Title

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Author

Obstfeld, Maurice

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UNIVERSITY OF CALIFORNIA, BERKELEY

Department of Economics

Berkeley, California 94720-3880

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Globalization, Macroeconomic Performance, and the Exchange Rates of Emerging Economies*

Maurice Obstfeld
Economics Department, University of California, Berkeley

Revised, October 2004

Key words: Developing countries, emerging markets, convergence, macroeconomic volatility, exchange-rate regimes, institutions, dollarization, original sin.

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*This paper was prepared for the Bank of Japan's 11th international research conference, Tokyo, Japan, July 5-6, 2004. Miguel Fuentes and Gabriel Chodorow-Reich provided superb research assistance. I thank Alan M. Taylor for permission to draw on our joint research. All errors are mine.

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Abstract

Among the developing countries of the world, those emerging markets that have sought some degree of integration into world finance are characterized by higher per capita incomes, higher long-run growth rates, and lower output and consumption volatility. These characteristics are more likely to be causes than effects of financial integration. The measurable gains from financial integration appear to be lower for emerging markets than for higher-income countries, and appear to have been limited by recent crises. One factor limiting the gains from financial integration is the difficulty emerging economies face in resolving the open-economy trilemma. Given their structural and institutional features, many emerging economies cannot live comfortably either with fixed or with freely floating exchange rates. Most recently, the exchange rates of several emerging countries display attempts at stabilization punctuated by high volatility in periods of market stress.

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Department of Economics
University of California
Berkeley, CA 94720-3880
obstfeld@econ.berkeley.edu

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1 Introduction

How do economists now view the effects of economic globalization? The most problematic obstacles to realizing conventional gains from trade arise for the poorer, industrializing economies, and they are especially severe in the arena of international currency relations and finance. A decade of experience and research since Mexico's 1994-95 crisis has led to a modal outlook which, if not decidedly more pessimistic, is certainly more nuanced than the one that prevailed during the heady early 1990s.

In the early 1970s, industrial countries moved to a regime of floating dollar exchange rates, within which they were able progressively to liberalize international financial flows while maintaining substantial national sovereignty over monetary policy decisions. The resulting "nonsystem," as it was often labeled, has now endured longer than its Bretton Woods predecessor, and its stability has on the whole been enhanced by monetary innovations such as explicit and transparent inflation targeting. Industrializing countries, by contrast, have found it much harder to settle into a comfortable resolution of the open-economy monetary policy trilemma. In those countries, institutional distortions and market failures complicate credible inflation targeting, render large exchange-rate movements more dangerous, make fixed exchange rates acutely crisis-prone, and apparently reduce the beneficial effects of financial liberalization.

While events of the 1990s have underscored these difficulties, none of them is an entirely new phenomenon. Many received extensive discussion in past academic research, for example, in the literature on the contractionary effects of devaluation and in that on the optimal sequencing of economic opening.[1] What *is* new is that an important subset of the industrializing world has now established extensive enough financial linkages with the rich countries, and achieved a sufficient degree of economic size, that its fortunes have first-order repercussions on the rest of the world. In other words, the relative success of some middle-income countries in growing and opening their economies also gives them a position in which their vicissitudes raise global concerns. No longer are the structural features of developing countries viewed as exotic special cases; indeed, newer institutional and geographic theories of the wellsprings of prosperity are sufficiently broad to encompass the poorest

[1]Earlier contributions include Díaz Alejandro (1975), Black (1976), and McKinnon (1982).

as well as the richest economies. Hopefully, this line of research can point the way toward fundamental reforms that will ease the difficulties of the globalization process.

This paper is a selective overview of industrializing countries' macroeconomic performance and external financial linkages. In section II, I review some salient differences in economic growth and volatility among three country groups, the high-income industrial countries, the generally middle-income countries with some degree of global financial integration, and the generally poor countries that remain closed to private international financial flows. In particular, I show that across these country groupings, both macroeconomic volatility and the ratio of per capita consumption volatility to output volatility are inversely related to per capita income. Section III looks at the postwar history of financial liberalization, the economic gains it has yielded, and their dependence on national institutions and per capita income. Although middle-income emerging markets may benefit less from financial opening than do richer country with higher institutional quality, some do appear to gain (at least for sufficiently high income and/or institutional quality), which helps explain their determination to participate in financial globalization. Given financial openness, emerging markets may have difficulty in finding a feasible exchange rate regime, a factor that heightens economic volatility and reduces their benefits from globalization.[2]

In section IV I focus upon one classic reason for the difficulties .emerging-market countries face in operating their exchange-rate regimes, their inability to borrow in their domestic currencies. I show how this institutional feature of markets makes floating more difficult by inducing additional exchange volatility and by complicating the process of current-account adjustment. I go on to argue that reliance on foreign-currency borrowing can undermine fixed exchange rates by generating financial fragility. Section IV also examines more closely emerging countries' experiences with flexible exchange rates. While the Calvo-Reinhart (2002) "fear of floating" phenomenon is confirmed at one level for a number of nonindustrial countries, it is also true that some have benefited from exchange flexibility through the accommodation of competitiveness trends and through the use of the exchange rate as a safety valve during intervals of turbulence. In general, the record reflects the

[2] Calvo and Mishkin (2003) argue that the choice of an appropriate exchange-rate regime is secondary to a sound institutional infrastructure for the economy, which is an ultimate determinant of economic success.

difficulties emerging countries have had in exchange-rate management, given their structural problems and their more open capital markets. Section V offers some concluding thoughts.

2 Economic Performance within Three Country Groups

The reality of economic growth experience is messy. Track records are quite different across national, regional, and stage-of-development units, defying simple generalizations. Accordingly, explanations of growth experience focus increasingly on geography or the diverse institutions governing nations' political, economic, and legal systems. Recent attempts at generalized theories emphasize "deep" factors, such those that might explain the origins of institutions.

Figure 1 portrays a basic fact, emphasized by Romer (1987), that there is no systematic tendency for national levels of Gross Domestic Product (GDP) per capita to converge (unconditionally) over time. The figure plots GDP per capita in 1960 in 1996 dollars (horizontal axis) against the average annual growth rate of per capita GDP over the following four decades (vertical axis). In a simple world of structurally identical Solow economies, capital-scarce poor countries would show faster growth, fueling a tendency toward convergence over time. Yet the slope of the regression line shown in Figure 1 is significantly *positive* rather than negative. Some countries that were poor in 1960 indeed have displayed rapid subsequent growth, and some that were relatively well off then have done poorly since (for example, Argentina and Venezuela). Nonetheless, the average tendency is toward divergence in national per capita incomes.

Figure 1 distinguishes among countries based on a tripartite classification that will be useful below. Following Husain, Mody, and Rogoff (2004), I classify countries as "advanced," "emerging," or "insular" (based on recent data). For those authors, the emerging market countries are those included in the Morgan Stanley Capital International (MSCI) index. I depart from them in transferring from their insular to the emerging category countries that, while not in the MSCI index, are classified by the IMF as having open financial accounts (for example, Uruguay). Thus, my insular group is characterized mainly of financially closed economies. While many in the emerging markets

group are currently financially open, a number of the countries included in the MSCI index—China is a notable example—do still maintain restrictions on international financial transactions. Furthermore, the insular group is on average the poorest group, while emerging-market countries generally are in the middle-income category. The appendix lists the country groups. Husain, Mody, and Rogoff refer to countries in my "insular" group as "developing," but I will reserve that term (as well as the term "nonindustrial," to be used synonomously) for the union of the emerging and insular sets.[3]

The finding of overall unconditional divergence is, in a mechanical sense, due to the insular group, which consists largely of African countries. These countries, which were among the poorest in 1960, have tended to become relatively poorer over time. But the convergence one would then find in a sample consisting of emerging plus advanced economies would be illusory, that is, it is not the result of factors stressed in a simple, uniform, Solovian account of the world. Within the emerging markets group, the East Asian economies have indeed displayed upward convergence, with some, like Singapore, growing so fast as to reach high-income status. But the Latin American countries, also mainly within the emerging markets group, show downward convergence. That is, some of the countries that were relatively rich in 1960 (much richer than the East Asian countries were then) have grown most slowly, but not as a result of relative capital abundance! Among the countries that are most prosperous today, there are a number of notable success stories, but as De Long (1988) has stressed, it is misleading to judge convergence on the basis of a sample of countries that, ex post, have become rich.

A more illuminating way to track the world income distribution is to compare countries' output positions relative to the United States as they evolve over time.[4] Figure 2 presents some relevant data, plotting the log of per capita GDP relative to the United States in 1960 (horizontal axis) against its value in 2000 (horizontal axis). The country sample is subdivided by region. Countries lying above the 45-degree line through the origin converged closer to United States output levels over the last four decades of the twentieth century, whereas those below only fell further behind. Many countries classified as high-income today were substantially further behind the United

[3]I borrow the term "insular" economy from McKinnon (1981), who applied it in a somewhat different sense.

[4]For a complementary discussion, see William Easterly's contribution to this conference.

States in 1960, but of course, the stand-outs in improving per capita income are the East Asian countries. (Singapore is in the high-income group in Figure 2, though it was middle-income in 1960.) Some other countries, such as India and Pakistan, have to some degree improved their relative position. The performances of these countries and much more, of China, underlie Fischer's (2003) observation that global unconditional output convergence appears more pervasive when the unit of observation is the individual rather than the nation.

Divergence in per capita output over the second half of the twentieth century is concentrated mostly in Latin America and subsaharan Africa. Those few Latin American countries that lie above the diagonal in Figure 2 (one is Brazil) are close to it. In subsaharan Africa, poverty is much greater and growth has been lower. These countries, with only a few exceptions, appear mired in low-output poverty traps, made worse by increasing political disintegration and the prevalence of AIDS.

For the most part, Latin America and East Asia make up the middle-income emerging markets group. The financial criterion on which this classification is based—a sufficient degree of openness to private capital movements, or inclusion in the MSCI index—is, again, an ex post criterion. All of these countries were relatively closed financially for much of the 1960-2000 period. But the regions' divergent experiences suggest that for emerging economies, it will be hard to establish any simple unidirectional causal link running from financial opening to economic growth performance (as the next section discusses more fully).

The volatility of economic growth, not just its mean level, affects economic welfare. Figure 3 therefore plots the standard deviations of annual per capita GDP growth (horizontal axis) and annual per capita private consumption growth (vertical axis). Countries are distinguished by membership in the high-income, emerging, or insular groups, and two comparative facts stand out. First, growth volatility, whether of consumption or of output, is highest (on average) in the developing group and lowest, by far, in the high-income group, with emerging markets generally occupying an intermediate position. Poorer economies tend to produce a greater proportion of primary products subject to highly variable supply and demand conditions, and their governments' policies often are erratic, so the comparatively high volatility of GDP is to be expected. Consumption volatilities would, however, be comparable across income groups were all idiosyncratic risks internationally diversifiable.

The second fact apparent in Figure 3 concerns the relative volatilities of consumption and output growth. The simplest consumption theories suggest that individuals will smooth consumption relative to income through domestic and foreign investment. In this context, it is worth underscoring that the GDP data, strictly speaking, measure output rather than income, so that conclusions should be drawn with caution. I will return to this problem in a moment. Nonetheless, for many countries income and output are sufficiently highly correlated that we would still expect consumption to be less volatile than output. For the high-income countries this prediction is largely borne out. In only four within my high-income sample is the volatility of per capita consumption growth higher than that of per capita output growth, and in three of those four cases they are approximately equal (the exception is Iceland). In the high-income group, the average ratio of the standard deviation of consumption growth to that of output growth is 0.82.

The emerging-markets group displays wide discrepancies in the relative volatilities of per capita consumption and output growth. The range is from 1.8 (Chile) to 0.5 (Philippines). On average, the ratio of standard deviations is 1.05, a mean relationship of approximate equality.

For a large majority of the insular economies, consumption volatility exceeds output volatility, often substantially. In this group of countries, the average ratio of consumption to output growth volatility is 1.5. This is especially painful because, as pointed out above, economic volatility in general is so much higher in poorer countries. The average standard deviation of annual per capita consumption growth is 7.4 percent in my insular-country sample, 4.1 percent in my emerging-markets sample, and only 2.3 percent in my high-income sample. That is why estimates of the potential benefits from eliminating national consumption variability tend to be so much higher for poorer countries (Obstfeld 1995; Pallage and Robe 2003).

What explains these differing patterns of per capita consumption and output growth volatility across country groups? One possibility, mentioned above, is the discrepancy between GDP and national income. This difference could be important in some cases, for example, nonindustrial countries for which highly variable remittances from workers abroad form a substantial share of national income. Of course, another main factor separating GDP from national income is the net flow of interest and dividends on foreign investments, although for many countries this flow is not very large compared to output. Data quality, especially of consumption data, might also be an issue

There are also some theoretical hypotheses. Neumeyer and Perri (2004) and Uribe and Yue (2003) suggest that changing perceptions of country risk on the part of foreign investors, which affect country borrowing spreads, can induce additional volatility in emerging-market consumption and business cycles. As Figure 3 shows, however, the problem is even worse for insular countries, which are largely closed to private capital movements and carry out even sovereign borrowing on a more limited scale. This fact alone indicates that openness to international financial flows, while possibly aggravating volatility in some cases, is far from being the only culprit.[5] The heterogeneity of country experience, and of experience across income groupings, suggests that a variety of factors may be at work in generating the high volatility and countercyclical relationship between output and saving that characterize many developing economies. In light of the important positive and normative implications, this pattern should be a focus for future research.

Figure 4 investigates the output-income distinction further by plotting consumption volatility against GNP rather than GDP volatility. (Again the data are in per capita terms.) The change slightly lowers the mean slope of the observations, while maintaining the general volatility orderings found earlier: on average, per capita income volatility is highest in the insular group and lowest in the high income group, and the same is true of the ratio of consumption volatility to income volatility (with a few outliers for the insular group). Of course, the reason the points in Figure 4 tend to be lower than in Figure 3 relative to the 45° line is that GNP volatility typically is not lower than GDP volatility, and for many developing countries, GNP volatility tends markedly to exceed GDP volatility. Figure 5 illustrates these facts. For high income countries, the average relation between GDP and GNP volatility is consistent with Lane's (2001) findings. In basic models of portfolio diversification, international trade in idiosyncratic risks should reduce income volatility compared with output volatility, so Figure 5 poses a further puzzle deserving future research. As just noted, the differing positions of these three country groups vis-à-vis the world capital market make it unlikely that a single explanation will apply in all cases. Later I will consider some potential problems raised for the emerging economies by features of the international capital market.

[5]This is also suggested by the decadal evidence on consumption growth volatility reviewed by Prasad et al. (2003).

3 Financial Integration, Performance, and Institutions[6]

The period following World War II is characterized by an overall trend of international financial liberalization that has culminated in virtually free cross-border asset trade for many countries. Nonetheless, financial opening has proceeded at different paces in different regions, remains unrealized in a fair number of countries, and sometimes has been subject to reversals.

Industrial countries followed a steady return to financial freedom after 1950, with high points including the return to current-account convertibility in Europe at the end of the 1950s, the widespread liberalization following the move to floating dollar exchange rates in the early 1970s, and the abolition of European capital controls in preparation for the launch of economic and monetary union in 1999. Figure 6, which displays the index of capital-account openness developed by Quinn (1997) and by Quinn and Toyoda (n.d.) for a number of regions, illustrates this evolution.

In our recent book (Obstfeld and Taylor 2004), Alan Taylor and I argue that the pattern of industrial-country liberalization reflects different approaches to the open-economy trilemma. The Bretton Woods arrangements governing the immediate postwar decades called for fixed exchange rates relative to the United States dollar. But Bretton Woods also permitted a regime of international capital control consistent with and supported by the extensive domestic financial restrictions inherited from the Great Depression and the world war. As a result, countries retained considerable independence of interest rates (see Obstfeld, Shambaugh, and Taylor 2004), as well as the option of occasional discrete exchange parity changes.

The return to current-account convertibility and the rapid growth of world trade, however, made international financial flows ever more difficult to contain. Just as China recently has struggled to shut out speculative capital inflows, European countries under Bretton Woods found themselves under speculative pressures which, by the late 1960s, had become seriously destabilizing despite tighter capital controls. While the move to floating dollar exchange rates early in 1973 was initially viewed as a temporary tactical retreat, the system proved durable. It gave countries monetary independence in the face of severe macroeconomic shocks, and allowed a gradual lowering of capital controls by some of the major industrial countries. Greater freedom of

[6]This section draws extensively on Obstfeld and Taylor (2004).

international transactions, in turn, served the interests of a resurgent financial services industry, which found new profit opportunities in the recycling of OPEC surpluses and in expanding foreign exchange trading. The resulting resolution of the trilemma has proved quite durable with regard to dollar exchange rates, although euro zone members have taken a quite different, and largely politically-motivated, approach, sacrificing national monetary autonomy in favor of absolute intra-zone exchange stability and capital mobility.

Figure 6's depiction of OECD capital-account openness is consistent with this narrative. The figure also shows the evolution of openness in nonindustrial country groups. Like the OECD, East Asia has trended upward, but without yet reaching an equal degree of openness, as some important regional actors, including China, retain controls. Africa and the Middle East have made less progress, although the trend is still toward greater financial openness.

The Latin American case is instructive. By 1960, Latin America had reached a high degree of financial openness. Indeed, aside from Canada and the U.S., all the countries that declared early current-account currency convertibility under Article VIII of the IMF's Articles of Agreement were located in Central America or the Caribbean. Given Europe's need to reconstruct and their favorable Western Hemisphere location, these countries enjoyed strong terms of trade in the early 1950s. Although this happy conjuncture could not persist indefinitely, capital-account liberalization moved forward in the region. For example, on December 29, 1958, just as major European countries were making their transitions to Article VIII convertibility, President Arturo Frondizi of Argentina announced a stabilization plan that included removal of quantitative trade controls and unification of the foreign exchange market under a floating exchange rate. The reasons were not unlike those that promoted regional liberalization moves some three decades later—a desire to establish credibility with foreign investors through thoroughgoing reforms, as well as the hope of emulating the more prominent growth success stories of the day. In Argentina's case, stated goals included the attraction of foreign capital and the emulation of West Germany's *Wirtschaftswunder* under free-market policies (Díaz Alejandro 1965).

Capital controls returned to the region in the mid-1960s as the volume of globally mobile capital expanded and as other balance of payments pressures built up. The shocks of the early 1970s greatly reinforced this reversal. Díaz Alejandro (1975, p. 12) has described how the the trilemma progressively restricted the room for maneuver of the developing countries:

> During the 1950s and early 1960s, even small countries with fixed exchange rates maintained a modest degree of autonomy over monetary policy, thanks to imperfections in international capital mobility. As such mobility improved dramatically during the late 1960s and early 1970s, small developing countries (and not-so-small ones, like Mexico) were faced with choices new to them but familiar to small industrialized economies: letting their remaining monetary autonomy evaporate, imposing or tightening exchange controls, or abandoning fixed rates.

Even though most industrial countries adopted floating dollar exchange rates, developing countries were reluctant to do so, and for the same reasons (some of which are discussed in the next section) that make floating problematic for them today. Fixed exchange rates, absent capital controls, would have opened the door to financial crises. So fixed rates plus an intensification of capital controls represented the preferred resolution of the trilemma. As Figure 6 shows, the retreat from financial openness in the nonindustrial world, while more pronounced in Latin America, also occurred in East Asia. Among the causal factors was the system of floating dollar exchange rates itself, insofar as movements in third-country dollar exchange rates altered the competitive positions of countries pegging to the dollar. The sovereign debt crisis of the 1980s served as a further brake on the progress of international capital mobility, which resumed only at the end of the 1980s.

There is now a substantial theoretical and econometric literature on the gains from financial liberalization. Space prevents a complete review, and instead I refer readers to Prasad et al. (2003), Obstfeld and Taylor (2004), and the references therein. The financial crises that many developing countries have suffered since 1990 raise the question of the realized gross gains from financial liberalization being worth the costs. For some observers, the answer is a clear no; and even previous advocates of capital-account opening now usually urge greater caution in doing so, and point to stricter preconditions for successful relaxation of controls.

My reading of the empirical literature is consistent with the view that, so far, financial opening generally has yielded smaller net gains for nonindustrial than for industrial countries. Consider, for example, the study by Bekaert, Harvey, and Lundblad (2002) on consumption- and output-growth volatility following equity-market opening. Using pooled time series and cross section data, the authors estimate much smaller volatility declines as a result of

equity-market liberalization in their emerging-markets sample than for mixed samples that include industrial countries. For the latter samples, in contrast, they find that equity-market liberalization significantly reduces the volatility in consumption and output growth, even when the Asian crisis years are included and even after controlling for certain macroeconomic reforms and the level of financial development.[7] Apparently the risk sharing benefits that emerging countries have derived from liberalization are smaller than for industrial economies (though such gains as can be reaped may be quite valuable, in welfare terms, at the margin).

Indeed, for emerging-market countries, Bekaert, Harvey, and Lundblad (2002) find significant volatility declines following liberalization only over the 1980–97 period. Once the sample is extended through 2000 so as to include the Asian crisis years, equity-market liberalization is estimated to have an insignificantly negative (and small) or even positive impact on the volatility of consumption and real GDP growth rates. The positive mean growth-rate effects found by Bekaert and his coauthors are also lower in a longer sample period that includes the Asian crisis. And the greatest decline in the estimated growth effect can be seen in the emerging-market subsample of countries. Because most of the high-income countries in the authors' sample liberalized their equity markets before the start of the sample period in 1980, a major concern is that apparent declines in volatility "following" liberalization mostly reflect the cross-sectional fact, documented above, that perhaps for other reasons, high-income economies are less volatile.

An important objection to econometric studies of the effects of financial opening is that any steps taken toward liberalization are endogenous and really reflect deeper parameters, that is, "institutions" however defined (Rodrik 1988). Countries with strong institutions will both liberalize and deploy complementary policy reforms, creating positive statistical correlations between financial integration and a variety of beneficial economic outcomes. That correlation need not imply, however, that countries can gain by liberalizing à la carte, without making the necessary complementary policy changes. For example, without effective prudential supervision of financial institutions, economic growth is likely to falter and capital inflows will likely aggravate the problems. A good institutional infrastructure, one in which the rule of

[7]These authors find much weaker results using the IMF's zero-one index of overall capital account openness, which is a notoriously coarse measure compared to others such as Quinn's.

law protects investor property rights, generates both good overall economic performance and an ability to reap net benefits from opening up to foreign capital. This linkage could help explain why poorer countries, which typically have weaker institutions, seem to gain less when they do open themselves to financial flows.

Better governments both liberalize external payments and create environments favorable to economic growth, but any independent effect of liberalization on growth remains unidentified in much of the linear cross-sectional analysis of growth effects. There could, however, be an important nonlinear interaction between quality of governance (which improves the prospects for productivity growth, raises returns to investment, and hence the demand for capital) and the benefits of financial opening (which speeds convergence to the steady state by augmenting the supply of lower-cost capital). In a recent study that examines the interaction between governmental quality, financial liberalization, and growth, Klein (2004) finds that indeed the biggest gains in economic performance—and, hence, implicitly in welfare—accrue to nonindustrial countries that have reached some minimum level of institutional capability. Such countries are likely to prefer open capital markets, but in that case may face a delicate task in trading off domestic monetary policy goals against exchange stability.

4 Market Failure and the Exchange Rates of Emerging Markets

I alluded earlier to the structural features that have made it difficult for emerging markets to embrace floating dollar exchange rates as a resolution of the trilemma, but which simultaneously make fixed-rate schemes prone to crises when capital is internationally mobile. Most of these features have been discussed in earlier academic literature, and they continue to influence exchange-rate policies in the nonindustrial world today. They include the tendency to avoid the domestic currency as a contractual unit of account and a lack of deep and resilient financial markets. Because these structural obstacles to fixing or floating stem from persistent institutional shortcomings, their recurrence in analyses of exchange-rate policies is not hard to understand. These problems certainly help explain the limitations to date on emerging markets' realized gains from asset trade.

4.1 The Sinful Circle

Discussing Argentina's recent experience from the perspective of the early 1960s, Díaz Alejandro (1965, p. 31) identified clearly how a prevalence of foreign-currency external debts could lead to contractionary currency depreciations:

> Devaluation may produce another type of wealth effect when some groups of the country have debts to foreigners expressed in terms of foreign currencies. A devaluation will then increase the value of the debt expressed in domestic currencies and will exert a depressing influence on the expenditures of these groups, especially when the domestic prices they receive for the sale of their products or services do not increase proportionally with the devaluation. When a country has a net foreign debt, this effect will make more likely an improvement in the trade balance and a drop in output following devaluation, especially when the debt is held by the private sector and is concentrated in short-term maturities.

Eichengreen and Hausmann (1999) coined the colorful term "original sin" to describe the impossibility of borrowing externally in terms of the domestic currency. More broadly, Guillermo Calvo speaks of "liability dollarization" to describe the extent to which domestic as well as external liabilities tend, in fact, to be denominated in dollars (for example, Calvo, Izquierdo, and Talvi 2003). Greater liability dollarization may be associated with a more extensive gross dollar liability position for the economy as a whole, spreading the negative impact of a currency depreciation. Even when dollar liabilities are nominally matched by dollar assets, there may be currency mismatches in some states of nature, for example, when important corporate debtors of domestic banks are unable to meet their dollar obligations in full. Brazil is subject to original sin, but its domestic liability dollarization was relatively limited in January 1999, which enabled it to devalue the real then without the calamitous balance-sheet effects seen in some other emerging markets. Other countries have proven more vulnerable to "sudden stops" in foreign lending, which force large exchange-rate adjustments and, in the presence of liability dollarization, sharp deterioration in balance sheets.

Economists do not have a full understanding of the factors that have allowed industrial countries to escape from original sin and to avoid exten-

sive denomination of domestic liabilities in foreign currencies. It seems more than likely, however, that histories of fiscal excess and inflation lower the perceived quality of domestic currency and make people reluctant to hold substantial creditor positions denominated in that currency's terms. In a deep sense, then, the problem stems from the weak government institutions that generate high and variable inflation. Even after the quality of institutions has begun to improve, liability dollarization can persist for some time, given the investments already made in avoiding the local currency. The phenomenon can be a circular one, because an inability to denominate debts in domestic currency leads to a harsher macroeconomic adjustment process, slower growth, and additional inflationary expropriations. Extensive foreign-currency liabilities make a floating exchange rate harder to live with, heightening the need for limiting exchange-rate movements relative to that for interest-rate independence under capital mobility. On the other hand, tighter limits on exchange-rate fluctuations raise the likelihood of some sort of speculative attack on the currency. As Eichengreen and Hausmann (1999) suggest, for some economies complete dollarization (of assets as well as liabilities, through abandonment of the national currency) may be the best solution of the trilemma.

4.2 Original Sin, Volatility, and External Adjustment

Discussion of original sin has stressed its implications for a *given* exchange-rate movement, but it is less appreciated that original sin will also affect the nature of foreign-exchange equilibrium, generally complicating current-account adjustment and exacerbating exchange-rate volatility. This observation follows from the classic portfolio-balance model of exchange-rate determination (for example, Kouri 1983). In the most standard, industrial-country version of that model, domestic residents hold a fraction of their wealth in foreign-currency bonds whereas foreign residents hold a fraction of their wealth in domestic-currency bonds—there is no original sin. Domestic residents do, however, have a home-currency habitat preference compared to foreign investors.

To guide the discussion I write the condition of equilibrium in the market for domestic currency bonds as

$$B = \delta(i^* + \varepsilon, i)W + \phi(i^*, i - \varepsilon)EW^*, \tag{1}$$

where $B > 0$ is the outside supply of domestic-currency bonds, W is home

wealth in domestic-currency terms, W^* is foreign wealth in *foreign*-currency terms, E is the exchange rate (domestic-currency price of foreign currency), i^* is the interest rate on foreign-currency loans, i that on domestic-currency loans, and ε is the expected rate of depreciation of the domestic currency (so that $\delta_1, \phi_1 < 0$ and $\delta_2, \phi_2 > 0$). Interest rates are held constant by the monetary authorities over the adjustment period that I will contemplate below.

In this setting, consider the mechanisms of portfolio adjustment following a shock that opens up a home current-account deficit. Because the foreigners whose wealth is growing are less keen on domestic assets than the domestic residents whose wealth is correspondingly shrinking, a wealth transfer to foreigners causes a fall in the relative demand for domestic-currency assets. The domestic currency therefore depreciates. restoring general portfolio equilibrium in three distinct ways, the first two of which depend on valuation effects:

1. Foreign investors suffer a capital loss, in foreign-currency terms, on their domestic asset holdings. As a result, their domestic asset holdings, measured in terms of foreign currency, shrink relative to their total wealth W^*. To maintain a given desired portfolio share of domestic assets, they must add to their domestic-currency asset holdings.

2. Domestic investors enjoy a capital gain on their foreign assets and allocate part of the resulting increase in wealth W to domestic assets.

3. The last equilibration mechanism is the most subtle and the most dependent on investors' having an accurate long-run view of the exchange rate's trajectory. As the wealth transfer to foreigners continues, the exchange rate depreciates further. But if the current-account adjustment process is *stable*, by which I mean that the world economy is converging toward a new steady-state wealth distribution, the *rate* of domestic currency depreciation will decline over time. This trend of decline in expected depreciation, ε, raises the desired portfolio shares $\delta(\varepsilon)$ and $\phi(\varepsilon)$ over time, helping to stabilize the foreign exchange market.

In this transition process to a stable foreign asset position, capital gains and losses on asset positions partially offset the effect on domestic net foreign debt of the wealth transfer through the current account, an aspect of international adjustment recently emphasized by Gourinchas and Rey (2004), Lane

and Milesi-Ferretti (2004), and Tille (2003). This pattern of asset-valuation effects eases the adjustment to a new long-run wealth distribution.

Next consider how the process works in a setting of original sin, with a debt (rather than assets) denominated in foreign currency. Because foreigners will not hold domestic-currency assets at all, $\phi \equiv 0$ and home investors' wealth equals $W = B + EF$, where F, assumed to be negative in the steady-state or long-run equilibrium, is the stock of foreign-currency assets that domestic residents hold in their portfolios.[8]

To render the model more applicable in the emerging-markets context, I assume that foreigners' demand for the home country's foreign-currency liabilities is an increasing function of the country spread $i_C^* - i^*$; that is, to compensate foreign investors for perceived country risk, the home country must pay a foreign-currency borrowing cost i_C^* in excess of the foreign risk-free rate i^*, with the spread an increasing function of the external debt. If foreign demand for home debt is given by

$$-F = \lambda(i_C^* - i^*)W^*, \quad \lambda'(i_C^* - i^*) > 0,$$

then one can write the required country borrowing spread as an increasing function of the share of foreign wealth invested in domestic liabilities,

$$i_C^* - i^* = \alpha(F/W^*), \quad \alpha'(F/W^*) < 0.$$

Equation (1) therefore becomes:

$$B = \delta\left[\alpha(F/W^*) + i^* + \varepsilon, i\right](B + EF),$$

or

$$EF = \frac{1 - \delta(,.,)}{\delta(,.,)}B \equiv \gamma(\varepsilon, F)B. \tag{2}$$

The condition for steady-state $\overline{F} < 0$ is that $\overline{\delta} > 1$. Observe that $\gamma_1 = -\delta_1/\delta^2 > 0$: higher expected depreciation raises the expected domestic-currency cost of foreign-currency debt, thereby inducing lower desired foreign-currency indebtedness. Also, $\gamma_2 < 0$; a lower foreign-currency debt (a higher F) is associated with a lower borrowing spread and, thus, with a higher desired ratio of foreign borrowing $|EF|$ to domestic assets. Notice for future reference that along the locus of portfolio equilibrium points such that $\varepsilon = 0$,

$$\frac{\mathrm{d}E}{\mathrm{d}F} = \frac{\gamma_2 B - E}{F} > 0. \tag{3}$$

[8] I am abstracting from the possibility that the developing country has gross foreign-currency assets as well as gross liabilities.

What is the equilibration process now after the emergence of a domestic current-account deficit? Notice that the valuation effects 1 and 2 discussed earlier are in the present case inoperative and perverse, respectively. Regarding effect 1, foreign demand simply does not enter eq. (2). Regarding effect 2, currency depreciation (a rise in E) raises the domestic-currency value of the foreign debt—*reinforcing*, rather than offsetting, the effect on domestic wealth of the initial wealth transfer to foreigners through the current account. In particular, this means that, as the local currency depreciates in the face of a current-account deficit, the external debt burden, measured in home currency (and in real terms if the real exchange rate is moving in the same direction) is increasing more rapidly than the pace of capital inflow alone would indicate. These considerations raise the possibility that current-account adjustment actually is unstable.

That is not the case if expectations are rational, however, due to effect 3, the tendency for expected depreciation to subside as a deficit is eliminated over time.[9] To see this, augment the equilibrium condition of eq. (2) with a simple current-account equation of the form

$$\dot{F} = \psi(E, F),$$

where $\psi_1 > 0$ (a competitiveness effect) and $\psi_2 < 0$ (a wealth effect). By imposing perfect foresight, $\varepsilon = \dot{E}/E$, in eq. (2), one obtains a two-dimensional dynamical system in E and F, as depicted in Figure 7 for the case of a net foreign-currency external debt. The $\dot{E} = 0$ schedule is positively sloped, as indicated by eq. (3), but it differs from the customary rectangular hyperbola because of the country-risk effect of external debt.

There is a unique, stable adjustment path leading to a steady state in the system's two variables. Observe that even though the value of the foreign debt, EF, rises more than proportionally to F during the stable adjustment process, portfolio equilibrium is maintained at each point in time by a sharply changing value of expected depreciation, ε. The model has two immediate implications.

First, the stable, saddle-path of convergence is steep relative to the case in which foreigners hold domestic-currency assets and the home country is a creditor in foreign currency. That difference gives rise to relatively high exchange-rate volatility in response even to minor shocks. The basic intuition

[9]Discussions of the stability question in this type of model include Henderson and Rogoff (1982), Kouri (1983), and Masson (1981).

is that of Dornbusch's overshooting paradigm: in the absence of stabilizing wealth effects, very big exchange-rate movements away from long-run equilibrium are needed to generate the expected exchange-rate reversals that, alone, can equilibrate the asset markets.

Second, under expectational assumptions less optimistic than long-run rational expectations, market instability is a possibility, perhaps accentuating volatility. It is an interesting question to integrate realistic learning processes into models of this type.

One way to illustrate the response to shocks is to investigate an unexpected but permanent foreign portfolio shift away from domestic assets—formally, a rise in the required country spread $i_C^* - i^*$ for any level of the foreign portfolio share $-F/W^*$. In Figure 8, this change is shown as a rightward shift of the $\dot{E} = 0$ schedule: given the deterioration in external credit terms, the emerging country's desired foreign borrowing $-F$ is now lower at any value of E. The exchange rate overshoots in depreciating up to the new stable saddle-path (point E_0.) On impact, the stock of foreign liabilities measured in home-currency terms, EF, actually rises and domestic wealth therefore falls. Sharp initial overshooting, however, creates an *expected* appreciation rate of domestic currency sufficient to maintain balance in the domestic bond market. Currency depreciation also creates a current-account surplus. In the adjustment to a new steady state, E falls and F rises, with the resulting fall in the ratio of foreign borrowing to domestic wealth accommodated by a steadily declining rate of expected currency appreciation.

An alternative shock is a fall in foreign demand for domestic exports, represented by an upward shift of the $\dot{F} = 0$ locus. The impact effects are much the same as for the last shock analyzed, which was basically a fall in foreign demand for the country's assets rather than its goods. The sharp fall in home wealth caused by the currency depreciation helps to explain the initial current account surplus, which is consistent with the country's reduced capacity to service foreign debts.

To summarize, we have another adverse implication of original sin. Left to its own devices, the foreign exchange market is likely to perform less smoothly than that of a currency which foreign investors are willing to hold. In essence, the greater incompleteness of the foreign exchange market removes a potential source of stabilizing demand for home-currency assets.

4.3 Dollarization and Financial Fragility

If liability dollarization causes problems under floating, it simultaneously makes fixed exchange rates harder to maintain. The financial fragility arising from unhedged foreign debts exposes fixed exchange rate regimes to speculative attack through a number of channels. One of these is the resulting vulnerability of the banking system to depositor panic, a possibility that, as is well known, can be avoided by sophisticated asset-market structures less likely to be utilized in nonindustrial economies (Freixas and Rochet 1997).

A simplified paradigm, based loosely on the model of Chang and Velasco (2001), shows how foreign investor panic can destabilize local banks, leading to huge crisis-induced depreciations such as those seen in East Asia (1997-98) and more recently in Argentina (2002).

Initially the exchange rate is fixed at E_0 through central-bank intervention. One can write the balance sheet of the domestic private banking sector as

$$E_0 M^* + M + C = I + H.$$

Here, M^* denotes foreign-currency deposits (for simplicity all held by foreigners); M denotes domestic residents' local-currency deposits; C denotes bank capital; I denotes illiquid banking system assets, unavailable at short notice; H stands for the banking system's high-powered deposits at the central bank.

In turn, the central bank's balance sheet is

$$H = ER + D,$$

where R denotes foreign reserves and D domestic credit. The major assumption is one of currency mismatch, so that for the banking system as a whole, short-term foreign-currency obligations exceed liquid foreign assets:

$$M^* > R. \tag{4}$$

This mismatch opens the door to a foreign investor panic, in which foreign lenders demand immediate repayment of the foreign deposit liability M^*. For convenience (albeit quite artificially), I assume tentatively that domestic investors do not simultaneously panic. I also assume that, at least initially, there is no maturity mismatch issue in paying off the foreign creditors: $H > E_0 M^*$.

If foreign lenders panic, the banking system, under a "sequential service" arrangement, uses some of its high-powered money holdings to purchase the

central bank's reserves R. The central bank is assumed to sell all of these and then to withdraw from pegging the exchange rate once $R = 0$. The banking system pays these reserves out to foreign creditors and then, by eq.(4), owes the balance of $M^* - R$.

Because there is a panic, the baking system is unable to borrow more foreign exchange from foreign sources. The only way it can obtain the resources needed to pay off the remaining foreign deposits is to sell high-powered money on the foreign-exchange market to domestic private holders of foreign currency. As a result domestic-currency deposits rise by ΔM. For simplicity, assume that local money demand is interest- and income-inelastic and that purchasing power parity holds. Then the increase in domestic deposits, ΔM, and the new equilibrium exchange rate, E_1, satisfy the equations

$$\frac{M + \Delta M}{E_1} = \frac{M}{E_0},$$

$$\Delta M = E_1(M^* - R).$$

The solution for currency depreciation is

$$\frac{E_1}{E_0} = \frac{M}{M - E_0(M^* - R)}.$$

Notice that for a big currency mismatch and a substantial extent of liability dollarization, the currency depreciation can be huge. It is in this sense that the financial fragility model can explain some of the huge currency depreciations seen in emerging-market crises.

Note also that bank capital falls by $(E_1 - E_0)(M^* - R)$, the capital loss on the portion of foreign bank liabilities not covered by central-bank support. Obviously the solvency of the banks will become questionable, probably leading to the domestic panic that I have so far assumed away. That panic, plus the negative effects on output and interest rates, will only worsen the ensuing economic chaos.

4.4 How Emerging Markets Have Floated

Data on emerging-market exchange rates are suggestive of some of the difficulties these countries have encountered in living with open financial markets, yet also reveal that some countries have been relatively successful in pursuing greater exchange flexibility. Husain, Mody, and Rogoff (2004) show that

compared to emerging markets with somewhat open financial accounts, many more insular countries operate currency pegs. They also show that insular-country pegs are more durable than emerging-market pegs, and that in general, emerging markets experience more exchange regime transitions than do insular countries. The relative financial isolation of the insular countries makes exchange-rate choices under the trilemma less stark for them.

Most emerging markets now live with a "limited flexibility" or "managed floating" arrangement. A look at how individual countries actually have managed rates often shows a marked reluctance to tolerate large currency fluctuations on a regular basis, though some countries have been transitioning toward higher levels of de facto exchange-rate flexibility. Figure 9 shows the monthly log dollar exchange rates (local-currency price of the dollar) for seven emerging markets since July 1994, comparing their behavior with that of the dollar exchange rate of the Japanese yen. Of these countries, Chile exhibits the exchange rate behavior that appears most similar to Japan's. Rather than the recurrent cycling that has characterized the yen/dollar rate, however, the Chilean peso has experienced a more definitive trend depreciation against the dollar—one manner in which emerging markets can utilize their exchange rate flexibility over time, even if they don't wish to allow large short-term movements. Significantly, Chile has less liability dollarization than many other emerging economies, and, according to Lane and Milesi-Ferretti (2004), engages in a relatively high degree of two-way asset trade, presumably leading to greater risk diversification.[10] Mexico's peso, like Chile's, has followed a distinct depreciating trend against the dollar since late 1995, but with a path that follows more muted short-term oscillations than in the Chilean case, except around the time of the Asian crisis.

The "fear of floating" type behavior posited by Calvo and Reinhart (2002) appears quite clearly for Peru after the Asian crisis period. As for the emerging Asian countries themselves (Indonesia, Korea, Thailand), there is a diversity of experiences. Since the turbulence of the late 1990s, Korea and especially Thailand have maintained relatively smooth exchange rate paths, with little trend. Indonesia's political and economic crisis has been more protracted, and it also has experienced terrorist attacks. Nonetheless the rupiah has been fairly stable against the dollar since early 2002. Indonesia's experience shows how an emerging market government, despite a preference

[10] An interesting recent discussion of Chile's experience, with comparisons to Australia's, is in Caballero, Cowan, and Kearns (2004).

for exchange stability, may resort to greater flexibility in turbulent periods.

Brazil also illustrates the use of exchange flexibility. After the January 1999 devaluation, the real followed a weakening rend against the dollar (a trend ended by a sharp appreciation as the Argentine collapse approached). The prospect of President Lula da Silva's election in October 2002, which emerged as a strong possibility in the spring of that year, widened Brazil's borrowing spread sharply and sent the real spinning downward. Rather than battling the markets, the Brazilian authorities accepted wider exchange rate fluctuations during the stressful period of political transition. Since the financial markets' apparent acceptance of the Lula regime in the spring of 2003, however, there has been remarkably little change in the real's dollar rate.

In summary, a few emerging markets (such as Chile) seem to be transitioning to fairly mature floating exchange rate arrangements. Others practice extensive smoothing, but may allow longer-term trends so as to accommodate gradual shifts in competitiveness. The financial vulnerabilities of these countries make large short-term exchange rate movements perilous, but also make it unwise to set up a narrowly pegged rate as a target for speculation. Finally, even countries with a preference for stability will temporarily let the exchange rate loose under duress, as a kind of pressure-release valve. While the resulting volatility may have costs, it is preferable to drawing a line in the sand and daring speculators to cross it. A more stable exchange rate can be reestablished once the turbulence has passed. These "regime changes" in exchange volatility, if present for industrial-country exchange rates, are much less pronounced.

5 Conclusion

As Fischer (2003) points out, it is remarkable how persistent emerging markets have been in retaining or returning to open capital accounts. This revealed preference indicates that emerging-market governments perceive economic gains to financial globalization. There is little doubt, however, that for emerging markets, those gains are limited by institutional deficiencies, such as those that generate liability dollarization and restrict many countries to borrowing in foreign currency. In particular, those deficiencies are obstacles to a comfortable solution of the trilemma. Fixed exchange rates have led to costly crises—a main negative of open financial markets—whereas more

flexible regimes raise their own problems. While some emerging economies have been able to use floating successfully to relieve market pressures, others exhibit "fear of floating," trading off the risks currency crisis against those of excessive volatility.

Those countries I have labeled as "insular" have on the whole performed worse than the emerging markets in terms of both average long-term growth and volatility. They have largely chosen to maintain closed capital accounts. But it would be wrong to ascribe the superior performance of the emerging markets to financial openness. It is much more plausible that both relative economic success and the desire for integration into world capital markets stem from a superior institutional infrastructure of the economy. Improvement of that infrastructure is critical both in moving the poorest developing countries toward improved living standards and in ameliorating the difficulties emerging markets have encountered during financial globalization.

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APPENDIX

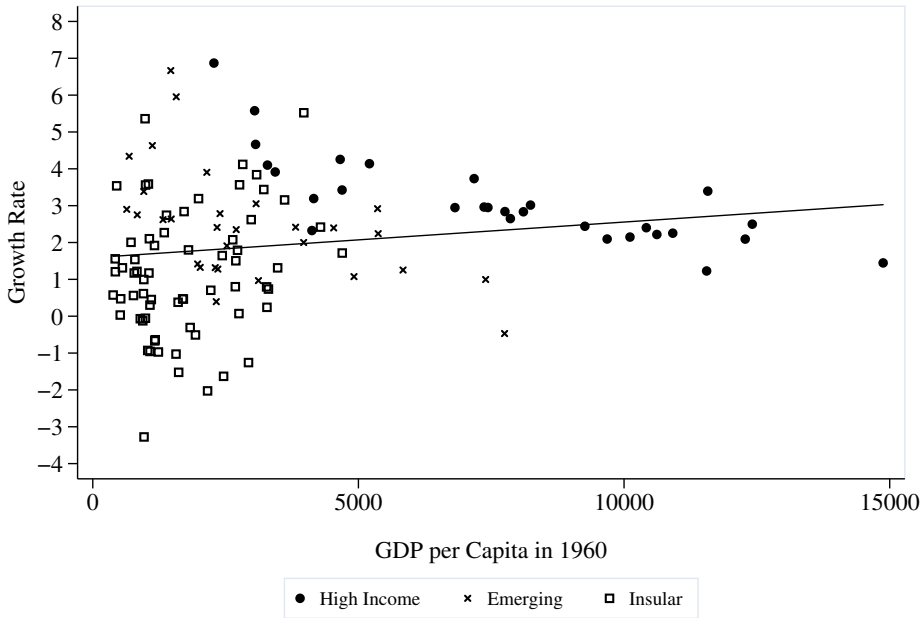
Countries used in Convergence Regression

Developing	Emerging	High Income
Algeria	Argentina	Australia
Bangladesh	Bolivia	Austria
Benin	Brazil	Barbados
Burkina Faso	Chile	Belgium
Burundi	China	Canada
Cameroon	Colombia	Denmark
Cape Verde	Ecuador	Finland
Chad	Egypt	France
Comoros	Guatemala	Greece
Congo, Republic of	India	Hong Kong
Costa Rica	Indonesia	Iceland
Cote d'Ivoire	Israel	Ireland
Dominican Republic	Jordan	Italy
El Salvador	Korea, Republic of	Japan
Equatorial Guinea	Malaysia	Luxembourg
Ethiopia	Mexico	Netherlands
Gabon	Morocco	New Zealand
Gambia, The	Pakistan	Norway
Ghana	Panama	Portugal
Guinea	Peru	Spain
Guinea-Bissau	Philippines	Sweden
Honduras	Seychelles	Switzerland
Iran	South Africa	United Kingdom
Jamaica	Thailand	USA
Kenya	Turkey	
Lesotho	Uruguay	
Madagascar	Venezuela	
Malawi		
Mali		
Mauritius		
Mozambique		
Nepal		
Nicaragua		
Niger		
Nigeria		
Paraguay		
Romania		
Rwanda		
Senegal		
Sri Lanka		
Syria		
Tanzania		
Togo		
Trinidad &Tobago		
Uganda		
Zambia		
Zimbabwe		

Also included in the Figures

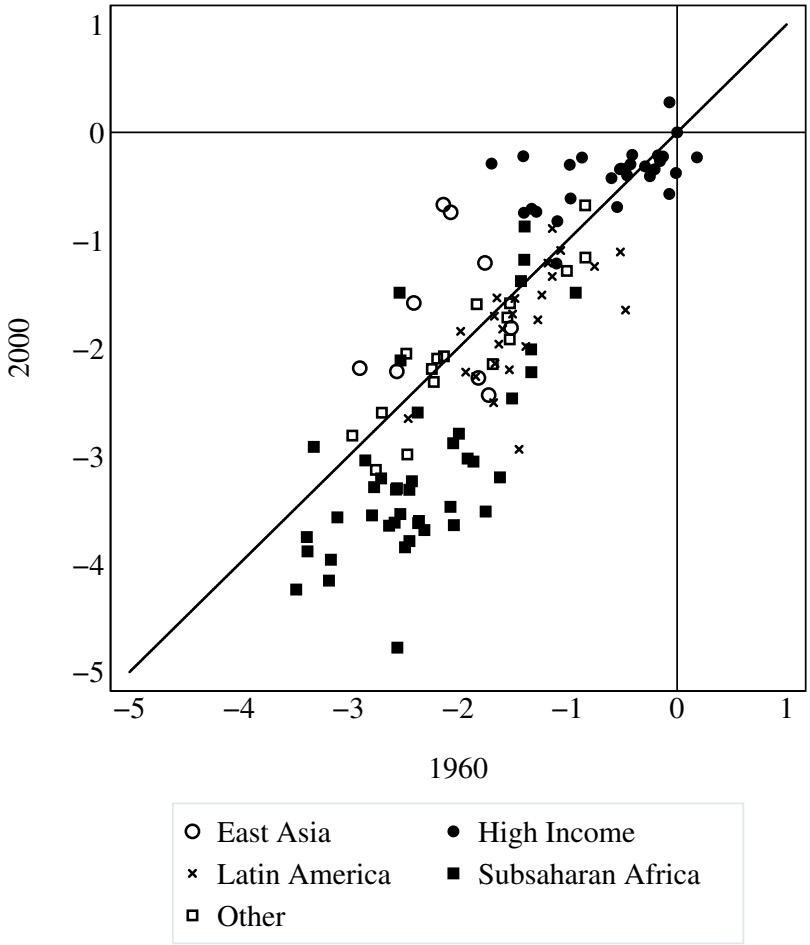
Developing	Emerging	High Income
Angola	Hungary	Antigua
Belize	Poland	Cyprus
Botswana	Taiwan	Germany
Central African Rep.		Puerto Rico
Congo, Dem. Rep.		Singapore
Dominica		
Fiji		
Grenada		
Guyana		
Haiti		
Mauritania		
Namibia		
Papua New Guinea		
Sao Tome and Principe		
Sierra Leone		
St. Kitts & Nevis		
St. Lucia		
St.Vincent & Grenadines		
Tunisia		

Figure 1: Average Annual Per Capita Growth Rate, 1960-2000



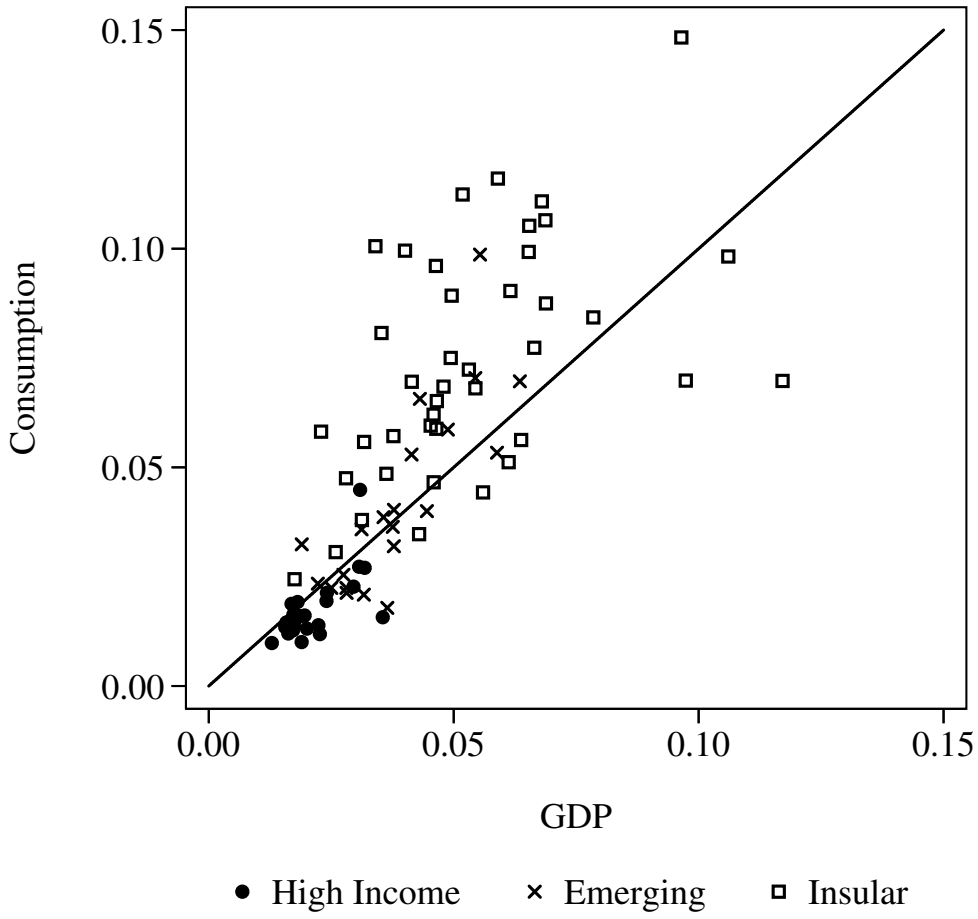
Source: Penn World Tables 6.1

Figure 2: GDP Per Capita Relative to US (log)



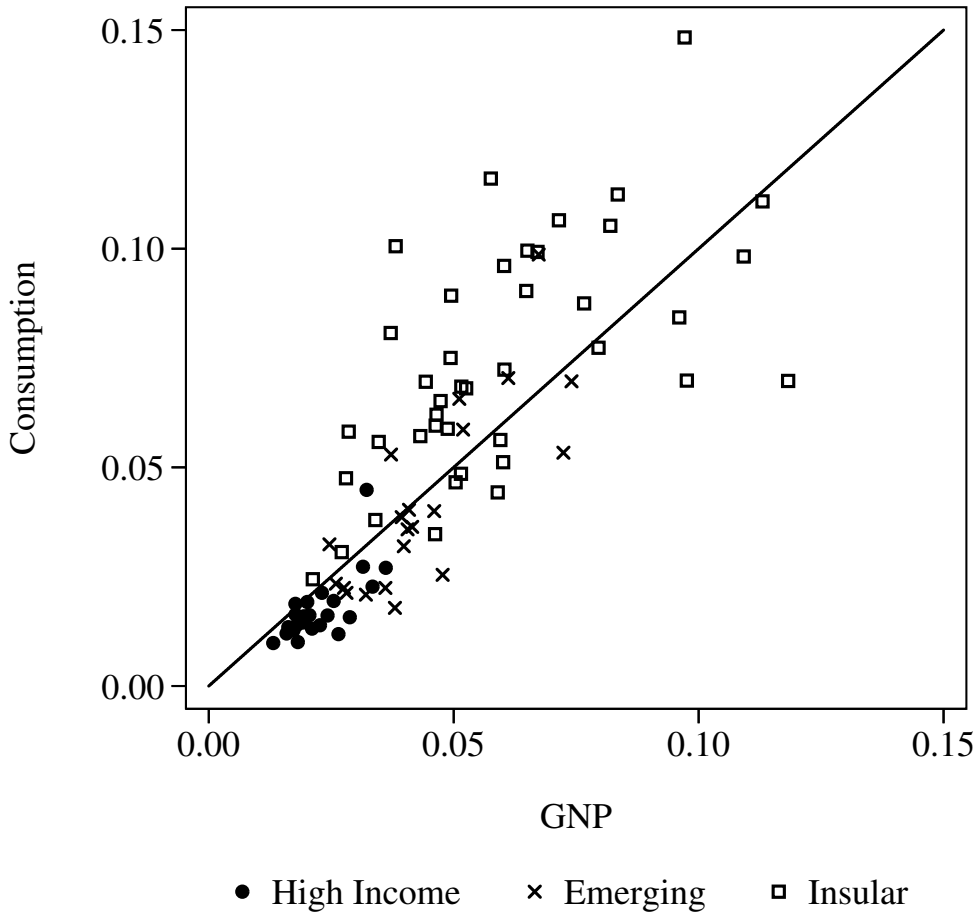
Source: Penn World Tables 6.1

Figure 3: Standard Deviations of Consumption and
GDP Growth Rates, 1975-2002



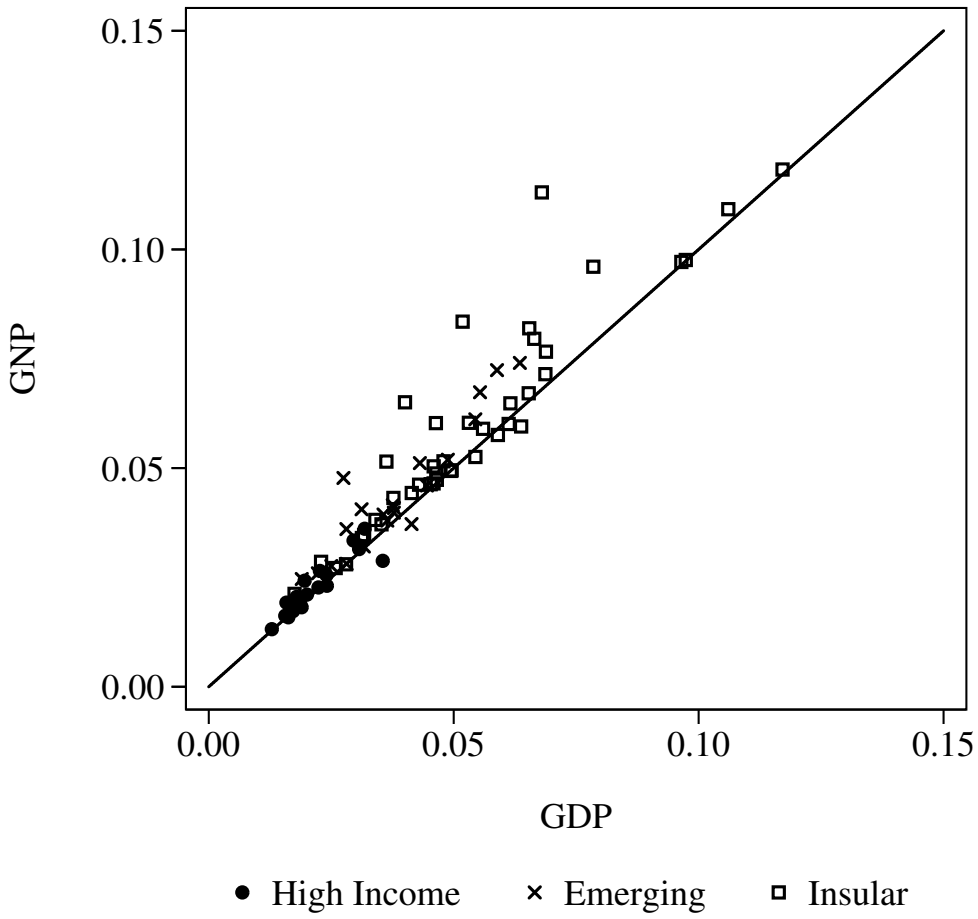
Source: World Development Indicators, World Bank

Figure 4: Standard Deviations of Consumption and
GNP Growth Rates, 1975-2002



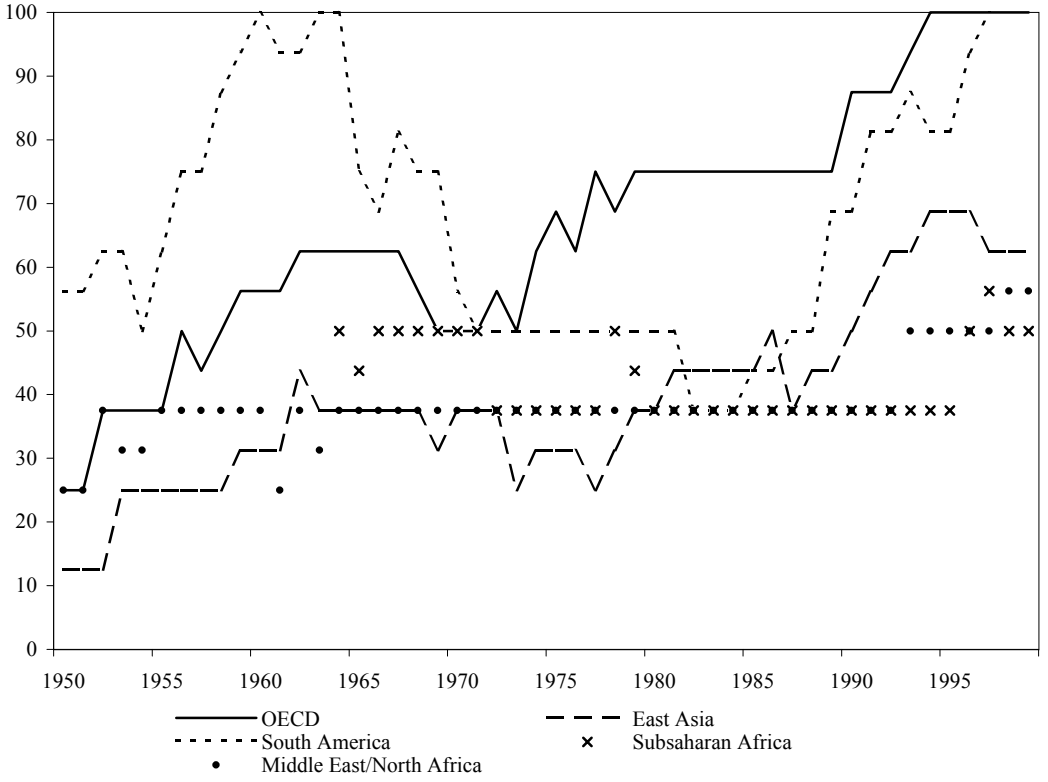
Source: World Development Indicators, World Bank

Figure 5: Standard Deviations of GNP and GDP Growth Rates, 1975-2002



Source: World Development Indicators, World Bank

Figure 6: Quinn's Measure of Capital-Account Openness, by Region



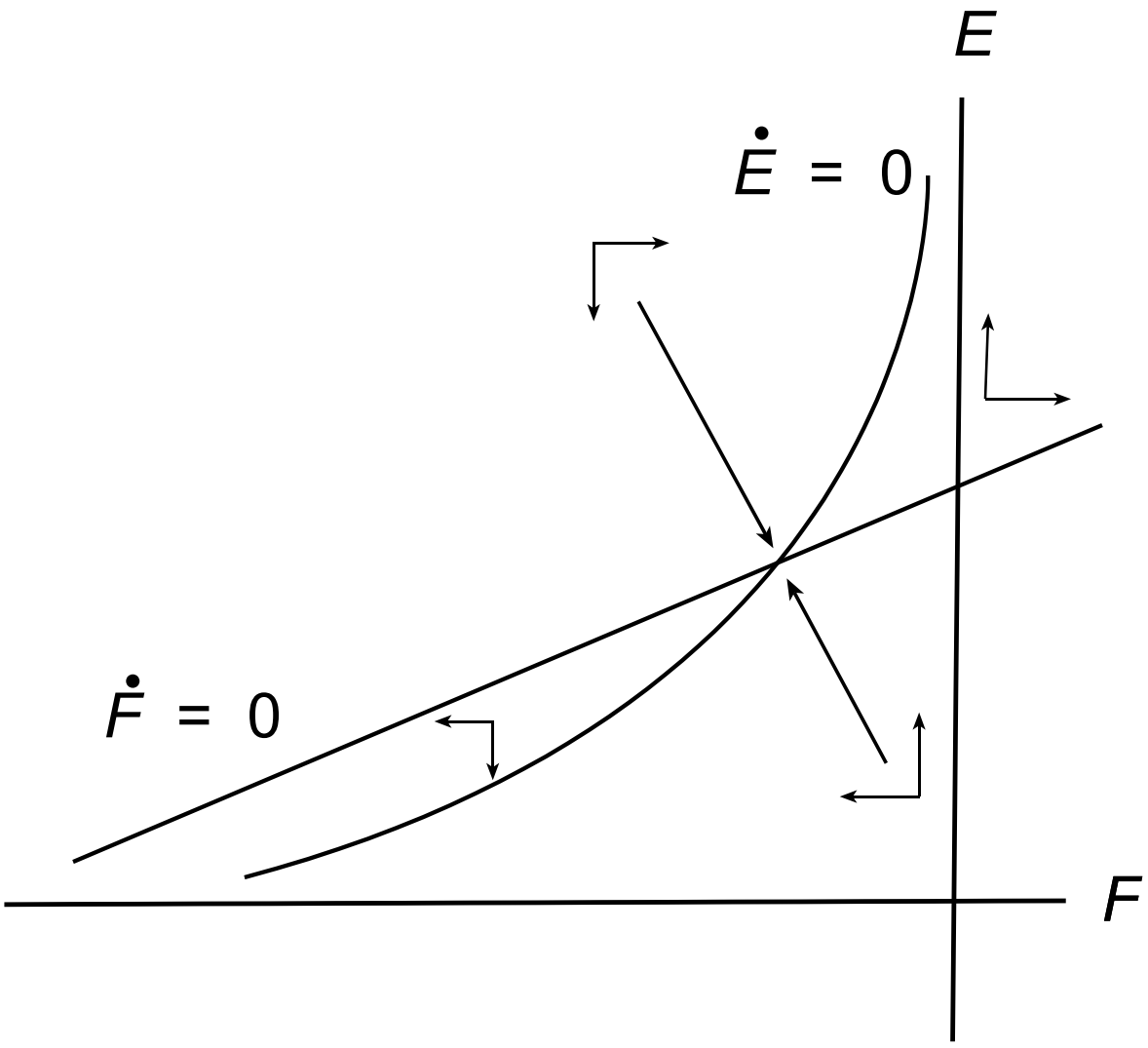


Figure 7

Current Account Adjustment with External Debt and Original Sin

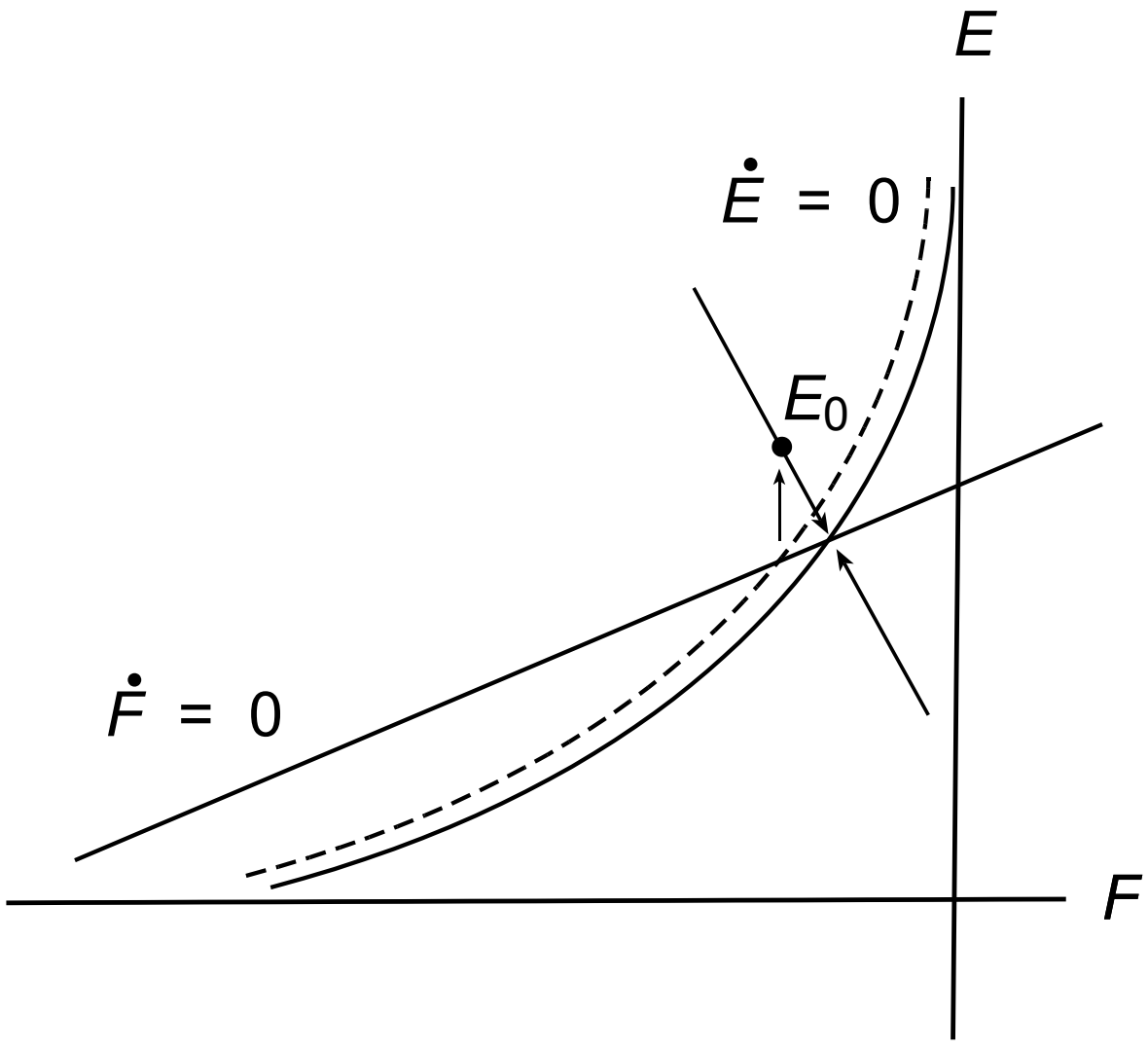
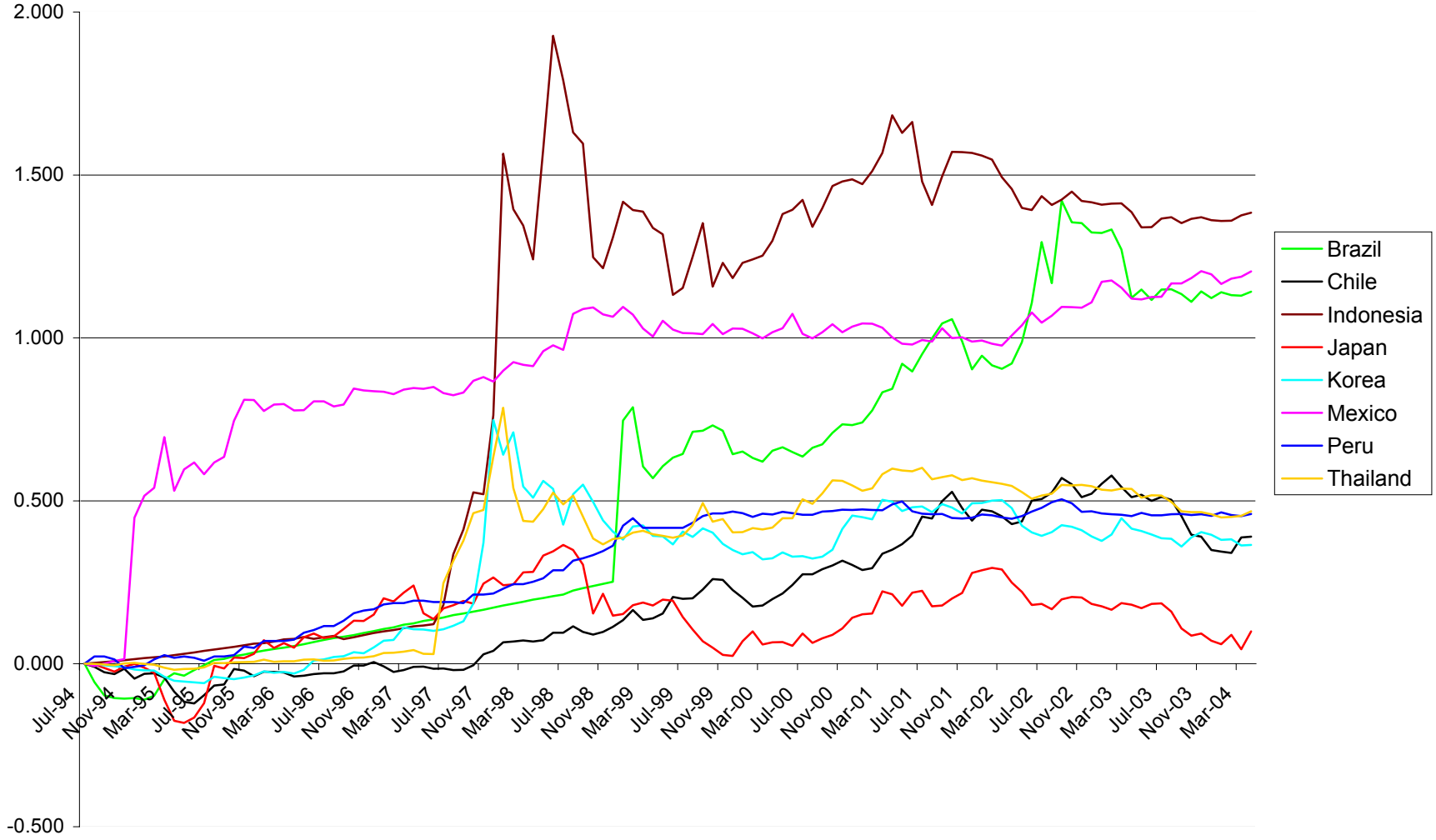


Figure 8

Effects of an Adverse Foreign Portfolio Shift

Figure 9: Log Exchange Rate versus USD



Source: Global Financial Data