

**Original Sin:
The Road to Redemption**

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1. Introduction

The preceding chapters have shown that original sin – the inability of emerging markets to borrow abroad in their own currencies – is both prevalent and problematic. It implies the absence of opportunities for international risk sharing. It prevents the benefits of international capital mobility from being reaped because it gives rise to a very significant increase in the volatility of debt servicing capacity. One way of seeing this is to recall the comparison in Chapter 1 above of the volatility of GDP growth in domestic and dollar terms.¹ Deflating nominal GDP by the domestic consumption basket, one finds that growth is a little less than twice as volatile in developing as developed countries. But when domestic product is measured in constant U.S. dollar terms, which is what is relevant for debt-servicing capacity when countries borrow in dollars, the volatility of GDP growth in developing countries more than doubles again. As a result, the volatility of debt-servicing capacity of developing countries with original sin is nearly five times that of industrial countries that borrow abroad in their own currencies.²

Our empirical analysis suggests that domestic reforms, by themselves, are unlikely to quickly eliminate this problem, given that the quality of domestic institutions and policies goes only so far in explaining the prevalence of original sin. Within the class of emerging markets, there is little correlation between the quality of institutions and policies on the one hand and the prevalence of original sin on the other. Widely-prescribed institutional reforms, in other words, seem to have relatively little impact on

¹ See Table 8 of that chapter.

² As expressed in their real GDP in local currency units. Measured in constant dollar terms instead of domestic units, the volatility of GDP growth also rises in developed countries, but this is not relevant to debt servicing capacity, our focus here, since these countries borrow in their own currencies. Another way

this specific problem. As a result, emerging markets are consigned to a situation of greater volatility than their advanced-industrial counterparts, making it correspondingly harder for them to sustain the mutually-reinforcing processes of growth and institutional reform.

We have no quibble with arguments for robust institutions that guarantee the rule of law, strengthen property rights, and encourage responsible fiscal, monetary and financial policies. We would certainly encourage countries to develop long-term fixed-rate domestic debt markets in local currency, in nominal terms where possible and inflation-indexed terms where not.³ But the findings of the preceding chapter suggest that doing so may not solve the problem of original sin; in addition, an international initiative may be required.

Earlier chapters have provided us with the building blocks for this initiative. We have seen that the global portfolio is concentrated in the currencies of a few large countries and international financial centers. We have seen how transactions costs in a world of heterogeneous economies can explain this bias toward a small handful of currencies. We have also seen that markets in the currencies of the select few emerging economies that have achieved redemption from original sin tend to develop through debt issuance by nonresidents, who then swap their debt service obligations into their currency of choice, allowing residents on the other side of the swap to offload their currency risk as if they had borrowed in local currency. We have suggested that the role of nonresidents may be related to their comparative advantage in separating currency risk

of making the point is to say that original sin makes the real exchange rate (the relative price at which local currency is converted into dollars) matter for ability to pay. We return to this in what follows.

³ Indeed, the advantages of developing these markets feature prominently in our discussion below.

from credit risk. And we have shown that this is something that the residents of countries with original may find more difficult to do, given that currency depreciation makes it harder for emerging-market borrowers to stay current on their foreign-currency-denominated obligations (in other words, because in their case currency risk creates credit risk).

Our proposal envisions the creation of a synthetic unit of account in which claims on a diversified group of emerging-market economies can be denominated, together with steps by the international financial institutions to develop a liquid market in claims denominated in this unit. As this new unit conquers space in the global portfolio, it will become possible for emerging-market borrowers to issue claims denominated in the underlying currencies and to place them on international markets. The result will be a more efficient international diversification of risks and a reduction in financial fragility.

We are not the first to offer proposals for increased international risk sharing as a response to problems of macroeconomic and financial instability. The World Bank (1999) has attempted to promote the development of insurance markets for terms-of-trade risk. Shiller (2003) has proposed that governments issue derivative securities that would permit GDP-per-capita swaps between countries as a way of diversifying country-specific macroeconomic risks.⁴ Caballero (2003) has advocated the development of instruments indexed to the prices of the principal commodity exports of emerging-market borrowers. Berg, Borensztein and Mauro (2002) have promoted the idea of GDP-linked bonds, the

⁴ To the extent that GDP per capita is correlated with the real exchange rate, the proposal developed in this chapter achieves a similar result but with an index that is easier to calculate.

coupons on which would fluctuate with the growth of real GDP.⁵ Our proposal is one more attempt, in this spirit, to help to complete incomplete financial markets.⁶

2. The Proposal

Our plan has four steps. Step 1 is to define an inflation-indexed basket of currencies of emerging and developing countries, which for convenience we refer to as the “EM index.” Step 2 is for multilateral institutions such as the World Bank to issue debt denominated in this index. To avoid incurring a currency mismatch, they would convert a portion of their existing loans into claims denominated in the inflation-adjusted currencies of each of the countries included in the index so as to replicate the index in their pattern of lending. This would allow the Bank to become part of the solution rather than an additional source of original sin. Step 3 would broaden and deepen the EM market by having G-10 sovereigns issue debt in this instrument and swap their currency exposure with countries whose currencies are included in the EM index. Step 4 would then encourage institutional investors and mutual funds to create products that add credit risk to the index as a way of further encouraging the development of the market.

⁵ To the extent that GDP fluctuations are strongly correlated real exchange rate movements, especially in bad times, these instruments may be seen as imperfect substitutes of our proposal. There are several differences. First, the Borensztein et al (2002) proposal only adjusts the interest coupon and not the principal, meaning that it really does not solve the balance sheet problem proper. For example, in Argentina’s recent crisis, real GDP declines by less than 20 percent at its trough, while dollar GDP declined by over 60 percent. Secondly, while GDP growth and real exchange rates are correlated, the correlation is not perfect. The bulk of the collapse in the capacity to pay in bad times comes from the decline in the real exchange rate, not in the growth of GDP in constant local currency units. Using real GDP involves using the secondary instead of the primary source in the collapse of the capacity to pay. Third, the calculation of GDP is much more convoluted and can only be done at lower frequencies (quarterly at best) and with greater error (it requires several surveys of production and of prices instead of a just the calculation of one price index).

⁶ But, in contrast to these earlier schemes, we base our initiative on an analysis of why the markets in question do not exist and attempt to learn as much as possible from the few exceptional cases where they have in fact developed in order to identify the most natural way of promoting their self-sustaining growth.

Step 1. Develop an index based on a basket of emerging-market currencies.

For developing countries to be able to borrow abroad in local currency, foreign investors will have to take a long position in those currencies. But it is hard to imagine many foreign investors managing portfolios that include the currencies of many small, poorly-diversified economies. We therefore propose the creation of a unit of account made up of a portfolio of emerging-market and developing-country currencies.⁷

For illustrative purposes, we describe in Tables 1 and 2 two such baskets, one that includes the 20 largest countries for which the IMF publication *International Financial Statistics* conveniently provides quarterly data on exchange rates and consumer price indexes since at least 1980, and another that includes the largest 22 countries with the same continuous data since 1993. We refer to these as the “EM 1980” and “EM 1993” Indices. We weight the constituent countries by GDP at purchasing power parity in order to avoid setting weights in a manner that favors countries that do not behave prudently.⁸ To deal with the temptation to debase the currency faced by net debtors borrowing in their own currencies, we index the debt to the consumer price level of each country.⁹

Indexing to the CPI, like indexing to the dollar, allows countries with limited credibility to lengthen the maturity of their obligations. But indexing to the CPI has better properties from the point of view of macroeconomic stability: it is similar to indexing to

⁷ As argued by Schiller (2003), new markets typically need new indexes to synthesize relevant information, whether it is the S&P 500, the CPI or the Lehman Bond Index.

⁸ As would happen if we weighted them by the market dollar value of GDP or the value of foreign debt. In particular, the second criteria would favor heavily indebted countries, while the first would favor those with overvalued currencies.

⁹ We thus calculate the index as a weighted basket of inflation-indexed national currencies. For each country in the basket we take an index of its end-of-period nominal exchange rate and divided by the consumer price index (CPI) of the same month. Note that the calculation of the real exchange rate would in addition multiply this ratio by the US CPI. We do not take this last step. The implications are discussed

the real exchange rate, which is a relative price.¹⁰ While indexing to the CPI may be necessary to create a demand by foreign investors to hold claims denominated in the currencies of emerging markets, it is not obviously sufficient, given that many emerging markets already issue CPI-indexed claims which have not found their way into the portfolios of foreign investors. This is the problem that the remainder of our proposal seeks to address.

Indexing to the CPI nonetheless gives the EM index several important characteristics. First, if the real exchange rate is stationary, the index will display long-run stability. Averaging over 20 countries enhances this stability still further. Second, since the real exchange rate tends to appreciate in good times and depreciate in bad times, debt service payments on these obligations are positively correlated with capacity to pay, which is the opposite of dollar debts. Third, the index has a long-run tendency to appreciate. To the extent that late-developing countries grow faster than advanced economies, this generates domestic inflation not offset by depreciation of the exchange rate (the Balassa-Samuelson effect), strengthening the real exchange rate and thereby raising the compensation received by foreign investors.¹¹

below. Note that, to the extent that US inflation is low and stable, our index resembles a basket of real exchange rates.

¹⁰ We say similar rather than identical because the bilateral real exchange rate is usually calculated by dividing the nominal exchange rate (in terms of domestic currency per dollar) by the local CPI and multiplying by the CPI of the U.S. Here we are not taking this last step. The implications of this are discussed below.

¹¹ The EM index appreciates vis a vis the dollar over time if the sum of the real exchange rate appreciation of the underlying currencies plus U.S. inflation is positive. This means that the index will appreciate, even if the real exchange rate depreciates, as long as this depreciation is less than U.S. inflation. If these countries are expected to see real appreciation, and that U.S. inflation expectations are in the neighborhood of percent, this should trend appreciation a robust characteristic of the index.

Figure 1 shows the value of the two indexes along with the yen-dollar and deutschemark-dollar exchange rates.¹² Historically, the two EM inflation-adjusted currency baskets are less volatile against the dollar than are the yen and the mark. For example, it is striking that in the period of the Asian and Russian crises the EM index actually depreciates against the dollar by less than the deutsche mark.¹³ This low volatility suggests, other things equal, that claims denominated in the EM index should be attractive to international investors.

Table 3 calculates the volatility of the two EM indexes vis-a-vis the dollar for various sub-periods and shows that their volatility is generally in line with that of other major currencies. Table 4 shows their average return, their volatility, and their correlation with real private consumption in seven advanced economies (where many important international investors reside). The indexes exhibit trend appreciation of about 2 percent per annum, volatility of 10 to 13 percent, and a negative correlation with real private consumption growth in the advanced economies. These characteristics suggest that the index should be an attractive form of diversification for institutional and retail investors in the advanced economies.¹⁴

The reduction in volatility associated with moving from a single emerging-market currency to a portfolio of such currencies is related to more than pure diversification.

¹² The indexes are presented on a per dollar basis so that increases in the index imply depreciations.

¹³ We return to the reasons for this relative stability below.

¹⁴ The stability of these real exchange rate baskets is not specific to our choice of countries. Hausmann and Rigobon (2003) calculate similar baskets for the 88 borrowers of the International Development Agency (IDA), which is the concessional window of the World Bank. (This means that Hausmann and Rigobon's broader index is dominated by the poorest countries, whereas our indices here are tailored to emerging markets.) They show that while the typical inflation-indexed currency of the 88 IDA countries has a standard deviation of 15.6 percent, a portfolio of all 88 countries weighted by their debt to IDA is just 3 percent. Hausmann and Rigobon also show that the volatility of an index limited to claims on a random

That is, it is related to more than offsets in random, uncorrelated shocks to real exchange rates. In addition, there are structural reasons why one should expect negative correlations among the real exchange rates of the countries constituting the index. Many of the countries in question are on opposite sides of the same markets. While some export oil or coffee, others import those commodities. Therefore a positive shock to one is a negative shock to another. Even when different countries export the same commodities, they are affected in opposite ways when shocks are to commodity supply. A frost in Brazil's coffee growing regions is a negative shock to Brazil but a positive shock to other coffee producers. An aggregate of emerging market real exchange rates is thus more stable than the individual components.¹⁵

In sum, the basket we are proposing has three characteristics – trend appreciation, low volatility, and a negative correlation with consumption growth in industrial countries – that should make it attractive for global investors. The question is how to create a liquid market in claims denominated in this index. The answer begins with Step 2.

Step 2. Have the World Bank and other international financial institutions issue debt denominated in the EM index. By borrowing in the currencies that comprise the EM index, the IFIs would gain the ability to extend loans to the countries issuing those currencies in inflation-adjusted local-currency terms without incurring balance-sheet mismatches themselves. And by issuing high-grade debt securities denominated in a

sample of either half or a fourth of the members of IDA (44 or 22 countries) would have a volatility of 4.4 percent and 5.8 percent, respectively.

¹⁵ The more countries that are included, other things equal, the more stability we should expect. In the limit (when all countries are included), the real exchange rate would not fluctuate, since the real exchange rate of the world as a whole is constant, by definition. Moreover, the inflation-indexed local currency is just the value of the domestic consumption basket which is itself much more diversified than the export basket, hence is also more stable.

basket of EM currencies, the IFIs would provide investors with a claim on a more stable unit than could be achieved by issuing in an individual currency.¹⁶

As noted in Chapter 9, the process of escaping from original sin has been led, in many cases, not by residents but by foreigners and often by international financial institutions issuing obligations denominated in the currencies of these countries. We have argued that this pattern reflects the need to separate credit risk from currency risk and the difficulty that the residents of countries with original sin have in doing so themselves. Foreigners, in contrast, can issue instruments with currency risk that is uncorrelated with credit risk.

We therefore propose that the nonconcessional windows of the World Bank and other international financial institutions should issue debt in the index described above.¹⁷ Their AAA rating allows them to access institutional investors. These bonds would be attractive as a result of the trend appreciation of the EM index, its relatively low volatility, and its negative correlation with consumption in the countries in which they are marketed. To be sure, they would be less attractive initially insofar as they would be relatively illiquid. However, given the mandate of the international financial institutions to foster economic growth and stability, not to mention their self- interest in the

¹⁶ In a world of costless transactions, an investor could create an implicit index by himself. Individuals could in theory create an S&P or a Nasdaq based portfolio by themselves. In practice transaction costs imply that it is more efficient for somebody to create the portfolio and sell shares in it. In addition, an attempt to replicate the EM index privately by purchasing the underlying instruments in the market would involve buying securities that have much more credit risk than the AAA rated IFIs, as no EM member is AAA rated.

¹⁷ International financial institutions usually operate through two main windows: a non-concessional window that is funded by borrowing in international capital markets using their capital base as collateral and a concessional window that is funded with fiscal resources of donor governments. In the case of the World Bank, the non-concessional window is known as the International Bank of Reconstruction and Development (IBRD) and the concessional window is called the International Development Agency (IDA). See also below.

development of this market (as we explain in the next paragraph), it can be argued that the IFIs should subsidize issuance until sufficient liquidity develops to make the new bonds easily tradable.¹⁸

The argument that it is in the self-interest of the IFIs to develop the capacity to lend to their clients in local-currency inflation-indexed terms runs as follows. At present, the World Bank and other IFIs lend in dollars to finance projects relevant to the borrowers' development needs. All lending by the World Bank and the regional development banks (RDBs) is in dollars, other major currencies, and Special Drawing Rights (which are themselves a basket of major currencies).¹⁹ This means that the IFI lending creates a currency mismatch in the balance sheets of the corporations whose investment projects are funded by these institutions. They similarly create a mismatch for governments by loaning in dollars to fund schooling, transport, water and energy projects whose costs are ultimately paid through local-currency-denominated taxes and service charges.

For nonconcessional lending, this practice of dollar lending has a clear explanation. The development banks borrow on international capital markets in the major currencies. By lending in those same currencies, they neatly match the currency denomination of their assets and liabilities.²⁰

However, the concessional windows of these institutions – the International Development Agency (IDA) and the Poverty Reduction and Growth Facility (PRGF) of

¹⁸ Moreover, since the World Bank would calculate the index, it would have a fiduciary responsibility to its investors in assuring that there is no opportunistic manipulation of the estimates of exchange rates or the CPI by member countries. This will impart more credibility to the index.

¹⁹In what follows, we refer to these alternatives as dollar lending for short.

the IMF and its equivalent in the RDBs – are not financed through borrowing on capital markets. Rather, they are funded by grants from the high-income countries.²¹ This makes it hard to argue that the reason for denominating these loans in dollars is to permit the development banks to avoid incurring currency mismatches. In this context, lending in dollars and SDRs is more difficult to rationalize.

Hausmann and Rigobon (2003) show that one result of the practice of denominating concessional loans in dollars is that repayments to IDA have undesirable cyclical characteristics. IDA loans become more burdensome precisely when it is harder for countries to pay, i.e. when the dollar value of the GDP of the borrowing countries declines significantly. Compare this with a situation in which IDA lending is denominated in inflation-indexed local-currency units of each country. In this case, the dollar value of debt service would decline (rise) when exchange rate depreciates (strengthens). Occasions on which a borrowing country was forced to suspend its repayment to IDA might then become less frequent because the tendency for the exchange rate to collapse at the same time output fell (making it doubly difficult to repay dollar debts) would no longer be relevant for debt servicing capacity. This improved outcome might even be achieved without any additional subsidization of concessional loans, insofar as its improved risk characteristics caused the net present value of the IDA portfolio to rise rather than falling.²²

²⁰ To put the point another way, they lend in dollars because, absent an initiative of the sort we develop here, original sin prevents them from issuing debt in the currencies of their borrowers.

²¹ They are then supplemented by reflows from their own lending operations.

²² Hausmann and Rigogon (2003) show that the currency risk of the portfolio of inflation-indexed local currency IDA loans between 1985 and 2000 would have been low, given the low and often negative correlations among real exchange rate movements of IDA countries. This is the same pattern that holds for our EM index, as noted above. In addition they show for IDA that the inflation-indexed local currency portfolio would exceed the value of the dollar portfolio if the sum of the U.S. inflation plus the real

Note that foreign currencies would maintain their function as means of payment. Borrowing countries would still receive loans and repay the World Bank in dollars. The only difference is that the unit of account on which those payments were based would now be inflation-indexed local currency.²³

Hausmann and Rigobon propose that the concessional window of the World Bank – the IDA – should move rapidly in this direction by converting all dollar- and SDR-denominated loans into inflation-indexed local currency. Our proposal is directed to the nonconcessional window of the World Bank – the IBRD – and would imply moving in the same direction, albeit more gradually. The problem with moving quickly is that, as just noted, the Bank finances its nonconcessional lending by borrowing on international capital markets. If the Bank were to redenominate its loans into inflation-indexed currencies of emerging markets while continuing to borrow in dollars, it would incur a currency mismatch. The solution to this is for the IBRD to begin funding itself by issuing bonds denominated in EMs. Because this market would be relatively illiquid initially, this part of the adjustment would take time. Hence the argument for moving more gradually.

Note that the World Bank would not be required to take on additional currency risk if it began funding itself by issuing EM-denominated debt. By converting some of its already-outstanding loans to EM members into inflation-indexed local currency loans, it

appreciation of the IDA basket of currencies exceeds 1.37 percent. U.S. inflation has been running at approximately 2 percent. If this rate is maintained going forward, there would be scope for some long-run real depreciation of the basket while still generating a larger net present value. However, if developing countries' income levels exhibit a trend towards convergence – as has been the case in China, India, East Asia and Eastern Europe, the Balassa-Samuelson effect would imply that they should also exhibit some trend appreciation. In this case, the move to local currency inflation-indexed lending should generate an even larger expected repayment stream, even better risk characteristics, and an even lower volatility in the total dollar value of the portfolio (given the low volatility of the basket).

²³ In other words, while dollars and other foreign currencies would be delivered, the amount of the obligation would be related to the inflation indexed-local currency value of the debt.

could exactly match the currency composition of the asset and liability sides of its balance sheet.

Regional development banks such as the Inter-American Development Bank, the European Bank for Reconstruction and Development, the Asian Development Bank and the African Development Bank lend only to subsets of the countries whose currencies are included in the EM index, as the latter is a globally balanced index. This would appear to make it more difficult for them to align the currency composition of the asset and liability sides of their balance sheets if they started borrowing in EMs. In fact, however, it would still be relatively straightforward for them to off-load the currency exposure associated with not lending to members of the EMs basket that are not in their region. They could do so by swapping currency exposures among themselves or with the World Bank. Each RDB would then have nicely matched EM-denominated debts and EM-denominated assets.²⁴ The RDBs would thereby eliminate the currency mismatch generated by their own lending, and at the same time become part of the solution rather than a source of original sin.²⁵

²⁴ Conceivably, if the issuance of EM debt by the World Bank is very large, the Bank might be unable to hedge the resulting currency exposure by converting some of its old loans into the member currencies of the index because the required amounts would exceed the volume of loans in its books to at least some of the EM members. But the Bank could still hedge its excess exposure to that currency by arranging a swap with another international financial institution – say a regional development bank – that would similarly wish to convert its dollar loans to local currency. Alternatively, the World Bank could purchase inflation-indexed local currency government obligations or ask an investment bank to offer it a hedge. All these operations would have the beneficial effect of reducing the currency mismatch of the respective countries.

²⁵ Hausmann and Rigobon (2003) simulate the impact on the IDA portfolio of converting IDA loans into inflation indexed local currency in the 1985-2000 period. They find that diversification implies a very large reduction in the overall currency risk of the portfolio of IDA. In addition, debt service becomes less procyclical and less correlated with the real exchange rate, moving the debt burden to states of nature where the capacity to pay is larger. Monte Carlo simulations show that under the counterfactual the same shocks to output, inflation and the real interest rate are associated with a more predictable evolution of the debt to GDP ratio than under dollar-based lending.

Once issuance by the World Bank and the RDBs reached significant levels, claims denominated in the EM index would form part of standard global bond indexes such as the Lehman Global Bond Index. This would then increase the demand for EM bonds by institutional fixed-income investors with a mandate to form portfolios that track the index.²⁶

It is important to emphasize that we are *not* proposing that developing countries should issue debt in EMs. This would not help to solve the problem of original sin, since it would just substitute exchange rate risk vis-a-vis the EM for exchange risk vis-a-vis the dollar. Currency risk would not be significantly diminished, because any one emerging market currency would only account for a fraction of the EM basket.

Instead, we are proposing changes that would allow countries to denominate their obligations in constant units of their domestic consumption basket. That is, they would become able to issue domestic-currency-denominated bonds indexed to their consumer price indices. The World Bank and regional development banks would aggregate the loans of the countries making up the EM index in order to create a basket of loans with the same currency composition as the EM bonds that they themselves issue. Institutional investors would not do this for them from Day 1 because private markets would initially be lacking in liquidity. But by taking steps to render the market more liquid, the IFIs would be paving the way for private financial institutions to take over the task.

It is important to emphasize that by adopting this strategy the World Bank and its regional counterparts are not assuming additional balance-sheet risk. Nor are they undertaking additional lending. To be clear, we are not proposing an expansion in the

²⁶ In fact, some coordination between issuance and adjustment of the index should be feasible, as suggested

scale of their operations. The only effect of the initiative would be to repackage currency risk already on their books and place it with international investors through the issuance of EM-denominated debt. Emerging markets that borrow from the World Bank, for their part, would be able to off-load the currency risk currently associated with their debt service obligations. Insofar as the result is an improvement in the capacity of countries borrowing from the Bank to keep current on their external obligations, the credit risk in the World Bank's loan portfolio could in fact decline, other things equal.²⁷

The cost to the Bank of funding a loan denominated in inflation-indexed local currency terms will depend on the yield that investors demand on EM-denominated World Bank bonds. This will differ from the yield on dollar-denominated World Bank bonds for three reasons. First, it will depend on the expected change in the exchange rate between the dollar and the EM index over the life of the bond. (Recall that we have argued that the EM will tend to appreciate against the dollar due to the Balassa-Samuelson effect, so on average this factor should reduce the interest cost to the Bank.) Second, it will depend on the risk premium that the foreign investor would demand for holding EM currency risk. And, third, it will depend on the liquidity premium which investors will demand due to the lower tradability of the new instrument.

It is hard to assert *ex ante* how large these last costs will be. New instruments often have to be priced at a discount until investors gain familiarity with them and secondary markets develop liquidity. On the other hand, the reduction in risk and the expected appreciation of the EM might in fact result in no additional interest rate cost for

to us by Andrew Wong.

²⁷ In addition, there would be no additional convertibility risk as countries payments would be made in the same currencies used at present.

the World Bank. The substantial gap between the interest rate on World Bank loans and the opportunity cost of borrowing for client countries suggests that the Bank might still be able to make attractively priced loans to its clients and recover any additional cost if it turns out that there is one. Even if there is a residual cost over and above this, the Bank might wish to absorb it. In other words, the Bank could decide on some degree of more favorable pricing in order to encourage borrowing countries to participate in the scheme on the grounds that it has an interest in solving the problem of original sin that threatens the stability of the international financial system.²⁸

Step 3. Have G-10 countries issue debt denominated in the index. If this effort succeeds in creating space in the global portfolio for EM debt, there will then be an opportunity for other high-grade non-residents to develop the market further. The governments of the United States, Euroland, Japan, the UK and Switzerland, the issuers of the five major currencies, are natural candidates to do so.²⁹ The debt denominated in their currencies is significantly greater than the debt issued by their residents.³⁰ They are at the opposite end of the currency-of-denomination spectrum from emerging markets, which should make some portfolio diversification toward EMs relatively attractive. More broadly, they are not immune from the systemic consequences of original sin, giving them an interest in solving the problem.

Thus, these countries could issue EM debt in order to further transform the structure of the global portfolio. Following issuance, they may wish to swap out of some or all of the EM currency exposure in order avoid adding an inconvenient currency

²⁸ In addition, differential pricing could be justified by the fact that borrowing in local currency inflation-indexed terms involves less credit risk for the Bank.

²⁹ In what follows we refer to them as the G-10 countries for short.

mismatch to their own fiscal accounts.³¹ To do this, they would negotiate currency swaps with the countries whose currencies make up the index. In turn, this would allow emerging markets to swap out of (to hedge) their dollar exposures. Eventually, these swaps could be intermediated by the investment banks, although in the initial stages the World Bank may have to organize them.³²

It is useful to consider the performance risk associated with these swaps. Emerging markets would pay into the swaps when their currencies were strong while getting money from them when their currencies were weak. Since real appreciation (depreciation) tends to occur in good (bad) times, the performance risk will be concentrated in good times. In times of crisis, when their currencies weaken significantly, emerging markets would be receiving net income from their swaps. This minimizes the relevance of ability to pay for performance risk, which is the opposite of what happens with dollar debts.

A swap can be thought of as an exchange of bonds between the two final parties to the transaction. Hence, if the emerging market were to default on its swap obligation, i.e. on the bond that it issued, then the industrial country would simply take back the bond that it had committed to the swap. Default risk would be limited to the change in value of the two bonds since the time they were issued. Again, performance risk would be limited.

³⁰ As documented in Chapters 1 and 9.

³¹ That is to say that may not want debt service denominated in EMs when their tax revenues were denominated in domestic currency.

³² In particular, the Bank's AAA rating would allow it to provide greater assurances to the treasuries of developed countries.

The net cost of borrowing for the G-10 countries, after taking into account the swap, might actually be less than borrowing in their own currencies. The swap would entail a transfer of resources from the country that is most anxious to pay in order to hedge its currency exposure to the country that is most indifferent about the transaction. In other words, the first country would be especially willing to pay for the privilege of concluding the transaction, while the second one would be relatively indifferent and could therefore negotiate more favorable terms. Since countries suffering from original sin would be particularly anxious to pay for the privilege of off-loading their currency exposures, the G-10 countries could presumably obtain relatively attractive terms.

However, the swap may be expensive to organize. If the cost of the swap exceeds the benefit to EM member countries of hedging their currency exposures, then the transaction may not take place. Anticipating this outcome, G-10 countries may not be willing to issue EM debt in the first place. A solution to this problem would be for EM member countries to commit to swap their exposures with G-10 countries at a pre-announced price. G-10 governments could then exercise this de-facto put option in the event that they did not find a more attractive swap alternative in the market.

The development of a private market in swaps will depend on the existence of liquid long-term fixed rate bond markets in local currency. These exist in some emerging markets and not in others. While our initiative will facilitate the development of local markets, the regional development banks could accelerate the process by issuing instruments denominated in the (inflation-indexed) currencies of individual member countries in order to help create a benchmark long-term bond that would be devoid of

sovereign and convertibility risk. The existence of a market in these claims would encourage investment banks to create and price the relevant swaps.

Step 4. Further develop the EM index market. Imagine that as a result of the preceding steps there develops a market in claims denominated in the EM index. It is reasonable to think that institutional investors and mutual funds will then create products that add credit risk to the index. They will be able to do so by buying local currency debt of the countries in the index. This will facilitate the development of these markets, further helping to erode original sin. It is conceivable that once the market has developed sufficiently, the role of industrial country governments and international institutions can be scaled back, as has happened with the issuance by nonresidents of debt denominated in the currencies of the Czech Republic, Hong Kong, Poland, Slovakia and South Africa.³³

3. Additional issues

In this section we deal with several questions that arise from our initiative.

Moral hazard. Dollar-denominated debts have a value that cannot be influenced by the monetary and exchange rate policies of the borrower. The same cannot be said about debts denominated in local currency. This might create an incentive for borrowers to allow their currencies to depreciate in order to reduce their debt burdens.

We have framed our proposal in inflation-indexed terms precisely in order to address worries about inadequate monetary credibility and opportunistic behavior. While the nominal exchange rate can be influenced by the monetary authorities, it is not clear

that the same is true of the real exchange, especially in the medium term (which is what is relevant to medium- and long-term debts). To put the point another way, debasing the currency would eventually accelerate inflation. Indexation protects the investor from this consequence.

In addition, it is not obvious that countries with original sin, which are the targets of this initiative, would manipulate their currencies in practice. As documented in Chapter 1, countries that suffer from original sin exhibit fear of floating. They accumulate international reserves and allow little volatility in their exchange rates.³⁴ Of course, as these countries are freed from original sin as a result of our initiative, they might exhibit less fear of floating and exercise more monetary discretion. Investors could then become more reluctant to hold securities denominated in EMs. Recall however that EM securities would be denominated in a composite of the currencies of a significant number of countries, whose exchange rates are imperfectly correlated with one another. Consequently, much of this exchange risk would be diversified away. In addition, the greater exchange rate flexibility and the absence of original sin would reduce the incidence of currency collapses, reassuring investors worried mainly about extreme outcomes. To the extent that there is still the fear of short-term gaming by borrowers to save on their debt service, amounts to be paid can be indexed to the average dollar value of the inflation-indexed local currency over a certain period, say a quarter or a semester.

³³ See Table 10 of the previous chapter.

³⁴ In addition, Hausmann, Panizza and Rigobon (2003) show that at short horizons, real exchange rate changes in developing countries exhibit negative skewness and excess kurtosis as would be the consequence of trying to maintain unsustainably appreciated exchange rates. They also show that at 5 year horizons these two characteristics disappear, as would be expected from the endogenous nature of the medium term real exchange rate.

This would further reduce the incentive to manipulate the exchange rate for opportunistic reasons.

Additional issues for the World Bank and other IFIs. We have argued that our proposal involves few if any financial risks for the World Bank and other international financial institutions. The IFIs would not assume additional currency risk and would benefit from the reduction in credit risk caused by the denomination of the debt in a unit that better tracks the borrowers' capacity to pay.³⁵ To be sure, there still could be pecuniary costs. In particular, it is unclear in Step 2 what interest rates investors will demand in order to purchase these bonds initially and how difficult it will then be to develop a liquid market. And it is unclear in Step 3 how costly it will be to develop swap markets.

We will not know these costs absent an effort to implement the plan. However, it is possible for the international financial institutions to specify an upper limit on the financial burden that they are willing to assume and to lose nothing if costs turn out to exceed that limit. For example, the World Bank could first agree with countries whose currencies are included in the EM index on the spread over prevailing dollar rates that they would be willing to pay in order to convert their debt into inflation-indexed local currency terms. Adjusted for whatever portion of the cost that the World Bank was willing to subsidize in the interest of market development (including zero), this would determine the coupon that the Bank offered on its bonds. The feasibility of the initiative would then hinge on whether there existed a demand for World Bank bonds at the

³⁵ To avoid currency risk they would have to make sure that they are able to match the issuance of debt in EMs with the conversion of existing loans to EM member countries into inflation-indexed local currency.

corresponding price. If there was no market, no debt would be issued, and nothing would be lost.

The same point applies to the issuance by G-10 countries. But if things ever got to this stage, a market in World Bank-issued EM bonds would already exist, making it easier to price the EM risk and to anticipate the implications of EM-denominated issuance for the required rate of return on G-10 debt. Uncertainty would then be limited to the price of the swap (which can be resolved before any debt is issued by negotiating an international agreement among EM members to swap currency exposures with G-7 countries at an agreed price, as noted above). If such an agreement is feasible, debt is issued. If not, no debt is issued, and implementation stops.

The history of international capital markets is a history of some markets that took off and of others that did not. It is also a history of markets that took off due to international initiatives. For example, markets in developing country bonds did not take off in the third quarter of the 20th century; in practice, the market was dominated by syndicated loans. However, following the debt crisis of the 1980s, the Brady Plan jumpstarted this market by converting pre-existing loans into tradable securities.³⁶ Similarly, inflation-indexed U.S. Treasury bonds (TIPS) did not exist until the late 1990s, despite the obvious advantages of inflation-indexed securities. The markets, left to their own devices, did not solve this problem; solving it required action by the U.S. Treasury. But following the Treasury's initial issuance of such securities, the market in TIPS has

Any temporary gap can be hedged by either buying a claim on that government in that denomination or swapping with it the currency exposure.

³⁶ At the beginning, the market seemed to value the enhancements that were embedded in the Brady bonds to make them more attractive, but by 1996 it was clear that the market could see through these enhancements and countries started to exchange the Brady bonds for Global bonds with no enhancements.

become quite active and liquid. If the analysis in this chapter is correct, then the value of developing an equivalently deep market in EMs would be large, both for the World Bank and its member countries. This implies that they should be willing to invest something in the development of the market. And it is not clear that the market would develop without their intervention.

Possible distributional consequences. There is a temptation to think that if an initiative involving international debts benefits a certain set of countries, then those benefits must come at the expense of other countries. In this context, it is tempting to think that if developing countries that borrow on international capital markets benefit from converting dollar loans into inflation-indexed local currency units, then the developed countries that lend on international capital markets must necessarily lose from the operation. In this subsection we suggest that this implication need not follow.

One way of thinking about the distributional consequences for debtor and creditor countries of converting dollar-denominated debts into local currency terms is in terms of uncovered interest parity. If there are no deviations from uncovered interest parity – that is, if the change in the exchange rate is exactly offset by the interest differential between loans denominated in dollars and local currency – then there are no distributional consequences of converting dollar loans into local-currency obligations. In a world of ex ante uncovered interest parity, in other words, there are no ex ante winners and losers; there is only the improvement in risk sharing associated with increased portfolio diversification. If countries are risk averse, then they all benefit from this diversification.

On the other hand, if deviations from uncovered interest parity are possible, the conversion can have distributional consequences. The question is whether these are

desirable or undesirable. If the borrower's exchange rate depreciates by more than the interest rate differential, then the borrower (in this case, the emerging market) gains and the lender (in this case, the advanced country) loses when debts are denominated in the borrower's currency. Conversely, borrowers that experience an unanticipated appreciation would pay more when their debts are denominated in local currency than when their debts are denominated in dollars. In this instance they would lose, and the advanced countries on the other side of the transaction would gain. If unexpected (real) exchange rate appreciations occur when times are unexpectedly good and unexpected real depreciations occur when times are unexpectedly bad, as seems plausible, countries then benefit when times are bad and pay an extra cost when times are good.³⁷ This pattern clearly has desirable risk sharing characteristics.³⁸

Note that the additional income insurance enjoyed by emerging markets as a result of this scheme does not come mainly from off-loading currency risk onto international investors. Rather, it comes from the more efficient sharing of risk among the countries whose currencies comprise the EM index. International investors, for their part, would only be taking on the residual aggregate risk in the index.

³⁷ We can think in terms of real exchange rate changes in this context because the local-currency-denominated claims in question are inflation indexed.

³⁸ In practice, the World Bank and other IFIs do not set the interest rates on their loans so as to make the interest rate differential between loans denominated in different currencies differ by the expected rate of depreciation. Generally, they set the same interest rate on loans to all borrowers in order to recover their costs and achieve an agreed profit target. This means that the interest rate is not determined to assure uncovered interest rate parity. Some countries benefit from this practice (they enjoy lower interest rates on their World Bank loans than they might be charged otherwise), while other countries do not (the interest rate they are charged by the Bank is higher than warranted by their country risk, since it is used to defray the additional costs associated by Bank loans to other riskier countries). For example, there is the sense at the time of writing that China's real exchange rate will have a tendency to appreciate. China should now find that the cost of borrowing from the World Bank in dollars is much cheaper than the cost perceived by a country that is anticipating a real depreciation. Under currency arrangements, in other words, China receives a subsidy, while other countries are penalized. Under the new regime, these winners and losers would change places.

Adverse selection. Another possible objection is that countries with good credit will not want to be part of an index that includes also countries with poor credit. Because countries with creditworthiness problems could have depreciating real exchange rates, including them in the EM index could make the latter less attractive to international investors, raising the required rate of return. This could create an adverse selection problem where only countries with poor credit would participate, causing the EM market to collapse.

In practice, it is not clear that this objection holds water. Countries with poor credit ratings exhibit a variety of macroeconomic problems, to be sure, but this does not mean that their real exchange rates will necessarily weaken further, which is what could make their inclusion in the EM index less appealing to international investors. If they experienced an earlier crisis, that experience will already have caused their exchange rates to fall. If the currency has overshot, then there may be an expectation of recovery and trend appreciation.³⁹ In any case, the credit risk of these countries would not directly affect the cost of funds to the World Bank (since this depends on the creditworthiness of the industrial countries providing the World Bank capital that guarantees the bonds).

Why not concentrate on other forms of hedging? Our initiative seeks to provide a form of insurance. In this respect it is not unique. There is a long history of proposals designed to enable emerging markets to self-insure through the establishment

³⁹ This was the historical behavior of real exchange rates in East Asia and Russia in 1999 and Mexico in 1995: these countries underwent crises that caught the markets by surprise. Large unexpected real depreciations were followed by large and to a large extent expected real appreciations. An exception was Brazil. In spite of its successful management of the transition to a floating regime in the midst of a currency crisis in January 1999, the real exchange rate did not recover, but instead underwent further pressure in 2001-2002. By contrast, Ecuador, a country with less commendable policies, has undergone massive appreciation since the 1999 crisis. This provides further evidence for the idea that the future course of the real exchange rate is difficult to predict.

of stabilization funds or by accessing derivatives markets.⁴⁰ These are potential alternatives to our proposal. But self-insurance does not reduce the total risk facing a country; it only alters the time profile. Self-insurance through the creation of stabilization funds is also susceptible to political pressures to appropriate the resources of the fund for opportunistic (electoral) purposes. Moreover, hedging through markets is limited by the (non)existence of long-term, liquid futures and options markets in the items that are relevant to country risk: oil, coffee, copper, etc. In practice, these markets are liquid only at relatively short horizons, typically less than two years. They insure against only price risk, not quantity risk. And other shocks, both real (such as earthquakes, hurricanes, floods, drought) and financial (such as sudden stops in capital flows), can be insured against in this way only to a limited extent.

Our approach can be thought of as an effort to more fully share the resulting real exchange rate risk across countries. Real exchange rate risk is an encompassing measure of economic risk that incorporates real shocks, terms-of-trade shocks, and financial shocks. Better diversification of welfare-impacting risks can be therefore be achieved through financial initiatives that share real exchange rate risk more thoroughly than is possible by hedging in commodity price derivatives markets.⁴²

Problems with calculating the EM index. Accurate measurement of inflation is critical for the development of a market in inflation-indexed bonds. This suggests that responsibility for measuring the inflation rate cannot simply be delegated to the borrower,

⁴⁰ See Newbery and Stiglitz (1979), Hausmann, Powell and Rigobon (1990), and Inter-American Development Bank (1995).

⁴¹ In addition, the terms of trade of a country explain very little of the volatility in the real exchange rate and this is a critical variable in determining the capacity to pay dollar denominated debts.

who may have an incentive to report biased estimates. Outside monitoring of the procedures used in this calculation may be required. The International Monetary Fund is the obvious entity to engage in such monitoring. The IMF currently operates a Data Dissemination System and a Special Data Dissemination Standard for countries active on international financial markets. A precondition for adherence to this standard is the timely release of methodologically-sound data on variables like inflation. Thus, it would be relatively straightforward to ask the Fund to vet the methodologies that countries use when calculating CPI inflation and to audit their correct application.⁴³

⁴² The downside is that the real exchange rate is a country specific variable hence is more prone to more moral hazard problems, as discussed above.

⁴³ It should be pointed out that the EM will be dominated by the currencies of countries that have access to international financial markets and consequently draw the bulk of their debt from private sources. Poorer countries whose debt is mostly from official concessional multilateral or bilateral sources should have their debts redenominated in inflation-indexed local currency, following Hausmann and Rigobon (2003). Countries in the EM have two salient characteristics. First, they have a level of institutional development such that official entities can be trusted to perform such tasks as calculating a CPI, especially if they know that the World Bank will be auditing their activities. Second, they have a level of income such that the CPI is composed of a large and highly diversified basket of goods and services so that the estimates of the CPI are unlikely to be affected by errors in any individual price measurement.

⁴⁴ The EM index appreciates vis a vis the dollar over time if the sum of the real exchange rate appreciation of the underlying currencies plus US inflation is positive. This means that the index will appreciate, even if the real exchange rate depreciates, as long as this depreciation is less than US inflation. Given that these countries are expected to see real appreciation, and that US inflation expectations are slightly above 2 percent, this makes trend appreciation a very robust characteristic of the index.

⁴⁵ In what follows, we refer to these alternatives as dollar lending for short.

⁴⁶ To put the point another way, they lend in dollars because original sin prevents them from issuing debt in the currencies of their borrowers.

⁴⁷ And supplemented by reflows from their own lending operations.

⁴⁸ They show that for IDA, the inflation-indexed local currency portfolio would exceed the value of the dollar portfolio if the sum of the US inflation plus the real appreciation of the IDA basket of currencies exceeds 1.37 percent. US inflation has been running at around 2 percent. If this rate were maintained going forward, there would be scope for some long-run real depreciation of the average basket and still generate a larger net present value. However, if developing countries' income levels exhibit a trend towards convergence – as has been the case in China, India, East Asia and Eastern Europe, the Balassa-Samuelson effect would imply that they should also exhibit some trend appreciation. In this case, the move to local currency inflation-indexed lending should generate a larger expected repayment stream, better risk characteristics of debt service and relatively low volatility in the total dollar value of the portfolio (given the low volatility of the basket).

⁴⁹ even larger expected repayment stream, even better risk characteristics, and an even lower volatility in the total dollar value of the portfolio (given the low volatility of the basket).

⁵¹ In other words, while dollars and other foreign currencies would be delivered, the amount of the obligation would be related to the inflation indexed-local currency value of the debt.

⁵² Conceivably, if the issuance of EM debt by the World Bank is very large, the Bank might be unable to hedge the resulting currency exposure by converting some of its old loans into the member currencies of the index because the required amounts would exceed the volume of loans in its books to at least some of the EM members. But the Bank could still hedge its excess exposure to that currency by arranging a swap with another international financial institution – say a regional development bank – that would similarly wish to convert its dollar loans to local currency. Alternatively, the World Bank could purchase inflation-indexed local currency government obligations or ask an investment bank to offer it a hedge. All these operations would have the beneficial effect of reducing the currency mismatch of the respective countries.

⁵³ Hausmann and Rigobon (2003) simulate the impact on the IDA portfolio of converting IDA loans into inflation indexed local currency in the 1985-2000 period. They find that diversification implies a very large reduction in the overall currency risk of the portfolio of IDA. In addition, debt service becomes less procyclical and less correlated with the real exchange rate, moving the debt burden to states of nature where the capacity to pay is larger. Monte Carlo simulations show that under the counterfactual the same shocks to output, inflation and the real interest rate are associated with a more predictable evolution of the debt to GDP ratio than under dollar-based lending.

⁵⁴ For countries that are in the index but are not members of particular international financial institutions, (e.g. countries from other continents that are not members of a given regional development bank), entering into swaps with the World Bank or with the other countries themselves would allow them to hedge out of their currency mismatch while also contributing to the elimination of original sin.

⁵⁵ In fact, some coordination between issuance and adjustment of the index should be feasible, as suggested to us by Andrew Wong.

⁵⁶ In addition, there would be no additional convertibility risk as countries payments would be made in the same currencies used at present.

⁵⁷ In addition, differential pricing could be justified by the fact that borrowing in local currency inflation-indexed terms is safer and hence involves less credit risk for the Bank.

⁵⁸ As documented in Chapters 1 and 9.

⁵⁹ That is to say that would not want debt service denominated in EMs when their tax revenues were denominated in domestic currency.

⁶⁰ developed countries.

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⁶⁴ To avoid currency risk they would have to make sure that they are able to match the issuance of debt in EMs with the conversion of existing loans to EM member countries into inflation-indexed local currency. Any temporary gap can be hedged by either buying a claim on that government in that denomination or swapping with it the currency exposure.

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⁶⁷ An aggregate index for Western Europe, Asia (mainly Japan) and the Far East (mainly Australia).

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⁶⁹ For example, there is the sense at the time of writing that China's real exchange rate will have a tendency to appreciate. China should now find that the cost of borrowing from the World Bank in dollars is much cheaper than the cost perceived by a country that is anticipating a real depreciation. Under the new regime, these winners and losers would exchange places.

⁷⁰ See Hausmann, Panizza and Rigobon (2003).

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3. Concluding remarks

International financial integration has not worked as promised. Capital account liberalization was supposed to stimulate growth in the developing world by channeling scarce capital to deserving economies and facilitating international risk sharing. Instead, private financial markets have been an engine of instability, and since 1998 debt flows to developing countries have become negative.

The condition we refer to as original sin is central to these problems. Unhedged aggregate dollar liabilities -- an unavoidable condition when a country unable to borrow in its own currency incurs a net foreign debt -- played a key role in the Asian, Russian and Latin American crises that soured international investors on emerging markets. But even where the impact is not so severe, it is clear that the inability of emerging markets to borrow abroad in their own currencies weakens their economic performance. Original sin renders their economies more volatile, their financial systems more fragile and their fiscal position less solvent, in turn making it more difficult to finance the sustained investment in strengthening institutions and policies necessary for economic development and growth. Efforts to reconcile economic stability with international capital mobility and to promote sustained economic growth -- which are the ultimate goals of the effort to develop a new international financial architecture -- are unlikely to succeed absent a solution to this problem.

The evidence is strong that original sin will not go away anytime soon as a result of the standard recipe of macroeconomic prudence and institution building. Efforts to strengthen national policies and institutions will help, but neither cross-country nor time-

series evidence suggests that they will suffice to ameliorate the problem over the horizon relevant for practical policy decisions. And even if some countries do succeed in achieving redemption from original sin through initiatives taken at the domestic level, they will only raise the bar for the others, insofar as the addition of one more currency to the global portfolio reduces the diversification benefits of adding yet another.

Thus, the best way for a large group of countries representing over 80 percent of the GDP of the developing world to escape original sin is for the international policy community to commit to an initiative to develop a debt market in a basket of developing country currencies. This chapter has sketched how they might go about this.

References

Berg, Andrew, Eduardo Borensztein and Paulo Mauro (2002), “Reviving the Case for GDP-Indexed Bonds,” IMF Working Paper no.02-211 (December).

Caballero, Ricardo (2003), “On the International Financial Architecture: Insuring Emerging Markets,” NBER Working Paper no. 9570 (March).

Hausmann, Ricardo, Andrew Powell and Roberto Rigobon (1993), “An Optimal Spending Rule for an Oil Exporting Economy,” in Eduardo Engel and Patricio Meller (eds.), *External Shocks and Stabilization Mechanisms*, Baltimore: Johns Hopkins University Press for the Interamerican Development Bank, pp.**-**..

Hausmann, Ricardo and Roberto Rigobon (2003), “IDA in UF: On the Benefits of Changing the Currency Denomination of Concessional Lending to Low-Income Countries,” unpublished manuscript, the World Bank.

Hausmann, Ricardo, Ugo Panizza and Roberto Rigobon (2003), “The Long-Run Real Exchange Rate Volatility Puzzle,” unpublished manuscript, Harvard University.

Inter-American Development Bank (1995), *Overcoming Volatility*, Economic and Social Progress Report 1995. Washington D.C: Inter-American Development Bank.

Shiller, Robert (2003), *The New Financial Order: Risk in the 21st Century*, Princeton: Princeton University Press.

World Bank (1999), ****.

Figure 1: Exchange rates vis a vis the dollar: the EM indexes, the yen and the mark

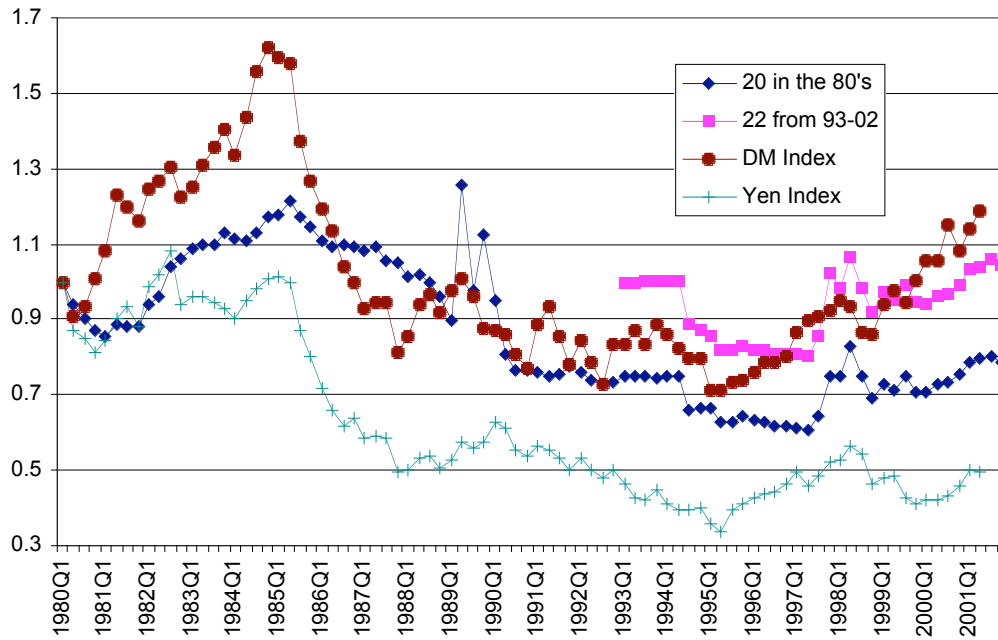


Table 1: Composition of the Emerging Market Indexes for base years 1980 and 1993

		WEIGHTS	
		1980 Index	1993 Index
		20	
		Countries	22 Countries
1	Brazil	18.95	18.09
2	Korea, Rep.	14.27	13.62
3	India	11.32	10.80
4	Mexico	8.79	8.39
5	Argentina	7.47	7.13
6	Indonesia	5.02	4.79
7	Turkey	4.81	4.59
8	South Africa	4.14	3.95
9	Thailand	4.12	3.94
10	Poland		3.29
11	Singapore	2.60	2.48
12	Malaysia	2.59	2.47
13	Israel	2.53	2.41
14	Colombia	2.37	2.26
15	Philippines	2.13	2.03
16	Chile	1.94	1.85
17	Venezuela	1.92	1.83
18	Pakistan	1.72	1.65
19	Peru	1.49	1.42
20	Czech Republic		1.27
21	Hungary	1.31	1.25
22	Uruguay	0.52	0.49
		100	100

**Table 2: Emerging market 1980 and 1993 indexes
(index value per US\$, Quarterly)**

Period	EM-1980	Period	EM-1980	EM-1993
1980q1	100	1990q4	76.6	
1980q2	94.1	1991q1	76.0	
1980q3	90.1	1991q2	74.8	
1980q4	87.0	1991q3	75.4	
1981q1	85.5	1991q4	77.3	
1981q2	88.8	1992q1	75.8	
1981q3	88.2	1992q2	74.0	
1981q4	87.9	1992q3	72.9	
1982q1	94.2	1992q4	73.4	
1982q2	96.1	1993q1	74.9	100.0
1982q3	103.9	1993q2	74.8	99.9
1982q4	106.0	1993q3	74.7	100.1
1983q1	108.6	1993q4	74.3	100.2
1983q2	109.8	1994q1	74.7	100.4
1983q3	109.9	1994q2	75.0	100.2
1983q4	112.7	1994q3	66.0	88.4
1984q1	111.5	1994q4	66.4	86.8
1984q2	111.0	1995q1	66.7	85.6
1984q3	113.0	1995q2	62.9	81.8
1984q4	117.0	1995q3	62.9	81.9
1985q1	117.9	1995q4	64.5	82.9
1985q2	121.3	1996q1	63.1	81.6
1985q3	117.3	1996q2	63.0	81.6
1985q4	114.6	1996q3	61.9	80.8
1986q1	110.6	1996q4	61.7	80.9
1986q2	109.2	1997q1	61.3	80.6
1986q3	109.7	1997q2	60.9	80.4
1986q4	109.2	1997q3	64.2	85.5
1987q1	108.2	1997q4	75.0	102.2
1987q2	109.2	1998q1	74.7	98.0
1987q3	105.3	1998q2	82.8	106.4
1987q4	104.9	1998q3	75.0	98.3
1988q1	101.5	1998q4	68.8	91.6
1988q2	101.9	1999q1	72.7	97.3
1988q3	99.5	1999q2	71.2	95.2
1988q4	95.8	1999q3	75.1	99.4
1989q1	89.7	1999q4	70.9	94.6
1989q2	125.8	2000q1	70.6	93.8
1989q3	97.8	2000q2	72.8	95.9
1989q4	112.6	2000q3	73.4	96.7
1990q1	95.2	2000q4	75.3	99.0
1990q2	80.9	2001q1	78.8	103.5
1990q3	76.6	2001q2	79.5	104.2

1990q4	76.6	2001q3	80.3	106.2
1991q1	76.0	2001q4	78.9	104.3
1991q2	74.8			

Table 3: Exchange rate changes vis a vis the US dollar

		1981- 2001	1981- 1993	1993- 2001
EM 80	Mean	1.6	2.5	0.2
	St. Deviation	12.4	13.5	10.1
EM 93	Mean			0.5
	St. Deviation			10.6
Deutsche M	Mean	0.1	2.0	-3.3
	St. Deviation	13.8	15.5	9.8
Yen	Mean	4.1	6.4	0.0
	St. Deviation	14.4	14.6	13.5

Table 4: EM Indexes: Average return, standard deviation and correlation with real private consumption.

	EM Index 80 (1980-2001)			EM Index 93 (1993-2001)		
	Avg. Return	St Dev	Consumption Correlation ₁	Avg. Return	St Dev	Consumption Correlation ₁
Canada	1.56	10.9	-14.5	1.49	10.5	-33.4
France	2.58	13.6	-25.9	2.92	10.2	-36.4
Germany	0.73	14.3	12.5	3.14	10.5	-14.5
Italy	4.22	14.0	-27.5	3.36	11.1	15.8
Spain	4.50	12.9	-62.0	4.30	10.5	-65.4
Japan	-3.12	13.9	4.3	0.13	11.8	34.3
United Kingdom	2.45	12.2	-35.3	-0.24	11.8	-21.4
United States	0.27	11.3	-23.4	-0.71	11.6	-25.5

¹Note: Correlations with Real Consumption: for France, Germany, Italy and Spain it covers 1980-1998.

For Canada, UK, US and Japan it covers 1980-01. A negative number indicates that the returns tend to be high when real private consumption is low.