a pessimum "middle way": de facto public guarantees to depositors, lenders and borrowers, and no effective supervision and control (until it was too late) of the practices of financial intermediaries. . . . As illustrated in the recent Chilean experience, foreign financial agents will not accept a separation of private and public debts when a crisis arrives. . . .

The well-known problem with this policy is that it encourages firms and financial institutions to reach for risk. Profits from favorable outcomes are paid out to owners of the institution while losses are shared with the government. The usual prudential regulations designed to limit the government's exposure to losses include requirements that the institution maintain adequate capital, that is, not immediately pay current accounting profits to equity holders, and maintain various restrictions on the nature and concentration of assets held.
erate a successful attack, even if the government follows fully consistent policies preceding the attack.

A more stringent condition for a self-fulfilling attack is that the change in the exchange rate regime itself generates a “fundamental” change in the optimal path for monetary policy. If the private sector expects a more expansionary monetary policy following a successful attack, such expectations can generate the collapse of a system that is otherwise fully viable. Finally, a much more stringent condition is that a plausible model of the government’s behavior implies that a change in policy following a successful attack is optimal, given the change in the economic environment generated by the attack.

The lesson from these models is that the exchange rate regime is secondary to the monetary policy that the government is expected to pursue, not just in the short run but over the indefinite future. If the speculative attack is interpreted by the private sector as a signal that the government will abandon monetary restraint in the future, speculation in financial markets will, by the usual arguments, result in capital movements today in anticipation of this perhaps distant event. It seems to follow that capital controls might significantly slow the onset of the attack. Moreover, an optimistic assessment of the potential role of capital controls might be that their adoption will change the conditions that generate the multiple equilibrium. For example, the government might find a way to recommit to not altering its behavior following an attack.

It is ironic that the first clear statement of these issues was heavily conditioned by the warning that an announced commitment to a regime—in this model, a commodity “standard” rather than an exchange rate “standard”—was unlikely to alter the private sector’s expectations about monetary policy over the long run. Flood and Garber’s (1984, pp.104–05) warning is worth repeating at length:

Behind the sequential transitions from one monetary scheme to another ... must lie a political economy that we have ignored. Such political economic forces determine the complete dynamic panorama of the monetary process. ... A commodity system can be interpreted as a discipline-imposing rule only if the commodity standard’s permanence is somehow guaranteed. As there is no means to ensure such permanence, the notion of a commodity standard as a stabilizing rule is a chimera.

Flood and Garber (1984) and Obstfeld (1986b) show that, if governments are assumed to follow more expansionary monetary policies following successful speculative attacks on their fixed exchange rate regimes, policy regimes that are otherwise viable can be forced to collapse through self-fulfilling private expectations. Obstfeld (1994a) refines the argument by specifying the political economy that might account for the government’s
ship would be more costly to attain. Once this opportunity was removed by the successful attack, it was then rational for the authorities to relax monetary policy. The speculative attack generated the subsequent government behavior that validated the attack.

To buttress this interpretation, Eichengreen, Rose, and Wyplosz (1994) offer empirical evidence that the fundamentals behaved differently in the months leading up to the ERM crisis than in a sample of crises in other fixed exchange rate regimes. In particular, they argue that the ERM crisis was not preceded by excessive money growth, growth in domestic assets, fiscal deficits, or a number of other variables usually associated with inconsistent policies.

A weakness in their interpretation of the evidence, as the authors acknowledge, is that a variety of factors might rationally lead to an expected change in the government’s behavior but leave no evidence in the run-up to the attack. In particular, they consider but are not persuaded by the possibility that the rising unemployment associated with tight monetary policy in Germany might have generated expectations that monetary policy in other countries would be eased in the future as the political cost of unemployment accumulated.

Speculative Attacks and Capital Controls

The role of capital controls in preventing self-fulfilling speculative attacks seems obvious. It is plausible that effective controls would delay the end of a regime that suffered a spontaneous change in private expectations. If the regime remained vulnerable through current account transactions, the extended life for the good equilibrium made possible by capital controls would presumably be desirable. This assumption is reinforced if the ultimate destination for the regime is assumed to be a credible common currency.

Nevertheless, the contrary argument is equally plausible. If the private sector knows that the system is protected by controls, it will be less impressed by observed stability. Lane and Rojas-Suarez (1992), for example, argue that the use of controls has ambiguous implications for the credibility of a monetary policy regime.

The role of capital controls is also problematic because self-fulfilling attacks can go in the opposite direction. For example, a spontaneous decline in private inflationary expectations could set in motion a sequence of falling interest rates and fiscal deficits that generates a good equilibrium. It is perhaps informative that there seem to be few examples of changes in private expectations generating self-fulfilling virtuous responses by governments. Countries that start from bad equilibria should shun capital controls as these
ective capital control program might buy enough time for the government to move the fundamentals to a region where self-fulfilling speculative attacks are less likely. Controls could thus be seen as a temporary measure to buy time for a virtuous government to establish its reputation. On the other hand, it is easy to show that the possibility that controls might be introduced in the future can generate attacks where none would be observed otherwise.

The removal of controls on capital outflows might also be interpreted by the market as a commitment not to penalize foreign investors and, therefore, as an attempt to generate capital inflows. A practical implication of this type of model is that the government probably must be prepared to maintain its fundamental policy stance even if it is temporarily forced to abandon the exchange rate peg. Maintaining this stance may involve significant short-run costs in terms of employment or distorting taxes necessary to finance debt-service payments on domestic debt. Unfortunately, the role of capital controls in reducing the costs of maintaining the fundamentals is much less clear. On the surface, it appears that controls might delay or even prevent a speculative attack and the associated costs. But the typical policy of imposing controls as the attack occurs—implemented probably because the authorities believe that the controls are not effective for long—can also be a powerful catalyst of speculative attacks. Finally, a careful treatment of expectations can suggest that policies designed to limit net capital inflows might have just the opposite effect.

IV. Effectiveness and Objectives of Controls

Effectiveness of Controls

Empirical work on the "effectiveness" of capital controls has suffered from the lack of a widely accepted definition of what constitutes an effective control program. At one end of the spectrum, effectiveness has been defined as differences observed over extended time periods in the average behavior of selected economic variables between countries with capital controls and countries without them. At the other extreme, effectiveness has been defined as a government's ability to maintain an inconsistent macroeconomic policy regime indefinitely.

For this reason, observers have examined the same or similar data sets and reached very different qualitative conclusions concerning the effectiveness of controls. Those who see controls as a short-term device to allow the government time to react and adjust other policy tools generally argue that controls can be effective. Those who have observed that the collapse of regimes is often preceded by the imposition of controls argue that controls are not effective. The reading here of the extensive empirical literature
branches of the same or very similar banks. An early attempt to measure the effectiveness of controls using these data is reported in Dooley and Isard (1980). This paper presents a model in which onshore and offshore interest rates on bank deposits denominated in the same currency are related to the extensive capital control program introduced by the German government over 1970 to 1974, and to the risk that such controls might be intensified.

A problem for testing the effectiveness of control programs is that they are complicated legal programs that are difficult to quantify. In Dooley and Isard's paper, the controls are quantified by evaluating both the size of the penalties or taxes on individual types of transactions and the extent of the coverage of the various transactions. These data suggest that the authorities managed to generate a 4 percentage point differential for a brief time, during which virtually all private capital inflows were prohibited.

In this respect, the controls in Dooley and Isard's paper had clearly measurable effects. Nevertheless, a speculative attack on the currency generated a very large—by standards of the 1970s—increase in Germany's international reserves, and the fixed exchange rate was abandoned. In line with the models reviewed above, the control program described in this paper appears to have slowed down the demise of the par value system but could not preserve it.

Gros (1987) reports spreads between Eurocurrency and domestic deposits for Italy and France from 1979 to 1986. He interprets these differentials, which were for short time periods as large as 20–24 percentage points, as consistent with his model that predicts that controls are temporarily effective in restraining large changes in investors' positions. That is, during times of turbulence in the ERM, private speculators were not able to adjust their open positions without cost. Nevertheless, the interest differentials rapidly returned over longer horizons to very low levels.

Similar evidence for five industrial countries from 1982 to 1992 is reported in Obstfeld (1995). Obstfeld (1995, p. 217) concludes that for industrial countries the links between onshore and offshore markets are very close but that "[t]he data also show . . . that actual or prospective government interventions remain a significant factor in times of turbulence." These data decisively reject the view that capital controls are always ineffective. However, the data also suggest that either the governments involved quickly removed the incentives for speculation through policy changes or speculators simply retreated to await another attack.

Chinn and Frankel (1994) report covered differentials for a group of developing countries in Asia. They find that, while these markets are not as integrated as the industrial countries, covered differentials seem to have narrowed during the 1980s even though capital controls were generally utilized by the countries studied. Melvin and Schlagenhauf (1985) extend this
the probability of devaluation, the market value of nontraded goods industries should not rise following an unexpected imposition of controls. Data for Portugal during 1992 and 1993 offer conflicting evidence. The value of nontraded goods equities did rise relative to export-oriented industries but declined relative to import-competing industries. The short sample period and the difficulty in identifying the orientation of firms cloud the results.

Eichengreen, Rose, and Wyplosz (1994) challenge this interpretation of the ERM experience. They make the point that focusing on actual devaluations biases the sample toward episodes in which capital control programs have failed. To overcome this bias, they examine the behavior of a number of economic variables during crisis and noncrisis periods to see whether the experience of countries with controls differs systematically from that of countries without controls. This comparison, they argue, is a more useful measure of the effectiveness of controls. During crisis periods, countries with controls experienced higher inflation, higher rates of money growth, and higher growth of domestic assets. Controls did not seem to affect the loss of reserves, interest rate differentials, or fiscal imbalances. During non-crisis periods, controls appear to affect all the macroeconomic variables tested except reserves.

Eichengreen, Rose, and Wyplosz's conclusion (1994, p. 8) is quite consistent with the literature surveyed above:

Controls do not allow countries which pursue policies inconsistent with a peg to keep their exchange rate unchanged forever. They do not prevent attacks, nor do they permit countries to avoid reserve losses or interest rate increases when attacks occur. Controls merely render expansionary monetary policies viable for a longer period by attenuating the link between crises and exchange rate regime collapse.

**Tests Where Forward Exchange Rates and Eurocurrency Interest Rates Are Unavailable**

An important limitation of the methodology reviewed above is that well-developed forward exchange markets or offshore deposit markets are needed to control for expected exchange rate changes. For many markets where liberalization is now a policy option, historical controls have inhibited the development of such markets. Thus, empirical research must rely on an alternative estimate of expected exchange rate changes. Phylaktis (1988) reports results for Argentina based on the model discussed above but uses realized spot rates as a proxy for expected changes in exchange rates. Some types of controls were found to influence the uncovered interest differential. The interesting aspect of these results is that the controls might have contributed to the effective taxation of foreign assets and a political risk premium, as well as perhaps to the exchange risk premium. The diffi-
Edwards (1989c) provides a qualitative evaluation of capital control programs leading up to 34 devaluations in developing countries. He concludes that governments typically intensified their control programs in the year before devaluations. He also reports data on premiums in financial exchange markets as devaluations approached. While there are exceptions, the financial rate premiums in most cases increased sharply in the one to three months before the exchange crisis led to devaluation. Nevertheless, data for these same episodes show that current accounts weakened and reserve assets declined despite the controls. Edwards (1989c, pp.189–90) concludes that "[a]t most one can argue that these heightened impediments to trade managed to slow down the unavoidable balance of payments crisis unleashed by the inconsistent macroeconomic policies." This evidence seems consistent with the more thoroughly researched data for industrial countries.

Direct Measures of Capital Flows

Johnston and Ryan (1994) examine the effects of capital control programs for recorded capital flows (including errors and omissions) for a cross section of 52 developing and industrial countries for the period 1985 to 1992. With this approach, controlling for factors other than capital controls that shape the structure of capital flows is quite difficult. As the authors point out, models of the capital account typically relate economic fundamentals, such as yield differentials and changes in wealth, to total net capital flows (that is, the mirror image of the current account balance). Within this constraint, the proportion of the capital account allotted to net official flows and net private flows then depends on the behavior of the government. If that behavior is not consistent over time, the behavior of net private capital flows will not appear to be related to economic fundamentals. Moreover, to the extent that control programs respond to capital flows, it would not be surprising to observe that new controls over capital inflows are associated with increased inflows.

Nevertheless, some interesting empirical regularities emerge from the data. The removal of controls on capital outflows by industrial countries did seem to influence the overall volume and structure of net private flows; direct investment and recorded long-term portfolio investment seem to have been particularly sensitive to changes in control programs. In contrast, control programs in developing countries do not seem to have affected either overall private capital flows or their composition. The authors plausibly conclude that the administration of control programs in developing countries has been less effective than in industrial countries.

A related empirical literature has attempted to measure private capital outflows from developing countries that are not captured by balance of payments reporting systems. Such outflows, generally identified as capital
find that controls have a negative effect on the stock of government debt. This finding is consistent with models discussed above that suggest that revenue from inflation is enhanced by controls and that domestic real interest rates kept below the world rate might limit debt-service costs. The structure of the economy also seems to be an important determinant of the use of controls. The data also suggest (controlling for initial income levels and political stability) that controls do not influence growth rates. Grilli and Milesi-Ferretti (1995) find similar results for a sample of 16 developing and developed countries. In particular, countries with controls seem to experience over an extended time period high rates of inflation, relatively high shares of government revenue from seigniorage, and relatively low real interest rates. These results suggest that fiscal considerations are the most important determinants of the use of capital controls and that the controls, or some factor highly correlated with the use of controls, have measurable effects on government revenues.

Integration and Net Capital Flows

The consensus from the empirical work reviewed above is that capital markets of industrial countries and many developing countries are highly integrated and that integration has increased substantially over the past 30 years. Capital controls or dual exchange rate systems have been effective in generating yield differentials, covered for exchange risk, for short periods of time, but they have had little power to stop speculative attacks on regimes that were seen by the market as inconsistent.

It is surprising in light of this evidence that so little supporting evidence is found in the nonfinancial data. What has become known as the Feldstein-Horioka puzzle is the lack of savings-investment imbalances among countries with apparently integrated financial markets. As argued in Dooley, Frankel, and Mathieson (1987), tests of savings-investment correlations are joint tests of several hypotheses, most of which have little to do with capital mobility or capital controls. The test of market integration might fail for several reasons: purchasing power parity does not hold; exchange rate risk is a powerful barrier to international investment; domestic financial markets are poorly integrated; the economies studied are near a steady state in which imbalances are very small; or government policies other than capital controls generate small current account imbalances.

In a recent survey of this literature, Obstfeld (1994c) suggests that the puzzle is real in the sense that current account imbalances in recent years appear to be too small relative to historical periods when capital accounts were apparently open, or to net capital movements within national boundaries. Several observers have concluded that the most plausible reason for
is associated with free trade in financial services. Obstfeld (1994b) develops the idea that closed national credit markets might be very unlikely to finance high-risk investments because of risk aversion among domestic savers and the inability to diversify within the domestic markets. If high-risk investment projects also have relatively large payoffs in terms of endogenous economic growth, the closed capital market implies that the growth rate of the country is limited. Opening the capital account in this model allows nonresident investors with lower levels of risk aversion to hold high-return investments in the country while residents hold relatively safe foreign assets. Thus, with no net capital flow, domestic savings are channeled into investments that generate a higher growth rate. As demonstrated in a simulation exercise, the welfare benefits of a higher growth path can be very large.

Partial equilibrium models of the potential benefits for investors of greater access to equity markets in developing countries also suggest that significant welfare gains are available (Lessard, 1973; and Harvey, 1994). These models employ an international capital asset pricing model to evaluate the possibility that opening equity markets would improve the risk-return trade-off faced by an investor currently limited to industrial country equities. Recent work has also tested the effects of restrictions on foreign investment as measured by an investability index compiled by the International Finance Corporation (Bekeart, 1995; and Claessens, Dasgupta, and Glen, 1995). These analyses suggest that existing controls have had significant effects on yields of equities and that removal of such restrictions would benefit investors.

The apparent benefits from international diversification have also led to research that compares optimal to observed portfolios. While there are many problems with the data on gross international capital flows—and even more with the calculation of stocks of cross-border private financial claims and liabilities—this research suggests a very clear “home bias” in portfolios of residents of industrial countries. Tesar and Werner (1992) report that residents of industrial countries hold almost all their wealth in the form of claims on residents of their home countries. Golub (1990) argues from evidence of gross capital flows that a very minor part of the capital stock of OECD countries reflects gross foreign ownership and concludes that this measure of capital mobility is even more puzzling than the data on current account imbalances (which were discussed in the previous subsection).

V. Conclusions

In this paper, we review the academic literature setting out the effects of controls predicted by a variety of economic models and testing the empirical relevance of such models.


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