IMF WORKING PAPER

WP/96/110

INTERNATIONAL MONETARY FUND

Research Department

Current Account Sustainability: Selected East Asian and Latin American Experiences

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October 1996

Abstract

A number of developing countries have run large and persistent current account deficits in both the late seventies/early eighties and in the early nineties, raising the issue of whether these persistent imbalances are sustainable. This paper puts forward a notion of current account sustainability and compares the experience of three Latin American countries--Chile, Colombia Mexico--and three East Asian countries--Korea, Malaysia and Thailand. It identifies a number of potential sustainability indicators and discusses their usefulness in predicting external crises.

JEL Classification Numbers:
F32, F34

*We are grateful to Ricardo Caballero, Juan Carlos di Tata, Koichi Hamada, Yeong-Rin Kim, Phillip Lane, Jonathan Ostry, Patricia Reynolds and Andy Rose for comments and suggestions. We are also grateful to Brooks Calvo for assistance with the data and to Manzoor Gill for assistance with the Charts. The views expressed are those of the authors and do not necessarily reflect those of the International Monetary Fund.

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Summary

A number of East Asian and Latin American countries have received a large portion of total international capital flows to developing countries in two periods in the late 1970s-early 1980s and in the early 1990s. These inflows have financed persistent current account imbalances, as well as the accumulation of foreign exchange reserves. The recent Mexican crisis has shown, however, that abrupt reversals in international capital flows can cause severe problems for economies with large external imbalances and has spurred renewed interest in the question of current account sustainability.

In its theoretical part, this paper first discusses the related concepts of external solvency, current account sustainability and "excessive" current account deficits. It then presents a simple model of foreign borrowing when capital flows take the form of debt or foreign direct investment, analyzing asymmetric information, enforcement problems, and expropriation risk. In its empirical part the paper integrates current account and capital account factors and discusses the experience of three Latin American countries--Chile, Colombia Mexico--and three East Asian countries--Korea, Malaysia and Thailand. The discussion attempts to determine why some countries suffered external crises (an exchange rate collapse followed by a renegotiation of external debt or an international bailout) while others did not.

Given the track record of the East Asian countries over the last 25 years, a natural question to ask is whether macroeconomic and structural features make them less likely to experience a reversal in international capital flows or less vulnerable to such a reversal. In the sample in this paper, East Asian countries are characterized by a higher degree of openness and by higher levels of savings and investment than Latin American ones. The analysis presents arguments as to why these macroeconomic structural features can help an economy to sustain protracted current account imbalances.

I. Introduction

In the early 1990s, several developing countries in East Asia and Latin America have experienced substantial capital inflows, which, in some cases, have been accompanied by large and persistent current account deficits. These developments have raised the issue of whether these imbalances could eventually prove unsustainable, and would thus require a policy shift in order to avoid external crises similar to those experienced by some countries during the early eighties. Concerns about the sustainability of large and persistent current account deficits were heightened by the Mexican crisis of 1994 and its contagion effects, which drew attention to the risks of a sudden reversal of capital flows. The apparent failure of traditional financial market indicators to predict occurrence and scale of the Mexican crisis has spurred renewed interest in the study of "early-warning" indicators that could help predict the emergence of a financial/ exchange rate crisis (Frankel and Rose (1996), Goldstein (1996), Kaminsky and Reinhart (1996), Milesi-Ferretti and Razin (1996)).[1] This paper contributes to this literature by comparing the recent experience with large and protracted current account deficits in selected East Asian and Latin American countries with the experience in the same regions of the early eighties. It emphasizes in particular differences in current and capital account developments across regions and across periods, and examines a series of potential indicators of current account sustainability. The Latin American countries that are the subject of this study are Chile, Colombia and Mexico, while the East Asian countries are Korea, Malaysia and Thailand.[2]

The comparison attempts to determine which factors account for the variety of different country experiences and, in particular, for the fact that some countries suffered external crises (an exchange rate collapse followed by a re-negotiation of external debt or an international bailout) while others did not. Our analysis of different country episodes follows a non-structural, case study approach. This allows us to take into consideration a broader set of factors than those that can be encompassed in a testable, state-of-the-art model of current account determination, at the cost of being unable to provide a quantitative assessment of factors impinging on the sustainability of current account imbalances. We view this approach as complementary to both the testing of models of current account determination (Sheffrin and Woo (1990); Ghosh and Ostry (1995); Glick and Rogoff (1995)) and to econometric and non-structural statistical analyses that relates the probability of various types of external crisis to a number of potential indicators (Edwards (1989); Klein and Marion (1994); Eichengreen, Rose and Wyplosz (1995) and Frankel and Rose (1996)).

The natural question that comes to mind in evaluating the viability of external imbalances is whether the country is solvent; that is, whether it has the ability to generate sufficient trade surpluses in the future to repay existing debt. This notion of solvency may not always be the appropriate yardstick for evaluating the sustainability of external imbalances, for two main

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[1] For an examination of macroeconomic and financial market indicators prior to the demise of the EMS, see Eichengreen, Rose and Wyplosz (1995).

[2] For Chile and Korea we consider only the experience of the early eighties, because these countries did not run large current account deficits in the early nineties.

reasons. First, it considers only the ability to pay, but abstracts from the willingness to pay. The present value of trade surpluses may theoretically be sufficient to repay the country's external debt, but the country may lack sufficient incentives to divert output from domestic to external use in order to service the debt. Second, it normally relies on the assumption that foreign investors are willing to lend to the country on current terms. This assumption, however, may fail to hold, as investors' behavior may be altered by uncertainty about the country's willingness to meet its debt obligations, or by a shift in expectations following an external shock. Clearly, availability of foreign funds, together with other market imperfections, imposes constraints on the sustainability of current account imbalances in addition to those imposed by pure intertemporal solvency. We argue in this paper that a notion of current account sustainability needs to explicitly take into account willingness to pay and willingness to lend considerations, and that this broader notion of sustainability provides a better basis for understanding the potential implications of protracted current account imbalances.

For a country that has positive net external liabilities and is running persistent trade and current account deficits, solvency and sustainability require a "turning point" in the trade balance from deficits to surpluses. The issue is whether this "turning point" can be achieved smoothly, without disruptions in economic activity, or whether it is forced by events (as would be the case, for example, when capital flows are suddenly reversed). In this respect, a crisis episode can be characterized by a sharp contraction in consumption and economic activity, in conjunction with the sharp reversal of the trade balance, and/or by an inability to fully service outstanding external obligations.

The literature on external crises has emphasized the importance of both current account (macroeconomic) and capital account (financial) factors. For example, with regard to the Mexican crisis, Dornbusch, Goldfajn and Valdés (1995) have stressed in particular the role played by an overvaluation of the real exchange rate, while Calvo (1995) has mostly emphasized financial factors such as maturity and currency composition of domestic debt and their link with the level of reserves. In our analysis we focus on both current and capital account developments across regions and across time. A comparison between the 1980s and the 1990s reveals significant changes in both sources of current account imbalances and the nature of the capital flows, with some of these changes being common across both regions. For example, in some of the countries we examine, most notably Colombia, Malaysia, Mexico and Thailand, the large current account imbalances of the early eighties were accompanied by large fiscal deficits. In contrast, none of the countries we consider was running significant fiscal deficits in the early 1990s--external borrowing reflected private sector's savings and investment decisions. On the capital account side, external borrowing in the late seventies and early eighties took the form of syndicated loans; in the 1990s, a large fraction of capital inflows took the form of portfolio flows and foreign direct investment.

Regional differences between East Asia and Latin America in economic structure and macroeconomic policy have been the subject of numerous studies (see, for example, Sachs (1985) for a regional comparison during the debt crisis period, and Calvo, Leiderman and Reinhart (1994) for a comparative study of capital inflows and policy responses in the two regions during

the early 1990s). The differences in macroeconomic performance and in the vulnerability to external shocks have been linked to a number of factors, such as differences in the levels of savings and investment and in the degree of openness. In this paper we emphasize differences in the structure of the economy, in the macroeconomic policy stance, in the composition of external liabilities, as well as in the external environment.

The main conclusion of the paper is that the likelihood of external crises has to be related to a composite set of factors, rather than relying on the robustness of individual indicators. Our interpretation of the evidence presented for this limited sample of country episodes is that the interest rate burden of external obligations and their composition interact with macroeconomic and structural factors, such as the level of savings and investment, the degree of openness, the level and flexibility of the exchange rate and the health of the financial system in determining whether protracted current account balances are likely to result in external crises.

The rest of the paper is organized as follows. Section II discusses solvency and sustainability of current account deficits in the context of standard intertemporal models of current account determination, in which the supply of foreign funds is infinitely elastic at the world interest rate. Section III examines key determinants of the supply of foreign funds in the presence of various capital market imperfections, in particular asymmetric information, and contrasts debt and FDI flows. Section IV presents a cross-country comparison of potential sustainability indicators, related to macroeconomic and structural features of the countries, as well as to the composition of external liabilities and the magnitude of external shocks. Section V concludes.

II. Notions of External Solvency and Sustainability

In evaluating the macroeconomic and external implications of persistent current account deficits, three questions ought to be addressed. Is the debtor country solvent? Is the current account deficit excessive? Are current account imbalances sustainable? In this section we clarify the relation between these concepts, and we develop a notion of current account sustainability.

A. Solvency

The natural starting point for our analysis is the standard national accounting. The current account balance, *CA*, is the change in the net foreign liabilities of a country. In an accounting framework, it is defined as follows:

$$\begin{aligned} CA_t \equiv F_t - F_{t-1} &= Y_t + r^* F_{t-1} - C_t - I_t - G_t \\ &= S_{pt} + S_{gt} - I_t \end{aligned} \tag{1}$$

where F is the stock of net foreign assets, Y is GDP, r^* is the world interest rate (assumed for simplicity to be constant), C is private consumption, G is government current expenditure, I is total investment (private and public), S_p is private savings and S_g is public savings. As the second equality in (1) shows, the current account balance is also equal to the difference between the economy's total savings and total investment. Current account imbalances are vehicles for the intertemporal allocation of resources.

We assume in this section that capital mobility is perfect, so that the net supply of foreign funds is infinitely elastic at the world interest rate level, postponing the discussion of imperfections in international capital markets to the next section. Intertemporal solvency is defined as a situation in which the country as a whole, and each economic unit within the country, including the government, obey their respective intertemporal budget constraints. The basic solvency requirement can be expressed by iterating forward the difference equation (1) and imposing the standard transversality condition that the present value of net indebtedness in the indefinite future has to tend to zero:

$$-(1+r^*)F_{t-1} = \sum_{s=t}^{\infty} \frac{1}{(1+r^*)^{s-t}}(Y_s - C_s - I_s - G_s) \qquad (2)$$

The RHS of equation (2) is simply the present discounted value of future trade surpluses (deficits), that must be equal to the present level of foreign debt (assets) in order for the country to be solvent. If a country has run persistent trade and current account deficits, thereby accumulating external debt, the solvency condition in equation (2) requires a "turning point" from trade deficits to surpluses, but is silent about timing and nature of this shift. This is a reflection of the fact that the solvency condition does not impose any structure on future events/policy decisions since, being an accounting relation, it does not incorporate any behavioral assumption.

What are the implications of the solvency condition for the long-run level of income and absorption? It is possible to impose some more "structure" on the condition for solvency by considering the fact that, for an economy to remain solvent, the ratio of external indebtedness to output cannot grow without bound. Assume that the domestic economy grows at a given rate $\gamma < r$ [3] and let lower-case letters indicate ratios of variables to GDP. Abstracting from changes in the real exchange rate, equation (1) can then be expressed as follows:

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[3]Otherwise a country could play "Ponzi games" indefinitely -- that is, borrowing to repay interest on its outstanding debt, without violating solvency conditions, as long as total indebtedness rises at a rate below the economy's growth rate. This possibility, which can arise in a Samuelson-type overlapping generations model (see Gale (1973)), implies that the economy follows a dynamically inefficient growth path.

$$f_{t+1} - f_t = \frac{1}{1+\gamma_t}[tb_t + f_t(r^* - \gamma_t)] \tag{3}$$

where *tb* is the trade balance. This expression simply says that changes in the ratio of foreign assets to GDP are driven by trade imbalances and by a "debt dynamics" term proportional to $f(r^* - \gamma)$. This latter term rises with the world rate of interest and falls with the rate of growth of the domestic economy. Consider now an economy in steady state, in which consumption, investment, and public expenditure are constant as a fraction of GDP. The long-run net resource transfer (trade surplus) that an indebted country must undertake in order to keep the debt to output ratio constant is determined by:

$$tb = 1 - i - c - g = -f(r^* - \gamma) \tag{4}$$

In the presence of economic growth a country can sustain permanent current account deficits while remaining solvent even when the growth rate is below the world interest rate, provided they are accompanied by sufficiently large trade surpluses. In this case, net resource outflows as a fraction of GDP will be smaller the higher the growth rate. More generally, a higher growth rate can facilitate a smoother "switch" in the trade balance. The size of the net resource transfer implied by condition (4) has been used as a simple measure of solvency in a number of studies. For example, Cohen (1995) considers the Mexican resource transfers (as a fraction of GDP) after the 1982 debt crisis as an "upper bound" on the feasible resource transfers for heavily indebted countries, and he compares this magnitude with each high debt country's resource transfer as defined by (4) , in order to assess its solvency prospects (see also Cohen (1992)). Reisen (1996) considers an augmented version of (4) that accounts for real exchange rate dynamics and variations in foreign exchange reserves to calculate a steady-state "debt-related" current account balance for a number of East Asian and Latin American economies.

Equation (4) provides a long-run condition for the stability of the foreign assets-to-GDP ratio, a sufficient condition for solvency. The fact that it refers to an economy which is in "steady state" is its major limitation. Indeed, for developing countries protracted current account imbalances are likely to characterize their transition towards higher levels of output, implying that steady state conditions may not always be the appropriate benchmark to evaluate the sustainability of current account imbalances.

B. The Notion of Sustainability

The notion of solvency defined in the previous sub-section has no behavioral content, and has therefore limited policy relevance. Therefore the literature has attempted to define a baseline for private agents' behavior and for future policy actions. With regard to private agents' behavior, it is typically assumed that they aim at smoothing their consumption stream, consistently with maximization of a concave utility function. With regard to future policy actions, in the case of public sector solvency the baseline has typically been established done by

postulating a continuation into the indefinite future of the current policy stance and no change in the relevant features of the macroeconomic environment (see, for example, Corsetti and Roubini (1991)). This gives rise to the notion of "sustainability"--the current policy stance is sustainable if its continuation in the indefinite future does not violate solvency (budget) constraints. The definition of sustainability based on solvency considerations is simpler for fiscal imbalances, given that these can be associated (at least to some degree) with direct policy decisions on taxation and government expenditure. Defining sustainability is more complex in the case of current account imbalances, given that these reflect the interaction between savings and investment decisions of the government and domestic private agents, as well as the lending decisions of foreign investors. While government decisions can, to a first approximation, be taken as given, private sector decisions are going to depend on their perceptions regarding future government actions. Furthermore, a key relative price, the exchange rate, is a forward-looking variable that by definition depends on the future evolution of policy variables.

The question of whether current account imbalances are sustainable can be reformulated as follows. If the current policy stance is maintained, is the "turning point" from trade deficits to trade surpluses likely to occur smoothly (i.e., without drastic changes in consumption and economic activity)? If the answer is yes, then the current policy stance is sustainable. By contrast, if an unchanged policy stance is eventually going to entail a "drastic" policy shift to reverse the trade balance position (such as a sudden policy tightening causing a large recession), or lead to a financial crisis (such as an exchange rate collapse leading to an inability to service external obligations), we have a case of unsustainability. This drastic change in policy or crisis situation can be triggered by a domestic or an external shock, that causes a shift in domestic and foreign investors' confidence and a reversal of international capital flows.[4] A crisis episode can be characterized by a sharp contraction in consumption and economic activity, in conjunction with the sharp reversal of the trade balance, together with an inability to fully service outstanding external obligations. Note that the shift in foreign investors' confidence may relate to their perception of a country's inability or unwillingness to meet its external obligations.

C. "Excessive" Current Account Imbalances

The accounting relations considered so far are of limited help in answering the question whether a given sequence of current account deficits is "excessive". In order to provide a framework that would allow us to address this question, it is necessary to rely on a model that specifies the behavior of consumption, investment and output. Actual imbalances can then be compared to the theoretically predicted ones in order to judge whether they have been excessive or not. In order to examine this question it is useful to first express the current account as the deviation of each absorption component from its "permanent" level. Following Sachs (1982), we

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[4]In the presence of uncertainty, definition of solvency and sustainability rely on expected values, implying that in some states of the world insolvency will occur. Under these circumstances, the issue becomes how likely the occurrence of a "bad" scenario is, and how vulnerable is a country to external shocks.

calculate the annuity values of each form of income and spending, Y_p, C_p, G_t and I_p which we identify with the superscript P.[5] Government solvency requires equality between the permanent level of government consumption and the annuity value of public sector wealth, which is given by the PDV of taxes plus the initial net asset position of the government:

$$G^P = \frac{r}{1+r}\left[(1+r)F_{gt-1} + \sum_{s=t}^{\infty}\left(\frac{1}{1+r}\right)^{s-t} T_s\right] \tag{5}$$

where F_g is the public sector's level of net assets. The net foreign asset position of the country, F, is given by $F_p + F_g$, since government net liabilities vis-à-vis the private sector cancel out. Using (2) and (2b) together with the economy's resource constraint (1) we obtain the following expression for the current account:

$$CA_t = (Y_t - Y_t^P) - (C_t - C_t^P) - (I_t - I_t^P) - (G_t - G_t^P) \tag{6}$$

Therefore, current account imbalances in an intertemporally solvent economy reflect deviations of output, consumption, investment and/or government spending from their "permanent" levels.

Two main approaches to the empirical implementation of intertemporal models of the current account have been used. The first approach emphasizes the consumption-smoothing role of the current account. Consider a small open economy under perfect capital mobility, that takes the world interest rate as given. In the absence of adjustment costs, investment will be undertaken so as to equate the marginal product of capital to the world interest rate in every period, regardless of the consumption profile. The latter will be determined by utility maximization considerations, subject to an intertemporal budget constraint. Assume for simplicity that the

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[5]The annuity value is calculated from the sum of the present discounted values (PDV) of present and future flows, and is given by:

$$X^P = \frac{r^*}{1+r^*}\sum_{s=t}^{\infty}\left(\frac{1}{1+r^*}\right)^{s-t} X_s \qquad X = Y, C, G, I \tag{2a}$$

In order to ensure solvency of the private sector, the PDV of lifetime consumption should be equal to the PDV of lifetime disposable income (private sector wealth). Accordingly, the permanent (solvent) level of private consumption must equal the annuity value of private sector wealth:

$$C^P = \frac{r^*}{1+r^*}\left[(1+r^*)F_{pt-1} + \sum_{s=t}^{\infty}\left(\frac{1}{1+r^*}\right)^{s-t}(Y_s - I_s - T_s)\right] \tag{2b}$$

where F_p is the private sector's level of net assets (domestic and foreign) and T is the tax burden. See Obstfeld and Rogoff (1996) for a more complete discussion.

consumption function takes a quadratic form, and that the discount rate equals the real interest rate.[6] In this case the level of consumption will be fixed along the optimal path, and will be determined by

$$C_t = C^P = rF_{t-1} + \frac{r}{1+r}\sum_t^{\infty} \frac{1}{(1+r)^{s-t}}(Y_s - I_s - G_s) \qquad (7)$$

Given the quadratic utility assumption, certainty equivalence holds and therefore the same equation will hold in the presence of uncertainty, with consumption being a function of the expected present discounted value of future net output. In this case, re-arranging terms in a stochastic version of equation (6), one obtains:

$$CA_t = -\sum_{s=t+1}^{\infty} \frac{1}{(1+r)^{s-t}} E_t \Delta(Y_s - I_s - G_s) \qquad (8)$$

According to equation (8), current account deficits reflect expected increases in future net output. This equation has been used as the basis for tests of current account behavior by Sheffrin and Woo (1990), Otto (1992) and Ghosh (1995) for a sample of industrial countries and by Ghosh and Ostry (1995) and Ostry (1996) for developing countries. The basic idea is an application of Campbell's (1987) methodology for testing the permanent income theory of consumption, and consists in the estimation of a simple VAR model linking the (detrended) current account and changes in net output to past values of the same variables. The current account needs to be detrended in order to eliminate any consumption-tilting component (see footnote 6). The model's implication is that the current account balance should incorporate all available information for predicting future changes in net output, and therefore the coefficient on past net output changes in the equation determining current net output changes should be zero. The simple behavioral model sketched above allows one to construct a predicted current account path, that can be compared with the actual one in order to gauge whether, according to the model, actual current account balances have been "excessive". [7]

An alternative method of estimating an intertemporal model of current account determination has been used by Glick and Rogoff (1995) and Leiderman and Razin (1991). The methodology consists in the determination from an intertemporal model with investment

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[6] The latter assumption is not innocuous: it implies the absence of a "consumption-tilting" term that would lead to an increasing or a decreasing consumption path.

[7] Cashin and McDermott (1996) use this VAR methodology to construct a model-generated series of the level of external liabilities, and suggest that the difference between the actual path of external liabilities and the theoretically constructed one can provide information about the sustainability of external imbalances.

adjustment costs and perfect capital mobility of the predicted responses of the investment and the current account to various types of productivity shocks (global and country-specific, temporary and permanent), as well as to other shocks, and in the subsequent estimation of the model. While the presence of investment adjustment costs and stochastic productivity lend more realism to the model, the data requirements for this type of estimation have so far limited its application to a sample of industrial countries.

What is the relation between external solvency, current account sustainability and "excessive" current account deficits? The concepts of solvency and sustainability are binary--a country is either solvent or insolvent, and a path of current account deficits either sustainable or unsustainable--and imply an increasing order of restrictiveness. The first concept, based on the intertemporal budget constraint, can accommodate a variety of future behavior patterns. The second is based on a continuation of the current policy stance, and therefore imposes more structure on future behavior. The notion of excessive current account deficits provides instead a quantitative metric based on deviations from an optimal benchmark (structurally derived from a model under the assumption of perfect capital mobility and efficient financial markets). One problem in using this metric as a basis for evaluating how close to unsustainability is a given path of current account imbalances is that its benchmark relies on the absence of capital market imperfections; consequently, deviations from the benchmark can simply reflect the existence of liquidity constraints or other financial market imperfections. We discuss how these imperfections can affect the supply of external funds in the next section; we do not, however, attempt to incorporate imperfect capital markets in an encompassing intertemporal model. Instead, we rely on the insights of the theoretical discussion to examine the issue of sustainability of protracted current account imbalances following a non-structural approach. We can thus incorporate a broader set of theoretical considerations than those that can be accommodated in a structural approach using the state-of-the-art equilibrium models, at the cost of lacking the ability to provide a quantitative analysis of sustainability.

III. Supply of External Funds, FDI and Debt Flows

In the simple intertemporal framework we have considered so far, market imperfections such as asymmetric information, moral hazard, and absence of bankruptcy arrangements do not play a role in shaping international borrowing and lending. These problems, however, are relevant, in particular for developing countries, typically characterized by shallower financial markets and higher vulnerability to external shocks, such as changes in the terms of trade, than more advanced industrial countries. A vast literature, mostly spawned by the debt crisis experiences of 1982,[8] has used imperfect capital market models to study how the equilibrium level of international lending depends on the form of creditor sanctions (including loss of reputation), the ability of the borrower to make credible commitments (for example, through

[8] For an early analysis of sovereign borrowing in private financial markets pre-dating the debt crisis, see Eaton and Gersovitz (1981).

investment), relative bargaining power in debt renegotiations etc. (see Eaton and Fernández (1996) for a recent theoretical survey on sovereign debt, and Cline (1995) for a retrospective on the debt crisis).

The portfolio choice of a risk-averse international investor can give rise to an upward-sloping supply-of-funds schedule (see, for example, Milesi-Ferretti and Razin (1996)). In addition to risk-aversion considerations, asymmetric information and enforcement problems can, however, play a pervasive role in international borrowing and lending, in particular for countries with less developed capital markets. The intensity of these problems is also a function of the type of capital flows a country is receiving. Following Razin, Sadka and Yuen (1996) we present a simple model that shows how these factors affect the behavior of domestic borrowers and international lenders when capital flows take the form of debt and of foreign direct investment.

A. Debt Flows

The domestic economy has N identical firms, that use capital to produce output with a technology that has stochastic returns, and borrow from domestic and from international capital markets. For each individual firm, the production function is $Y = F(K)(1 + \epsilon)$, where ϵ is a stochastic variable distributed on the interval (-1, 1). Firms make their investment decisions before the state of the world (that is, ϵ) is known. Thus, since all firms face the same probability distribution of ϵ, they all choose the same level of investment (K). They then learn about the state of the world, and subsequently issue debt, either at home or abroad, to finance the investment. At this stage, domestic lenders are better informed than foreign lenders. There are many ways to specify the degree of this asymmetry in information. However, in order to facilitate the analysis, we simply assume that domestic lending institutions, being "close to the action," observe ϵ before they make their loan decisions, but foreign lending institutions, being "far away from the action" do not. We model enforcement problems by assuming that, in the event a domestic firm defaults, creditors are able to appropriate only a fraction δ of the total value of the firm.[9]

Competition among the borrowing firms and among the lending institutions, both domestic and foreign, ensures that there will be a unique interest rate charged to all the domestic borrowing firms. Denote this domestic interest rate by r. Given its investment decision (K), a firm will default on its debt if the realization of its random productivity factor is low so that the output that would be appropriated by creditors $\delta F(K)(1 + \epsilon)$ is smaller than its accumulated debt $K(1+r)$. Thus, there is a cut-off value of ϵ_o, such that all firms which realize a value of ϵ below ϵ_0 default and all other firms (that is, firms with $\epsilon > \epsilon_0$) fully repay their debts. This cut-off level of ϵ is defined by

$$\delta F(K)(1 + \epsilon_0) = (1 + r)K \tag{9}$$

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[9]Results would be analogous if we were to assume that only foreign creditors cannot fully appropriate the firm's resources.

Denote the cumulative probability distribution of ϵ by ϕ. Then, $N\phi(\epsilon_0)$ firms default on their debt while the other $N[1-\phi(\epsilon_0)]$ firms remain solvent.

Recall that domestic lenders observe the value of ϵ before making their loan decisions. Therefore, they will not be willing to extend credit to firms with positive net worth but ϵ below ϵ_0, since these firms would still have an incentive to default; they will only finance those firms with $\epsilon > \epsilon_0$. Foreign lenders instead do not observe ϵ, so that they will advance loans to all firms, since they all look identical to them. Thus, foreign lenders will give loans to all the $N\phi(\epsilon_0)$ firms that will choose to default and to some fraction (say, β) of the $N[1-\phi(\epsilon_0)]$ would-be solvent firms (the other fraction, $1 - \beta$, of the would-be solvent firms is financed by domestic lenders). The total amount of loans made to domestic firms by foreign lenders, that we denote by *FPDI* (Foreign Portfolio Debt Investment) is therefore $[\beta N(1 - \phi(\epsilon_0)) + N\phi(\epsilon_0)]K$.

Let e^- is the mean value of ϵ realized by the bankrupt firms, i.e. $e^- \equiv E(\epsilon/\ \epsilon \leq \epsilon_0)$. For later use we also define by e^+ the conditional expectation of ϵ, given that $\epsilon \geq \epsilon_0$, i.e. $e^+ \equiv E(\epsilon/\ \epsilon \geq \epsilon_0)$.[10] Total receipts of foreign lenders on their loans are then given by:

$$A = \beta N[1 - \phi(\epsilon_0)]K(1 + r) + N\phi(\epsilon_0)\delta F(K)(1 + e^-) \qquad (10)$$

The first term on the RHS of (10) is the amount received by lenders from the solvent firms. Each defaulting firm can pay back only a fraction hat is $\delta F(K)(1+\epsilon)$. The second term on the RHS of (10) is the total amount foreign lenders receive from the bankrupt firms, that pay back only a fraction δ of their gross output.

Since foreign lenders can earn a return of r^* in their home countries, it must be the case that $FPDI\ (1 + r^*) = A$. Substituting for the values of *FPDI* and A determined above, this condition becomes:

$$\left[\beta N[1 - \phi(\varepsilon_0)] + N\phi(\varepsilon_0)\right]K(1 + r^*) = \beta N[1 - \phi(\varepsilon_0)]K(1 + r) + N\phi(\varepsilon_0)\,\delta F(K)(1 + e^-) \qquad (11)$$

This equation, together with (9), determines the supply of external funds to domestic firms, for a given level of β. What are its implications for the domestic interest rate in relation to the world rate? Intuitively, foreign lenders will charge ex ante a risk premium on the world rate of return r^* because of the risk of default. Indeed, substituting (9) into (11) and re-arranging terms, we obtain the following expression:

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[10]Note that the weighted average of e^- and e^+ must yield zero (the average value of ϵ). It follows that the expected value of ϵ for the "bad" ("good") firm is negative (positive): that is, $e^- < 0$ ($e^+ > 0$).

$$1 + r^* = (1 + r)[\alpha + (1 - \alpha)\frac{1 + e^-}{1 + \epsilon_0}]$$
$$\alpha = \frac{\beta[1 - \phi(\epsilon_0)]}{\beta[1 - \phi(\epsilon_0)] + \phi(\epsilon_0)} \qquad (12)$$

Since e^- is smaller than ϵ_0, it follows that r is larger than r^*.

We now turn to the demand side-- that is, the debt-financed investment decision of a representative firm. This firm invests K in the first period and expects to receive a gross output of $E[F(K)(1 + \epsilon)] = F(K)$ in the second period. It also knows that if ε turns out to be smaller than ε_0, it will default on its debt. This firm expects then to pay back its accumulated debt, that is $K(1 + r)$, with probability $1 - \phi(\epsilon_0)$. It expects to default, paying only $\delta F(K)(1 + e^-)$, with probability $\phi(\epsilon_0)$. Thus, the expected value of its cash receipts in the second period are

$$F(K) - [1 - \phi(\epsilon_0)]K(1 + r) - \phi(\epsilon_0)\delta F(K)(1 + e^-) \qquad (13)$$

Maximizing the latter expression with respect to K yields the following first-order condition:

$$F'(K) = \frac{1 - \phi(\epsilon_0)}{1 - \phi(\epsilon_0)\delta(1 + e^-)}(1 + r) \qquad (14)$$

Note that since $1 + e^- < 1$, it follows that $F'(K) < 1 + r$. Knowing that under "bad" realizations of ϵ (when $\epsilon \leq \epsilon_0$) it will not fully repay its loan, the firm invests beyond the level where the unconditional expected net marginal productivity of capital is equal to the interest rate. Therefore, asymmetric information implies that i) the domestic interest rate will be above the world rate and ii) the marginal product of capital is driven below the domestic rate of interest. These problems are compounded by the existence of enforcement problems on foreigners' claims on domestic firms, captured by the term δ.

The model can be closed by determining endogenously the fraction β of funds that "good" firms will borrow from abroad, which depends on equilibrium domestic savings (for details, see Razin, Sadka and Yuen (1996)).

B. FDI Flows

From an economic point of view, we look at FDI not just as a purchase of a sizable share in a company but, more importantly, as an actual exercise of control and management. We thus view FDI as a tie-in activity, involving an inflow of both capital and managerial inputs. We make three key assumptions. The first is that this combination of inputs accords foreign investors with the same kind of "home-court" advantage (with respect to, say, business information) that domestic investors have, but foreign portfolio (debt and equity) investors lack. Specifically, foreign direct investors can learn about the state of the world (i.e., the realization of the productivity factor ϵ) at the same time as domestic investors. The asymmetric information feature of the preceding section is thus circumvented by FDI. The second key assumption is that FDI is also a form of technology transfer, that enhances the productivity of foreign-owned firms. The third assumption is that FDI investment is subject to the risk of capital taxation at a rate t with probability p.

A foreign direct investor purchases a domestic company from scratch, at the "greenfield" stage, i.e., before any capital investment has been made. In fact, the foreign direct investor makes the capital investment decision herself and imports a bundle of inputs, K^* and M^*, where K^* is capital and M^* is a managerial input. Gross output in the second period is $(1 + M^*)^{\gamma}F(K^*)(1 + \epsilon)$, where $0 < \gamma < 1$. The first term captures the productivity-enhancing effects of technology transfer. If J firms are purchased by the foreign direct investors, for a price of V per firm, then the total volume of FDI is given by

$$FDI = J(K^* + V) \tag{15}$$

Equation (15) says that the total cost of FDI is composed of two elements: the purchase price of the firm (V) and the imported capital input K^*. Gross output of a domestically owned firm, which invests a capital input of K, continues to be $F(K)(1 + \epsilon)$. As foreign investors and domestic investors are equally informed, the expected value of ϵ is equal for both investors, i.e., zero.

If a firm is sold to foreign direct investors, its expected second-period cash receipts, will be

$$(1 + M^*)^{\gamma}F(K^*)(1 - pt) - M^*w_M^* \tag{16}$$

where w^*_M is the world wage of managerial inputs. The net value V to the foreign investors of a firm purchased in the first period is $[1 + M^*)^{\gamma}F(K^*)(1 - pt) - M^*w_M^*]/(1 + r^*) - K^*$. Similarly, the market value of a domestically-owned firm is given by $- K + F(K)/[1 + r]$. Arbitrage considerations require equality between the value of domestically-owned and foreign-owned firms:

$$\frac{(1+M^*)^{\gamma}F(K^*)(1-pt)-M^*w_M^*}{1+r^*}-K^*=\frac{F(K)}{1+r}-K \tag{17}$$

Optimizing behavior on the part of all firms (i.e., maximization by foreign investors of the LHS of (17) with respect to K^* and M^* and by domestic investors of the RHS of (17) with respect to K) yields:

$$(1+M^*)^{\gamma}F'(K^*)(1-pt)=1+r^* \tag{18}$$

$$\gamma(1+M^*)^{\gamma-1}F(K^*)(1-pt)=w_M^* \tag{19}$$

$$F'(K)=1+r \tag{20}$$

The equation system composed by (17)-(20) can be solved for the equilibrium values of the four endogenous variables K, r, K^* and M^* as a function of the exogenous variables r^*, w_M^* and pt. The spread between the domestic rate of interest r and the foreign rate r^* increases when the tax rate or the probability of taxation of foreign investment increases. For γ close to zero (in which case foreign firms have almost no technological advantage) it is easy to show that the spread between r and r^* is positive (see equations (17), (18) and (20) for γ, and hence M^*, close to zero).

In the simplified setup that we presented, the advantages of FDI flows for domestic residents stem from their productivity enhancement role and the fact that they allow to circumvent asymmetric information problems. The perceived risk of taxation/expropriation, however, can raise the rate of return required by foreign investors. Empirical studies have suggested that FDI flows can have positive effects on economic growth (see Borensztein, De Gregorio and Lee (1994)) and are associated with lower probabilities of an exchange rate collapse (Frankel and Rose (1996)). On the other side, if a country tries to avoid an equilibrium exchange rate appreciation by restricting debt flows, but is allowing foreign direct investment, it is subsidizing foreigners' purchases of domestic assets, that are kept artificially cheap by the

exchange rate policy. More generally, the key issue is whether relative price distortions are causing a sectoral misallocation of foreign investment. [11]

C. Imperfect Information: Additional Aspects

One additional aspect of asymmetric information is that the rate of interest a bank charges may itself affect the riskiness of loans by affecting either i) the action of borrowers (moral hazard or incentive effect) or ii) their characteristics (sorting or adverse selection effect). As shown in Stiglitz and Weiss (1981) this type of asymmetric information problems can lead to credit rationing.[12]

The existence of implicit or explicit bailout clauses can worsen moral hazard problems, in an analogous fashion to a decline in collateral. In practice, the international financial community may be unwilling to let a country default on its debt obligations, because of the trade and capital markets disruptions this could induce or for protection of foreign investors.[13] Moral hazard problems may also be exacerbated by the implicit or explicit bailout clauses within a debtor country: for example, excessive borrowing by the banking sector can be induced by expectations of a government bailout should the sector run into financial difficulties. Moral hazard problems in international borrowing and lending can also arise whenever the borrower can take "hidden actions" that affect output and hence its ability/willingness to meet external obligations. Gertler and Rogoff (1990) emphasize how these problems can arise when a borrower cannot commit to using funds for investment, rather than for "disguised consumption" or capital flight. This argument links the intensity of moral hazard problems -- and hence the level of lending--with the level of investment or (inversely) with capital flight; it also underscores how foreign direct investment may be a way for foreign investors to ensure that the final use of their funds is "appropriate".

What other macroeconomic and structural features of a borrower can affect the willingness to pay and willingness to lend variables? In principle, variables that increase the cost of default on foreign obligations (by raising, for example, the impact on the domestic economy of sanctions or isolation from international capital markets) strengthen willingness to pay and therefore make a sudden reversal in capital flows less likely. If default is associated with trade disruptions, its cost will be higher for more open economies. If the "punishment" for default consists in the inability to borrow and lend on international capital markets (at least for some

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[11] We are grateful to Ricardo Caballero for this point. Fry (1993b) found that the growth effects of FDI flows are reversed in the presence of trade distortions and financial repression.

[12] See also Folkerts-Landau (1985) for an open-economy application.

[13] On the effect of this type of moral hazard on the behavior of commercial banks lending to developing countries, see, for example, Dooley (1995).

time), its cost would be higher for countries with higher output variability, because of the inability to smooth consumption.

A related set of considerations arises when one examines whether a country is vulnerable to a reversal of capital flows caused by a sudden shift in investors' sentiment, that would by itself validate the expectations driving investors' actions. This possibility is captured in models featuring multiple expectations-driven equilibria (see, for example, Calvo (1995) and Obstfeld (1994, 1996)). In these models, for "bad" equilibria to arise there typically must be some underlying weakness in economic fundamentals (for example, low foreign exchange reserves or a weak banking system), even though this weakness by itself need not lead to a crisis, in the absence of a shift in expectations.[14] This suggests the importance of taking a close look at fundamentals when assessing the sustainability of current account imbalances, even in the absence of clear crisis signals, and to evaluate the potential for shocks that could trigger a shift in expectations.

In sum, informational asymmetries, enforcement problems and other forms of capital market imperfections can cause the supply of external funds to be less than perfectly elastic, and to be subject to shifts for a number of domestic and external shocks. In the next section we build on the theoretical analysis to elaborate on how structural factors as well as the macroeconomic policy stance determine the vulnerability of the economy to shocks, referring to specific country experiences.

IV. A Comparative Analysis

Before discussing more in detail different indicators identified in the theoretical analysis, it is useful to briefly highlight some common features of the different country experiences. We start with the 1980s.[15] First, all the countries in our sample experienced a substantial worsening in external conditions during this period, with large terms of trade shocks, a substantial increase in world interest rates, and the demand effects of the world recession of 1981-82. Second, the countries in our sample experienced a sustained real exchange rate appreciation during the period of high current account imbalances (a partial exception being Korea). As a result, the exchange rate at the time of the crisis or policy shift was appreciated with respect to historical averages.

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[14] This is a feature that distinguishes these models from "first-generation" models of balance of payments crises à la Krugman (1979) where a policy inconsistency inevitably leads to a crisis.

[15] Detailed country studies are beyond the scope of this paper. For a discussion of the experience of Malaysia during the 1980s, see, for example, Demery and Demery (1992); on Thailand during the same period, see Robinson et al. (1991); on Korea, see Aghevli and Marquez-Ruarte (1985), Collins and Park (1989) and Haggard et al. (1994); on Colombia, see Ocampo (1989), Carrasquilla (1995) and Clavijo (1995); on Chile, see Edwards and Cox-Edwards (1987), Larraín (1991) and Corbo and Fischer (1994); on Mexico in the eighties, see Buffie (1989) and Hierro and Sanginés (1991), and on the recent Mexican crisis, see International Monetary Fund (1995a, b); Calvo and Mendoza (1996a, b); Sachs, Tornell and Velasco (1996) among many others.

Third, in Malaysia, Thailand, Colombia and Mexico persistent current account deficits during the late seventies and/or early eighties were associated with large fiscal imbalances.[16] Therefore the policy adjustment (pre-emptive or forced by an external crisis) involved both a fiscal and an external dimension, and took the form of a large fiscal consolidation together with a nominal depreciation of the exchange rate. The latter resulted in a substantial real depreciation which, together with an output slowdown at the beginning of the adjustment period, temporarily raised the ratio of external debt to GDP. However, in the countries that avoided a crisis the real depreciation also spurred export growth and therefore reduced current account imbalances; as a result, the external debt to GDP ratio started to decline.

The experience with protracted current account deficits during the 1990s has different characteristics, both on the external side and on the macroeconomic policy side. With regard to external conditions, at the beginning of the decade short-term interest rates were low and economic activity in industrial countries very weak. These conditions, together with the change in domestic conditions in a number of developing countries that implemented market-oriented reforms and undertook macroeconomic stabilization policies, played an important role in the new wave of capital inflows from industrial to developing countries, a significant fraction of which took the form of portfolio and foreign direct investment.[17] Calvo, Leiderman and Reinhart (1993) find that external factors account for a significant fraction of the variance in real exchange rates and foreign exchange reserves in a sample of Latin American countries; Chuhan, Claessens and Mamingi (1993) find that external variables "explain" around half of bond and equity flows from the US to Latin American countries; Fernandez-Arias (1996) finds that the decline in world interest rates in the early 1990s improved creditworthiness of debtor countries, and that "push" factors were dominant in the renewal of capital flows. Also, the volatility of terms of trade has been less severe than in the 1980s. With regard to macroeconomic conditions, they were in general more stable; in particular, none of the countries we consider experienced sustained fiscal imbalances--current account imbalances mainly reflected a gap between private savings and private investment. Only Mexico, that used the exchange rate as a nominal anchor in a disinflation process, experienced a sustained real exchange rate appreciation comparable to the ones of the previous decade.

A number of features distinguish the Latin American and East Asian countries in our sample. Both during the 1980s and the 1990s the East Asian countries had higher levels of savings and investment, and a higher degree of openness (as measured by the ratio of exports of goods and services to GDP). Since there was no significant difference in debt levels as a fraction of GDP during the 1980s, this implied that the debt to exports ratio was considerably lower in East Asian countries. Openness increased for every country we consider between the 1980s and

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[16] Korea also experienced severe macroeconomic problems, including fiscal imbalances.

[17] For a discussion of capital inflows in the countries in our sample, see Schadler et al. (1993); Corbo and Hernández (1995); International Monetary Fund (1995b); Khan and Reinhart (1995); and Koenig (1996).

the 1990s, while the east Asian countries stand out for their large increase of national savings and domestic investment between the two decades.

We turn now to a more detailed examination of factors related to current account sustainability, based on the theoretical analysis of Sections II and III, focusing first on external variables, and then on macroeconomic and financial indicators.

A. External Variables

Table 1 shows the behavior of the average real interest rate on external debt.[18] It highlights the very large increases in the period 1979-82. The overall impact of these interest rate increases was compounded by the dynamics of tradable goods' prices, measured in dollar terms: these implied very large increases in real interest rates, in particular for Mexico, Chile, Korea and Thailand in 1982. The overall impact of the real interest rate increase depends on the debt-to-GDP ratio: among the countries in our sample, Chile, Korea and Malaysia had a higher external debt-to-GDP ratio than Colombia, Thailand and Mexico around the time of the debt crisis (see Table 3). In the mid-eighties--at the time Colombia, Malaysia and Thailand implemented a policy shift--external conditions (in terms of interest rates) were more favorable.

Table 2 presents the evolution of the terms of trade. Economic theory suggests that the optimal response of the current account depends, inter alia, on the perceived persistence of the shock, with an improvement following positive temporary shocks and a possible deterioration if the positive shock is permanent and stimulates investment significantly.[19] All countries experienced large shocks during the late seventies and the eighties, but with different timing. Mexico had a dramatic terms of trade improvement in the period 1979-81, reflecting the oil price boom, but a large subsequent deterioration, that brought its terms of trade back to their level in the late seventies. Korea was hit heavily by the oil shock, with a large terms-of-trade deterioration in 1980. Chile's terms of trade worsened considerably from 1980 onwards, while Malaysia's adjustment period in 1985-86 also coincided with a large negative terms-of-trade shock. Thailand had a significant terms-of-trade deterioration between 1978 and 1982, while Colombia experienced large swings. Overall, terms-of-trade volatility was higher in the three Latin American countries during the 1980s; however, the impact of terms-of-trade shocks on the domestic economy is also a function of the degree of openness, which was much larger in East

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[18] The real interest rate is defined as the average nominal interest rate on external debt, in dollar terms, deflated by a 3-year moving average index of domestic tradables' prices measured in dollars. Domestic tradables' prices are proxied by a weighted average of the country's export unit values and industrial country's export prices. The methodology draws from Sachs (1985).

[19] See, for example, Obstfeld and Rogoff (1995) and Razin (1995). Tornell and Lane (1996), however, argue that in countries where strong interest groups compete for fiscal resources, even a temporary terms-of-trade improvement can induce an increase in redistributive activity by relaxing constraints on public spending. This can cause a deterioration in the current account.

Table 1. Real Interest Rates on External Debt*

	Chile	Colombia	Mexico	Korea	Malaysia	Thailand
1975	-4.6	-14.5	-5.9	-5.9	-4.3	-4.3
1976	3.1	-14.3	-8.4	-0.1	3.3	-0.3
1977	-1.3	-12.2	-9.6	-3.6	-0.4	2.4
1978	-7.1	- 6.8	-9.3	-7.1	-5.6	-2.3
1979	-7.9	-0.1	-16.4	-6.2	-4.0	0.3
1980	3.3	7.3	-0.2	3.9	1.4	4.1
1981	17.6	10.2	-0.5	11.6	8.0	14.3
1982	22.3	16.3	15.5	15.2	13.1	15.2
1983	14.8	12.8	15.0	12.3	11.0	14.2
1984	16.6	7.1	13.8	11.9	10.3	11.0
1985	10.4	1.3	14.1	7.9	9.9	7.5
1986	3.3	-1.1	5.1	2.5	4.9	2.2
1987	-2.9	0.7	4.4	-2.4	2.9	-2.1
1988	-2.6	6.9	0.3	0.5	1.8	1.3
1989	3.2	6.2	4.4	3.4	4.2	2.9
1990	9.0	7.7	3.4	6.4	5.7	5.9
1991	7.5	8.2	3.7	6.4	3.5	6.4
1992	10.5	10.1	5.9	7.6	4.4	7.2
1993	5.9	6.4	3.3	6.4	2.6	6.0
1994	0.6	3.2	2.3	4.3	1.7	4.3

Source: World Bank, World Debt Tables and IMF, World Economic Outlook.

*Average dollar nominal interest rate on external debt deflated by a 3-year MA of domestic tradables' price inflation. Tradables price inflation: average of changes in domestic export unit values and of industrial countries' export prices.

Table 2. Terms of Trade (Period Avg. = 100)

	Chile	Colombia	Mexico	Korea	Malaysia	Thailand
1970	186.7	76.7	95.8	108.3	127.0	113.4
1971	176.2	73.0	101.7	105.3	110.1	108.8
1972	173.0	74.8	102.1	105.0	99.7	108.4
1973	188.9	79.4	95.6	101.1	111.9	117.7
1974	157.2	84.0	85.2	93.4	110.9	121.7
1975	84.6	77.7	80.7	86.3	88.5	114.7
1976	92.4	102.9	93.4	98.2	95.9	95.0
1977	85.2	132.1	110.9	103.4	105.5	117.0
1978	84.2	105.1	107.4	106.9	106.9	117.6
1979	93.8	96.0	104.8	104.6	112.6	107.7
1980	92.5	95.1	153.8	92.9	108.5	100.3
1981	83.5	110.1	166.5	91.9	103.9	101.6
1982	78.3	114.8	107.0	97.7	99.5	87.2
1983	79.7	117.0	102.8	93.6	99.2	91.3
1984	74.3	117.5	100.0	95.1	105.9	93.4
1985	69.0	106.9	94.0	91.5	97.0	87.9
1986	69.0	133.4	70.6	97.0	82.2	97.3
1987	75.8	109.4	94.9	100.1	89.3	95.9
1988	86.9	104.1	85.8	101.1	91.7	94.7
1989	85.5	103.4	86.7	105.5	92.8	92.5
1990	78.1	101.1	95.8	104.0	90.9	89.4
1991	78.4	99.1	91.1	103.6	91.2	90.2
1992	78.9	93.3	92.9	103.1	93.5	88.4
1993	73.8	92.5	94.4	104.0	93.2	88.1
1994	82.0	98.7	94.8	104.5	95.2	89.8
1995	92.1	102.0	91.4	101.9	97.0	89.9

Source: IMF, World Economic Outlook

Asian countries. During the 1990s, the variability of terms of trade has been much more modest. This reflects in part the increased export diversification towards manufactured goods of the countries in our sample, which reduces the impact of changes in the prices of primary commodities on the terms of trade.

B. Macroeconomic Indicators

A number of macroeconomic and structural indicators for the various country episodes are summarized in Table 3. The first potential indicator of external sustainability is the level of external debt in relation to GDP. In our limited sample, however, this ratio does not allow to discriminate between crisis and non-crisis episodes--external debt to GDP ratios were much higher in Korea and Malaysia I than in Mexico 1981 or 1994. Overall, debt to GDP ratio tended to be higher in the 1980s than in the 1990s, reflecting among other things the increased importance of non-debt creating capital flows in recent years (see discussion below).

A second, related factor is the interest burden of external debt. This factor does not help to clearly discriminate between crisis and non-crisis episodes: it "singles out" the experiences of the eighties, and in particular Chile and Korea, while for the experiences of the 1990s, the interest burden is quite similar across countries. The "operational solvency condition" (equation (5)), augmented so as to include the effects of real exchange rate changes, implies that the perpetual resource transfer needed to prevent to external debt to GDP ratio from increasing is determined by the interest burden adjusted for growth and real exchange rate appreciation/depreciation. In Chile and Mexico I all three components that had been favorable during the late 1970s turned unfavorable in the run up to the crisis: interest rates increased, high growth came to a halt and the real exchange rate started to depreciate. In Colombia, Korea, Thailand and Malaysia the adjustment period also involved a large upfront depreciation; however, the growth slowdown was short-lived. In the case of Mexico II, the crisis was preceded by a relatively modest increase in interest burden but followed by a large real depreciation and a deep recession. Based on our sample, it appears therefore that the resource transfer, while clearly a measure of the cost of external adjustment, is not an unambiguous predictor ex ante.

A third factor is the ratio of exports to GDP. In order to service and reduce external indebtedness, a country needs to rely on traded goods' production as a source of foreign exchange. On the one side, countries with a large exports sector can service external debts more easily, because debt service will absorb a lower fraction of their total export proceeds. In order to generate the foreign exchange necessary to service external debt in case of an interruption in capital flows, a country needs to engineer a resource shift towards the exports sector. Since this shift cannot occur instantly, sharp import compression may become necessary, with adverse consequences on the domestic industries relying on imported inputs (Sachs (1985) and Sachs and Warner (1995)). This import compression may be more costly in a relatively closed economy,

Table 3. Macroeconomic Indicators 1/

	Chile	Colombia I	Mexico I	Colombia II	Mexico II	Korea	Malaysia I	Thailand I	Malaysia II	Thailand II
	1979-81 (1982-83)	1980-84 (1985-88)	1977-81 (1982-83)	1992-95	1991-94 (1995)	1977-82 (1983-88)	1979-84 (1985-86)	1979-84 (1985-86)	1991-95	1991-95
CA balance	-9.1 (7.6)	-5.1 (0.5)	-5.0 (0.3)	-3.4	-6.7 (-0.3)	-5.4 (2.6)	-8.2 (-1.1)	-6.1 (-1.7)	-5.7	-6.7
Savings	7.4 (5.9)	14.6 (20.5)	18.7 (22.0)	16.4	15.7 (17.9)	25.6 (31.6)	26.6 (25.7)	22.5 (26.9)	30.0	34.0
Investment	17.0 (13.5)	19.7 (20.0)	23.7 (21.8)	19.8	22.4 (18.2)	31.0 (29.0)	34.8 (26.8)	28.7 (28.6)	35.7	40.6
Exports	19.7 (21.3)	12.6 (18.1)	10.6 (17.2)	18.3	12.7 (24.0)	32.5 (36.9)	53.2 (55.6)	23.0 (27.8)	82.4	36.6
REER	124.1 (118.5)	135.5 (80.2)	126.4 (103.5)	77.6	113.9 (76.0)	103.6 (92.2)	117.9 (111.8)	115.5 (95.0)	83.5	88.5
Fiscal Balance	2.1 (-3.3)	-3.5 (-1.0)	-8.0 (-11.2)	-0.8	0.4 (0.0)	-2.8 (0.0)	-14.5 (-8.9)	-4.3 (-2.8)	-1.5	3.2
Growth	7.2 (-7.4)	2.6 (5.1)	7.5 (-2.4)	5.0	2.6 (-6.9)	5.8 (10.7)	6.9 (0.0)	5.4 (8.2)	8.4	8.9
Interest Payments	5.5 (8.6)	3.5 (3.5)	3.9 (6.7)	1.8	2.2 (NA)	5.6 (1.7)	4.4 (5.4)	2.9 (2.5)	2.0	2.3
Ext. Debt	48.2 (89.5)	40.8 (43.3)	31.4 (62.7)	28.9	35.5 (65.1)	50.0 (19.6)	55.2 (78.9)	35.9 (35.1)	35.1	42.6

1/ Current account balance, savings, investment, exports, fiscal balance are average ratios of GDP during the period. The growth rate and the real effective exchange rate are period averages (REER: average 1970-1995=100). Interest payments and gross external debt are ratios to GDP, and refer to the last year of the period. Sources: IMF, International Finance Statistics; World Bank, World Debt Tables and national sources.

because it is more likely to entail cuts of "essential" imported inputs (Williamson (1985)).[20] The size of the export sector can also be related to willingness to lend and willingness to pay considerations. Insofar as debt default is associated with trade disruptions (such as difficulties in obtaining export credits) it may be more costly for an open economy. Furthermore, the constituency against actions that would entail trade disruptions is also likely to be stronger, the larger the size of the export sector. According to the theory of international borrowing sketched in Section III, higher costs of default would reduce the likelihood of sudden reversals of capital inflows, because foreign investors will perceive the country--ceteris paribus--as less risky.

On the other side, a more open economy is, ceteris paribus, more vulnerable to external shocks such as fluctuations in the terms of trade or foreign demand shocks. In this regard, vulnerability is reduced by a well diversified commodity composition of trade. Fluctuations in commodity prices have a larger impact on the terms of trade for countries with a narrow export base, and those particularly dependent on raw materials for their imports, thus weakening their ability to sustain current account deficits. Ghosh and Ostry (1994) found support for the view that large current account deficits are more likely to be unsustainable in countries with a less diversified export base in the context of a model based on precautionary savings. Mendoza (1996) presents evidence that the volatility of terms of trade is associated with lower economic growth in a wide sample of countries.

Among the countries in our sample, the East Asian ones that successfully adjusted after experiencing large current account imbalances (Korea, Malaysia and Thailand) had a large export share, and managed to increase exports significantly during the adjustment period. By contrast, the export to GDP ratio was lower in Mexico (especially in 1982) and in Chile, although it should be pointed out that exports were rising rapidly prior to all three crisis episodes considered (Mexico I and II; Chile). In Colombia, that had a low export share in the early eighties, both the exports share and the degree of export diversification increased substantially. These findings are in line with results presented in Sachs (1985), who compares East Asian and Latin American countries at the time of the debt crisis. The episodes we considered thus suggest that large current account imbalances are less likely to lead to external crises when the economy has a large export base. Indeed, the interest burden and the level of external debt appear to be better indicators of sustainability when expressed as ratios to exports, rather than to GDP.

A fourth factor is the level of the real exchange rate. A persistent real exchange rate appreciation can be driven by "fundamental" factors such as high productivity growth in the traded goods sector, or favorable terms of trade shocks. However, in the context of a fixed or managed exchange rate system, it could also reflect a fundamental inconsistency between the monetary policy stance and exchange rate policy, giving rise to "overvaluation", or the effects of inflation inertia or imperfect credibility in the context of an exchange-rate-based inflation

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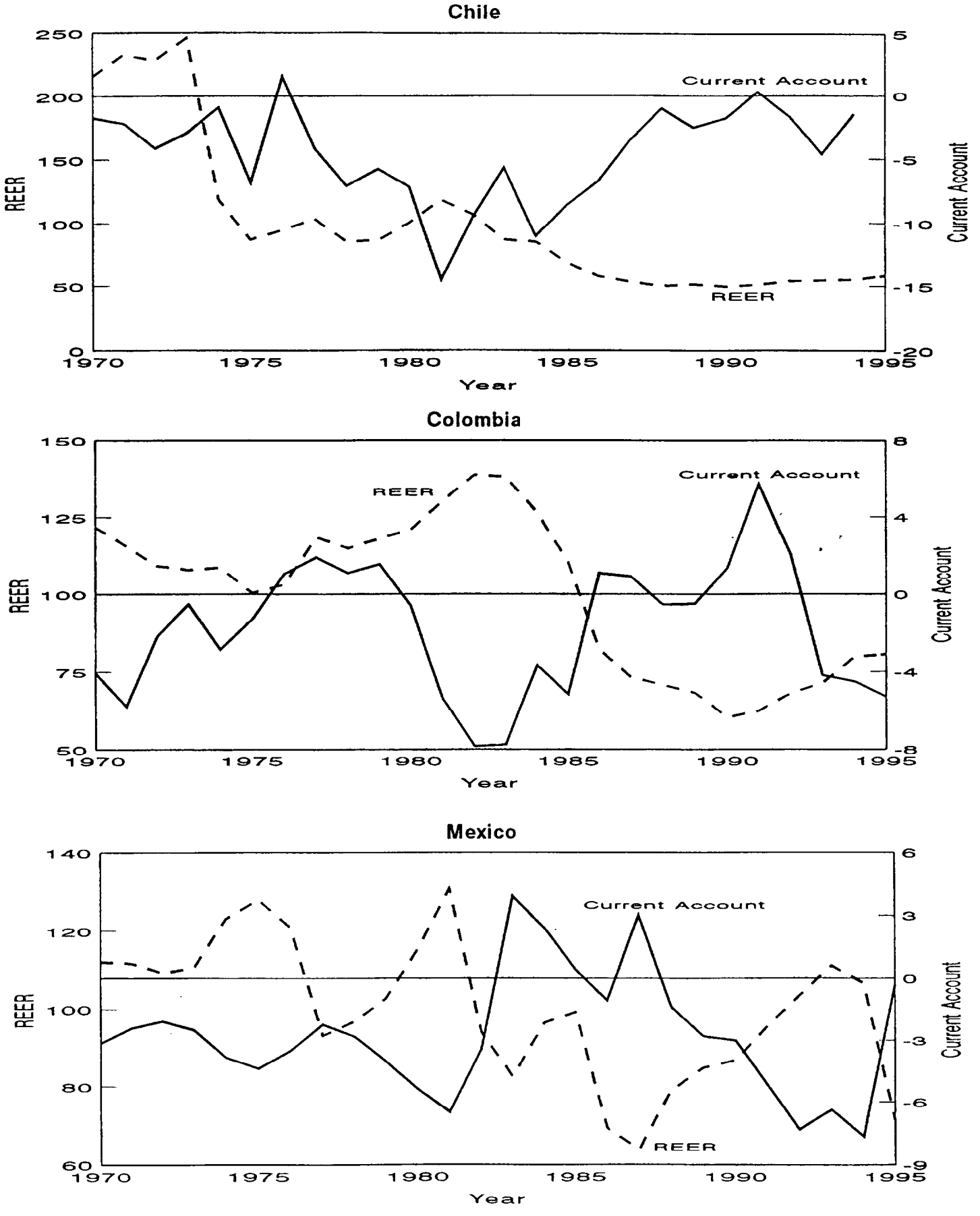
[20] In evaluating the relation between the size of the export sector and current account sustainability, "exogenous" determinants of openness, such as the size of the country, should also be taken into account.

stabilization plan (see Calvo (1986)). An overvaluation would typically be maintained by high domestic interest rates and/or by the presence of capital controls, and would encourage a decline in savings as domestic residents intertemporally substitute present for future consumption. These effects would contribute to a widening of current account imbalances and loss of foreign exchange reserves (which can be reinforced by expectations of a future devaluation, that encourage capital outflows). Finally, the weakening of the export sector hinders the ability of the country to sustain external imbalances. A real exchange rate appreciation could also result from large capital inflows; it would result in an overvaluation only to the extent that these are not driven by long-term fundamentals, but by factors such as a non-credible exchange rate stabilization or excessively volatile short-term flows. Weaknesses in domestic financial intermediation and supervision (which we discuss below) can hinder the efficient allocation of capital inflows between consumption and investment, and contribute to the overvaluation.

In practice, however, it is difficult to make the definition of real exchange rate overvaluation operational, in the absence of a well-established framework of real exchange rate behavior (see Edwards (1989)). In developing countries that have undertaken structural reforms, large capital inflows and a real exchange rate appreciation may reflect an increase in productivity and in the return to capital; if current account deficits also emerge because of the underlying increase in permanent income, this would not be an indicator of unsustainability. The difficulty lies clearly in evaluating to what degree a real appreciation reflects improved fundamentals. It is notoriously difficult to determine an appropriate benchmark against which to measure any real exchange rate misalignment. Table 3 reports the level of the real effective exchange rate (measured in terms of relative CPI indices) relative to its average level during the past 25 years. The three crisis episodes we consider are all characterized by a sustained real exchange rate appreciation in the period preceding the crisis, leading to an appreciated level of the real exchange rate. Colombia, Malaysia and Thailand also experienced a sustained real appreciation during the late seventies/early eighties, and an exchange rate devaluation was a key component of their adjustment process. In the crisis episodes, an exchange rate depreciation was indeed undertaken before the full onset of the crisis, but failed to prevent it. Our sample evidence thus suggests that large current account imbalances are more likely to result in a crisis when they are accompanied by a relatively appreciated level of the exchange rate.

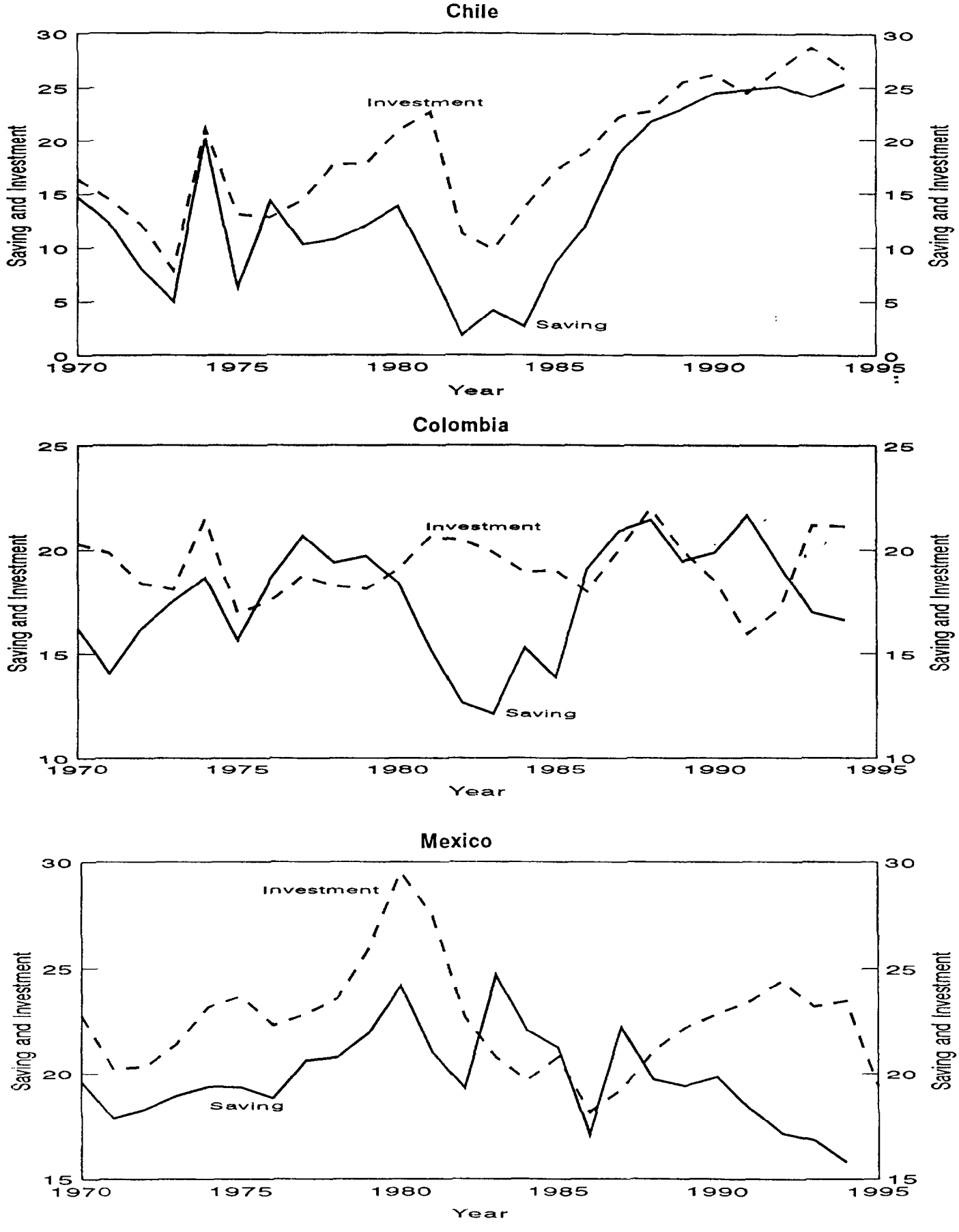
A fifth factor is the level of national savings and investment. For a given current account balance, the levels of savings and investment can have implications for the sustainability of the external position. High levels of investment imply--ceteris paribus--higher future growth through the build-up of a larger productive capacity, and therefore enhance intertemporal solvency (see equation (6)). High savings and investment ratios can also act as a signal of creditworthiness to international investors, because they act as a form of commitment to higher future output and

Chart 1. Current Account and Real Effective Exchange Rate, 1970-95



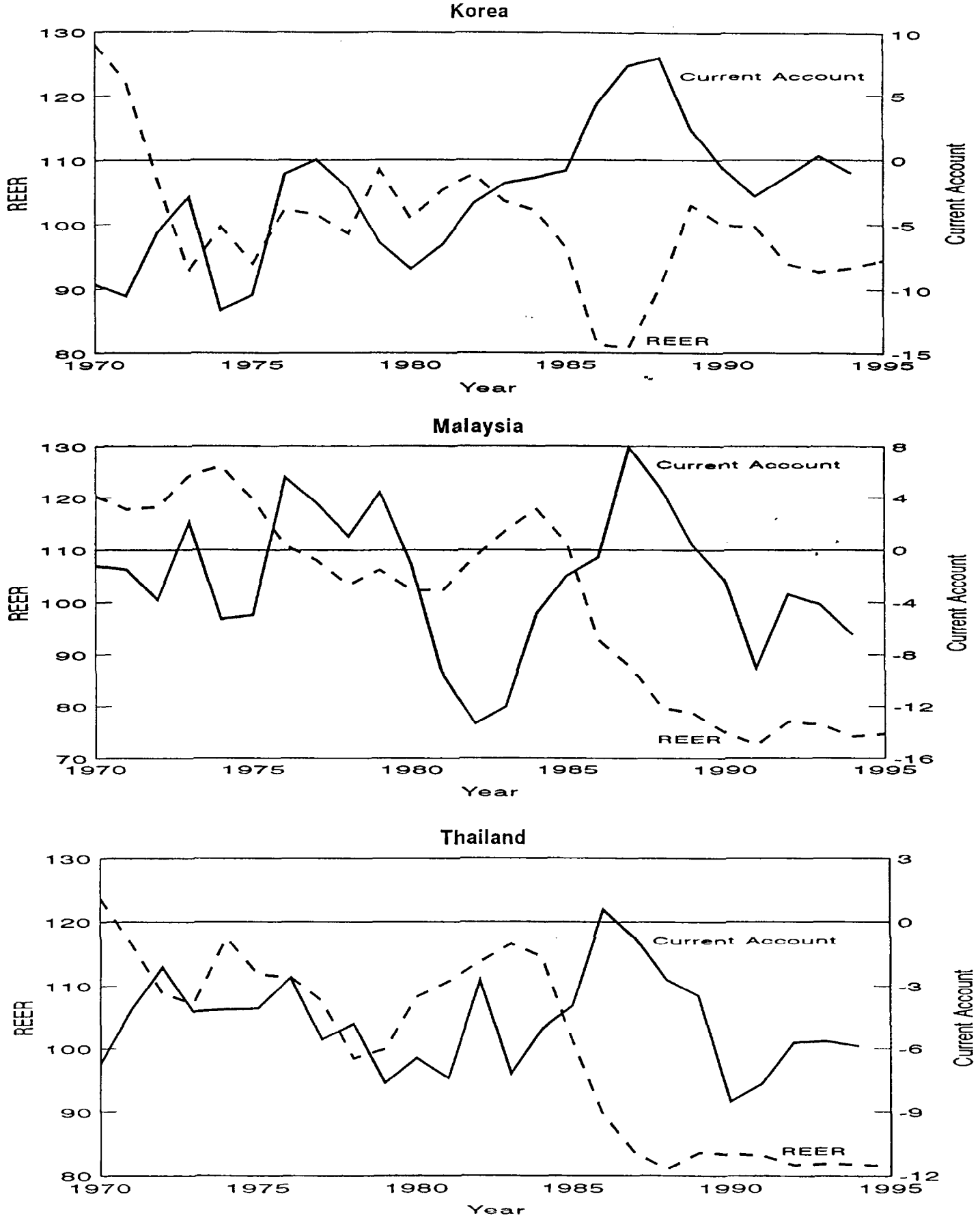
Source: IMF, International Financial Statistics and authors' calculations.

Chart 2. Saving and Investment, 1970-95



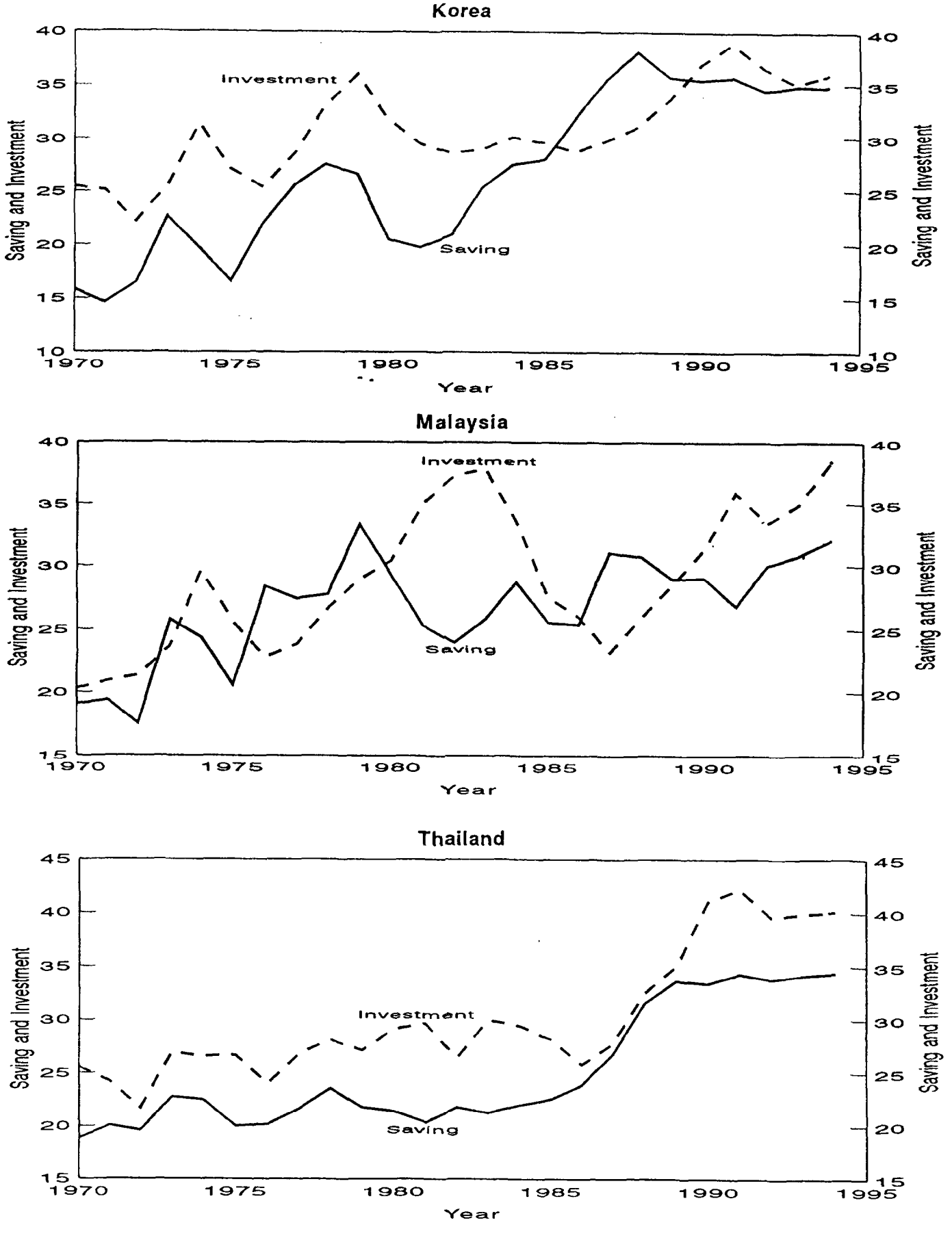
Source: IMF, International Financial Statistics and authors' calculations.

Chart 3. Current Account and Real Effective Exchange Rate, 1970-95



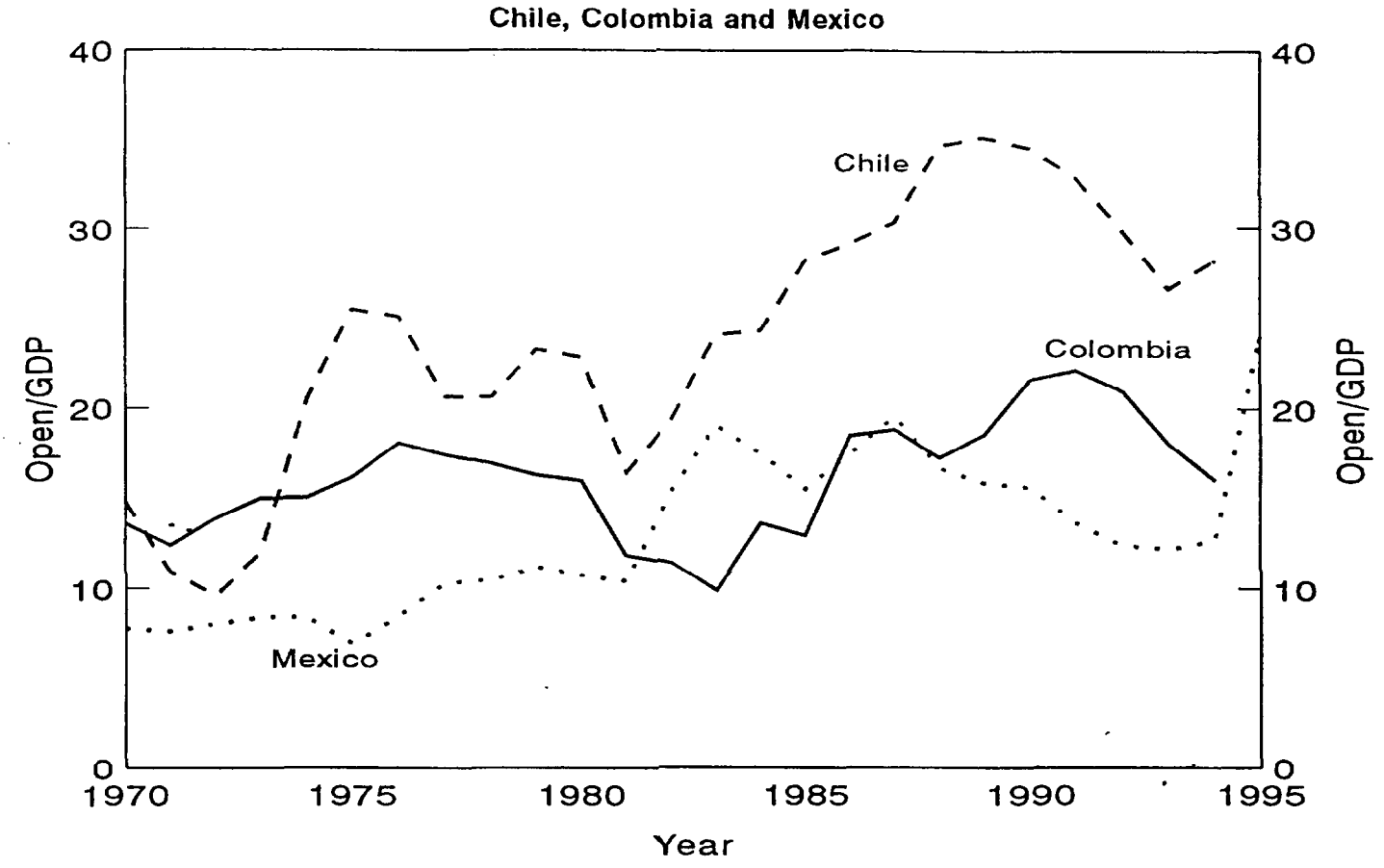
Source: IMF, International Financial Statistics and authors' calculations.

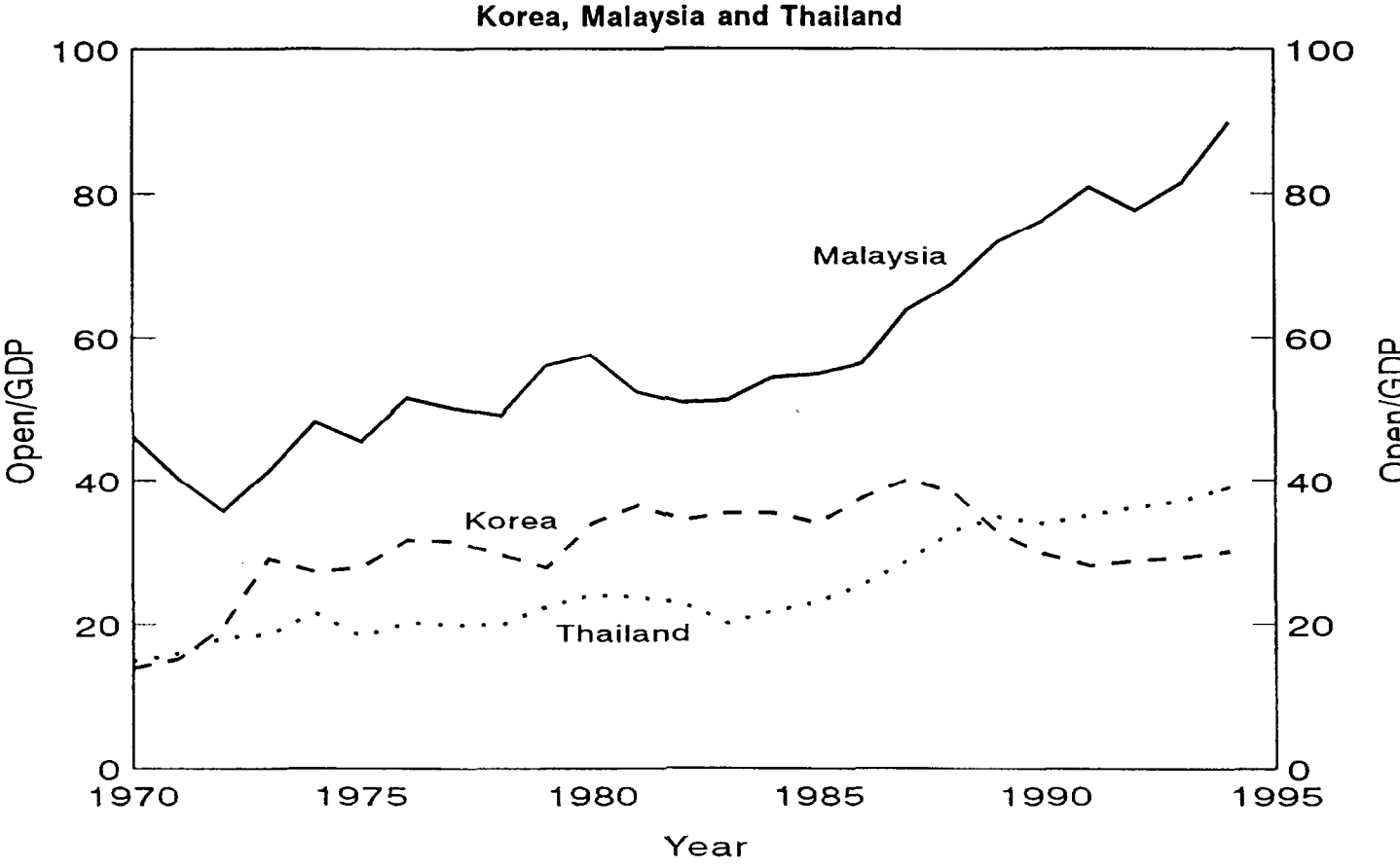
Chart 4. Saving and Investment, 1970-95



Source: IMF, International Financial Statistics and authors' calculations.

Chart 5. Degree of Openness, 1970-95





Source: IMF, International Financial Statistics and authors' calculations.

thus raise the perceived ability to service and reduce external debt.[21] Among the episodes we consider, savings were extremely low in Chile in the run-up to the crisis. At the other extreme, Korea, Malaysia and Thailand had high savings and investment rates. Savings were also low in Mexico in the early nineties. It is interesting to observe that, in both Chile and Mexico II the low savings rates were not attributable to public sector imbalances, but rather to low private savings. In summary, all three crisis episodes are characterized by low savings, especially by middle-income developing countries' standards.[22]

A sixth factor is the fiscal balance. In a pure debt neutrality case (Barro (1974)) the current account is independent of the time profile of taxation, and therefore of the public sector deficit. This can easily be seen in the intertemporal framework of Section III (equations (2), (5) and (6)). Among other things, the debt neutrality result relies on the fact that consumption depends only on lifetime income and that taxes are not distortionary. If taxes are distortionary, they would have an effect on the level of output and investment, and would therefore affect the current account. Furthermore, if consumption depends also on disposable income, for example because some consumers are unable to borrow at the same terms as the government, lower taxes today would induce higher consumption (see Jappelli and Pagano (1994)). Similarly for the firms, the effective easing of borrowing constraints associated with lower present taxes could induce an increase in investment. Analogous effects would obtain if future tax obligations are not expected to fall entirely on current period taxpayers.

All the effects discussed so far would imply, among other things, imperfect substitutability between private and public savings and a positive correlation between budget deficits and current account deficits. The discussion also suggests that the strength of this correlation may depend on the degree of development of domestic financial markets. Namely, in countries with under-developed or highly regulated financial markets we would expect to find stronger links between the fiscal stance and the current account balance, and therefore between government budget

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[21]The discussion above assumes that investment is necessarily growth-enhancing and that it enhances the ability to repay external debt. Investment projects, however, may be chosen inefficiently, because of financial market distortions or because they are driven by political priorities. For example, relative price distortions may skew investment towards the nontraded goods sector, therefore failing to enhance a country's ability to generate future trade surpluses. Under these circumstances, high levels of investment may not enhance sustainability.

[22] In Colombia the level of national savings was low until 1984, but was raised considerably over the following period, thanks in particular to a large increase in public savings. More recently savings have declined. Fry (1993a) discusses savings and investment trends in East Asia. For recent cross-sectional studies of determinants of savings see Masson et al. (1995) and Edwards (1995).

solvency and current account sustainability.[23] Also, during sharp adjustment periods, the issue of Ricardian equivalence may become less important since typically in crisis situations liquidity constraints are binding, and therefore fiscal consolidation may facilitate the transformation of external deficits to surpluses. Pre-existing fiscal imbalances can also complicate the transfer of resources abroad through the government budget, because of the government's difficulties in collecting resources from the private sector--the so-called dual transfer problem.[24]

The evidence provided by our sample suggests that the absence of large fiscal imbalances ex ante does not imply that current account deficits will prove sustainable, as exemplified by the cases of Chile and Mexico II. Note, however, that all the external crises we considered entailed, ex-post, a large fiscal cost for the government in the form of bailouts of banks and firms, as well as the shouldering by the budget of private external debt. Clearly, large fiscal imbalances, which were present in Mexico I, Malaysia I, Colombia I and Thailand I, raise fiscal sustainability issues, and did therefore require a policy shift. Indeed, the main element of the policy reversal in the latter countries consisted in a substantial reduction of the fiscal deficit; for all these countries, the increase in public savings raised the overall savings rate and contributed to the reduction of external imbalances.

C. Capital Account Factors

For all countries we have considered the capital account is more open and the financial system considerably more liberalized in the 1990s than it was a decade earlier, although the degree of liberalization differs across countries. This has affected policymakers' ability to sterilize external flows and intervene in exchange markets. Remaining controls on international capital movements are mainly designed to limit the size of capital inflows, as opposed to controls on capital outflows that were preponderant during the seventies and eighties. Grilli and Milesi-Ferretti (1995) show that during this earlier period countries with large current account deficits were more likely to impose restrictions on capital outflows. In part, the more limited reliance on capital controls can be explained by the increased difficulty of enforcing effective limitations to international capital mobility. Furthermore, there is increased awareness of the distortions that capital controls cause by imposing a wedge between rates of return on capital in the domestic

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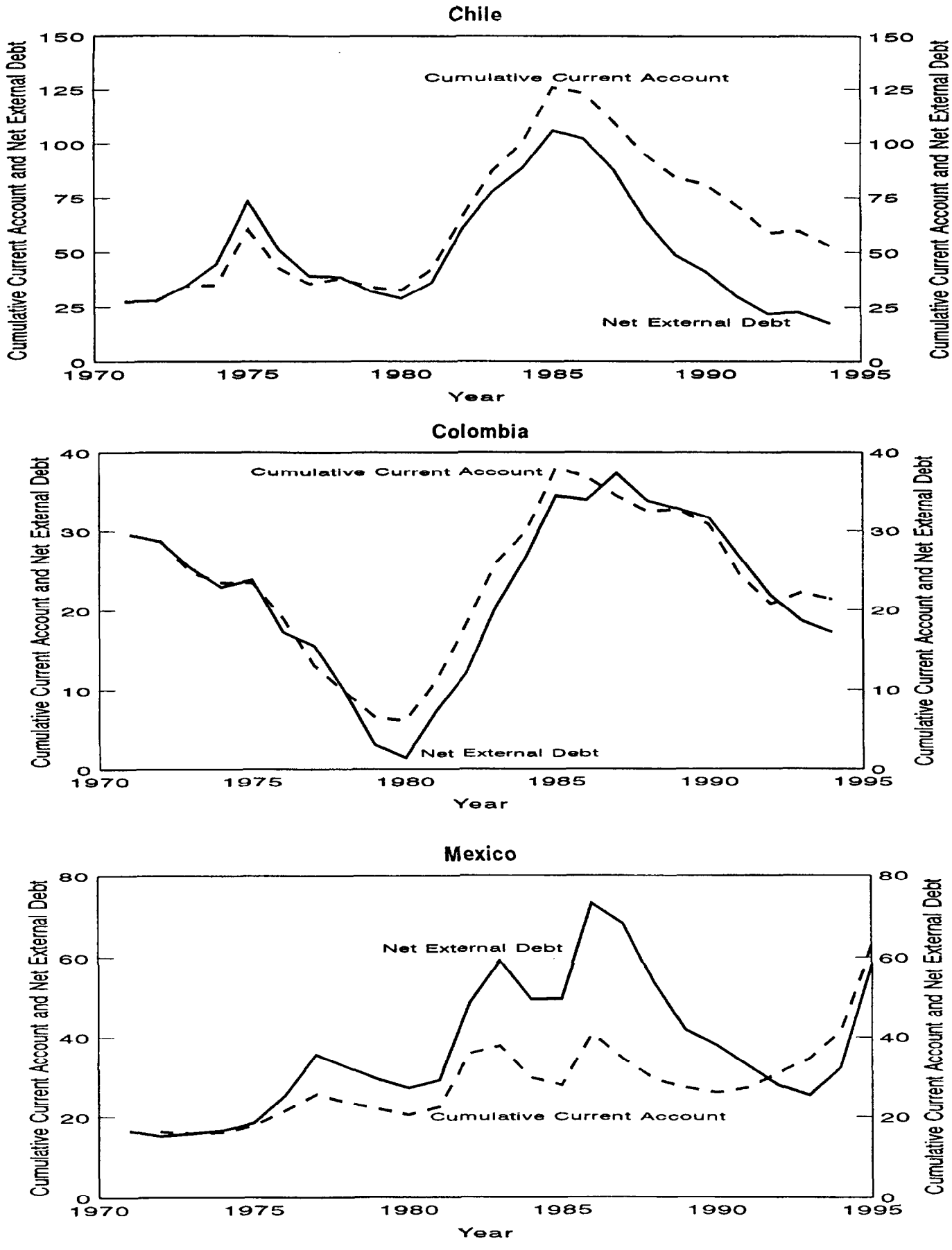
[23]The degree of private sector saving offset to a given increase in public sector saving may also depend on the level of public debt (Sutherland (1995)). With low public debt the current generation could view a future debt stabilization policy (via fiscal surpluses) as remote, thus the future tax liabilities are perceived to be small and fiscal adjustments affect aggregate demand and savings. In contrast, with high public debt the future debt stabilization looks imminent and the debt neutrality is at a full force. The link between the twin deficits may therefore be stronger the lower is the level of public debt. Another implication of this line of reasoning is that the effects of fiscal stabilization on aggregate demand are weaker the higher is the public debt burden.

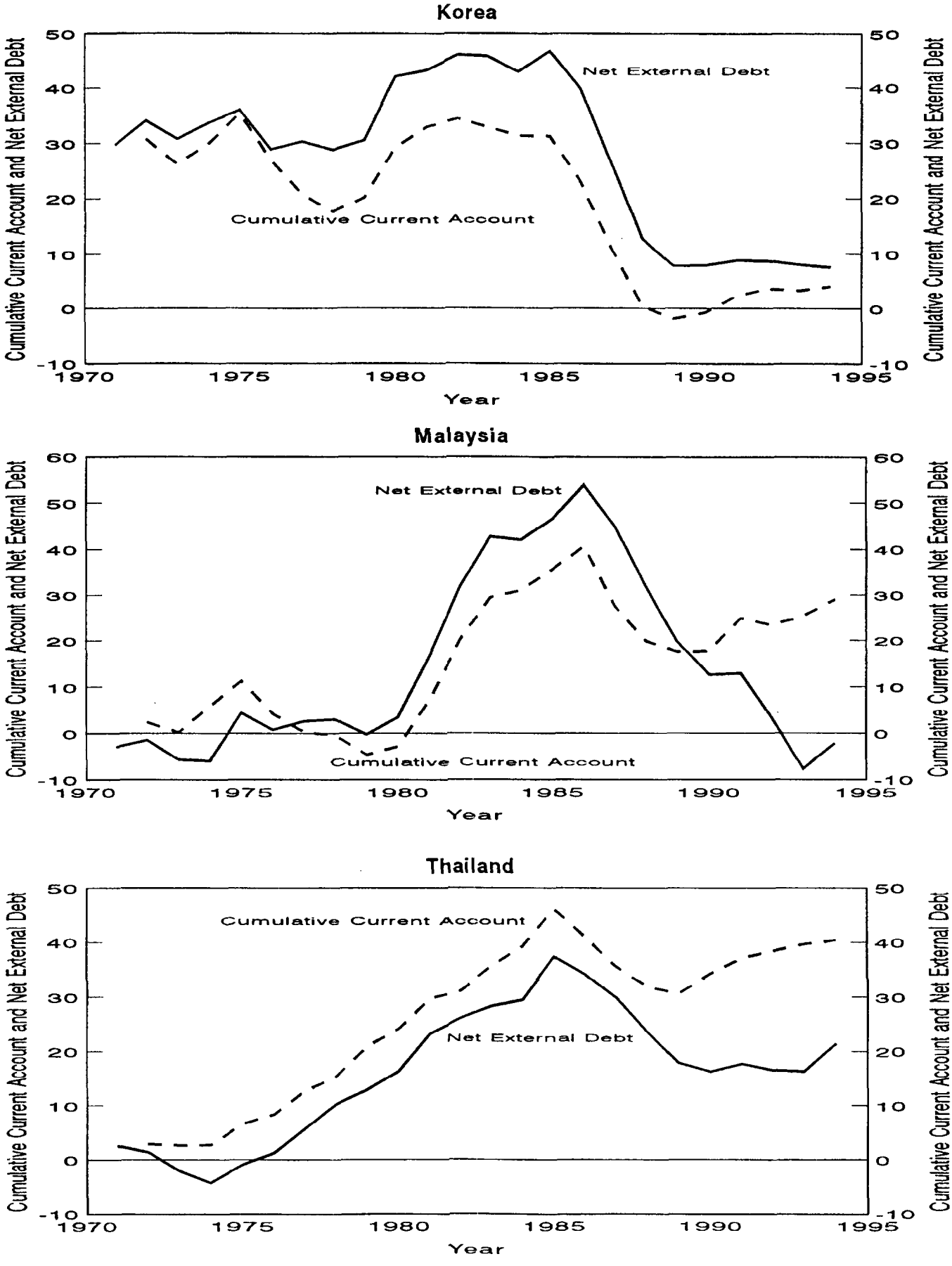
[24] See Bevilaqua (1995) for an empirical analysis of this issue.

Chart 6. Cumulative Current Account and Net External Debt, 1970-95



Source: World Bank, World Debt Tables;
IMF, International Financial Statistics and authors' calculations.

Chart 7. Cumulative Current Account and Net External Debt, 1970-95



Source: World Bank, World Debt Tables;
IMF, International Financial Statistics and authors' calculations.

economy and abroad.[25] An open capital account should improve resource allocation, and can also provide a disciplining device, since a policy inconsistency between, say, an expansionary monetary policy and a pegged exchange rate would result in the collapse of the peg. Furthermore, an open capital account could serve as a signal of a country's commitment to the pursuit of "sustainable" policies, and thereby raise foreign investors' perception of the country's creditworthiness. This would contribute to reducing the cost of capital for the country and/or to increase the supply of foreign funds (see, for example, Bartolini and Drazen (1996)). On the other side, when the capital account is very open, *de jure* or *de facto*, a country is more vulnerable to sudden reversals in the direction of capital flows. This reversal may concern not only foreign capital, but also domestic capital.[26] Furthermore, economic research and practical experience have also highlighted the potential dangers associated with poor financial supervision and a weak banking system when the capital account is open (see, for example, Diaz-Alejandro (1985)).

Considerations pertaining to the health of the financial system, that played a significant role in the crisis episodes of the 1980s, [27] play an even more important role during the 1990s, because a larger fraction of external funds are intermediated by the domestic financial system with respect to the previous decade, when most external borrowing was undertaken by the public sector (see Goldstein (1996) for a discussion of indicators of financial fragility and Kaminsky and Reinhart (1996) for an examination of the link between balance of payments and banking crises).

Drastic changes in the composition of capital flows took place between the late seventies/early eighties and the early nineties. During the earlier period all the countries in our sample relied heaviliy on commercial bank borrowing in the form of syndicated loans, as well as on borrowing from official creditors. In contrast, the experience of the 1990s is characterized by large private capital inflows , a sizable fraction of which took the form of foreign direct investment and portfolio investment. Economic theory suggests that the degree of risk-sharing,

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[25] The degree of de facto opening of the capital account is endogenous, and depends in particular on the strength of the incentives to export capital (risk-adjusted rate of return differentials due to domestic policy misalignments, political instability etc.).

[26]This is exemplified by the experience of several Latin American countries (such as Argentina, Mexico, Peru, and Venezuela) in the run-up to the debt crisis (see, for example, Diaz Alejandro (1985) and Sachs (1985)). For those countries, the level of "official" foreign debt at the time of the debt crisis was much higher than the cumulative value of past current account imbalances, indicating that the accumulation of debt had financed not only excess of imports over exports, but also private capital outflows.

[27] For a discussion of banking difficulties in Chile see Velasco (1991) and De la Cuadra and Valdés-Prieto (1992). Diaz-Alejandro (1984, 1985) and Rojas-Suarez and Weisbrod (1995) also discuss other Latin American experiences. Johnston (1991) discusses bank distress in Thailand.

as well as the intensity of asymmetric information and enforcement problems are related to the composition of external liabilities (see the discussion in Section III). Table 4 reports some summary statistics on the level and composition of external liabilities and capital flows. Among these statistics, the cumulative value of current account imbalances as a fraction of GDP can be taken as an approximate measure of net external liabilities. This measure shows that the lower level of net external indebtedness during the 1990s with respect to the 1980s is mostly due to the relative importance of non-debt-creating capital inflows, such as FDI, in recent years. This is particularly striking in the case of Malaysia, but is also evident from the cases of Mexico, Thailand and (to a lesser degree) Colombia during the 1990s.[28] A corollary of these developments is that interest payments on external debt constitute a declining fraction of net resource transfers associated with existing external liabilities, while profit repatriation takes a more important role.

The table also reports other debt-composition factors, such as the fraction of short-term debt in total debt and the size of portfolio flows, that can potentially play a role in determining the sustainability of external imbalances. There is a notion that vulnerability to external shocks and capital flow reversals is enhanced when portfolio investment and short-term inflows account for most of capital inflows, as these are perceived to be potentially more volatile than long-term flows or foreign direct investment.[29] In our limited sample, the data do not show a consistent pattern in this respect: for example, just before the debt crisis the share of short-term debt in Chile (19 percent) was considerably lower than in Mexico and Korea (above 30 percent), and in the 1990s portfolio inflows have been as large in Malaysia as in Mexico (as a fraction of GDP). In a study that focuses on currency collapses, rather than protracted current account imbalances as this one, Frankel and Rose (1996) find weak correlation between debt composition variables and the probability of exchange rate crashes, but they find a significant negative correlation between the proportion of external liabilities accounted for by FDI and crash incidence. The lesson we draw from the individual country studies and from existing empirical evidence is that the composition of external liabilities may affect the vulnerability of a country to an external crisis, but that indicators of the composition of external liabilities should not be considered in isolation as predictors of current account sustainability, but rather together with the other macroeconomic, structural and external factors highlighted in this section, as well as with the stability of the domestic financial system.

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[28]For Mexico I the net external liabilities measure is well below external debt (especially after 1981), signaling the presence of capital flight.

[29] For theoretical arguments on the effects of short-term debt on the likelihood of balance-of-payments crises, see, for example, Calvo (1995) and Cole and Kehoe (1996). With regard to capital flow volatility, however, Claessens et al. (1995) find that in a sample of industrial and developing countries the statistical labels "short-term" and "long-term" in most cases do not provide information regarding the persistence and volatility of flows.

Table 4. Financial Indicators 1/

II	Chile	Colombia I	Mexico I	Colombia II	Mexico II	Korea	Malaysia I	T hailand I	Malaysia II	Thailand
	1979-81 (1982-83)	1980-84 (1985-88)	1977-81 (1982-83)	1992-94	1991-94 (1995)	1977-82 (1983-88)	1979-84 (1985-86)	1979-84 (1985-88)	1991-95	1990-95
Net Ext Debt 2/	36.2 (88.8)	34.5 (33.9)	29.5 (59.5)	17.2	32.3 (58.3)	44.5 (12.8)	42.1 (53.8)	29.5 (23.6)	-2.2	21.4
Cumul. CA Deficits 3/	44.2 (83.7)	38.0 (32.6)	26.0 (42.3)	21.4	41.3 (62.8)	33.9 (0.5)	31.3 (43.5)	39.2 (31.9)	32.0	40.4
Short-Term Debt	19.3 (14.5)	21.8 (9.5)	32.0 (11.0)	6.3	24.6 (NA)	33.2 (30.0)	13.5 (13.2)	23.7 (22.1)	25.0	47.8
For. Exch. Reserves	24.8 (14.6)	15.4 (21.8)	6.4 (5.2)	40.5	5.0 (10.4)	7.9 (34.9)	23.7 (31.7)	17.9 (32.8)	106.3	49.6
Net FDI Flows	0.9 (1.3)	1.2 (1.0)	0.9 (0.7)	1.8	1.8 (2.8)	0.1 (0.3)	4.1 (2.1)	0.7 (0.8)	7.9	1.5
Net Portf. Flows	0.0 (0.0)	-0.0 (0.1)	0.0 (0.0)	0.6	4.9 (-4.3)	0.0 (0.1)	0.0 (0.0)	0.3 (0.9)	2.2	1.4

1/ Net external debt and cumulative current account deficits: ratios to GDP, last year of the period. Short-term debt and foreign exchange reserves: ratio to total debt, last year of the period. Portfolio and FDI flows: ratios to GDP, average during the period. Sources: IMF, International Financial Statistics, and World Bank, World Debt Tables.

2/ External debt minus nongold foreign exchange reserves.

3/ Initial net external debt plus cumulative value of current account deficits, as a ratio of last period's GDP.

VI. Conclusions

The discussion of country experiences has highlighted the differences between the large current account deficit episodes of the late seventies/early eighties and those of the early nineties. For most of the countries we consider, the earlier period was characterized by large fiscal deficits and a real exchange rate appreciation; fiscal adjustment measures, together with a devaluation of the currency, were the key features of the policy shift implemented to reduce external imbalances. The large and sustained current account deficits of the early nineties reflect instead an imbalance between private savings and private investment. On the capital account side, the inflows of the earlier period took mainly the form of borrowing from commercial banks (syndicated loans) and from official lenders, while in the early nineties, characterized by a more open capital account, foreign direct investment and debt and equity portfolio flows played a more important role. A corollary of the increased importance of non-debt-creating flows is that external debt represents only part of net external liabilities.

With regard to regional differences, the East Asian countries we consider have higher savings and investment ratios, reflected in higher growth rates, and exports represent a larger fraction of GDP. High savings and a high degree of openness are factors which our analysis suggests are important in determining the sustainability of persistent current account deficits.

The event study approach used on this paper can accommodate a broad set of factors, but is limited by the sample size and the inability to quantify the relative importance of different sustainability indicators. The issues that are raised in the discussion should be the focus of a more structured empirical analysis, relying on a broader set of country experiences. A potential approach is to characterize "turning points" in the evolution of current account imbalances in terms of the macroeconomic and capital account indicators identified in this paper. If such "turning points" are accompanied by severe macroeconomic distress in the form of sharp drops in consumption and economic activity or a collapse of the currency, this would suggest that the deficits were not sustainable.

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