

**Original Sin:  
The Road to Redemption**

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## 1. Introduction

The preceding chapters have established 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 adequate opportunities for international risk sharing and renders the world a riskier financial place, especially for the emerging-market economies in question. Table 1 illustrates this now-familiar point from yet another perspective. It shows that while the rate of growth of real GDP is somewhat more volatile in developing countries in general and Latin American and Caribbean countries in particular than in the advanced industrial economies, real GDP denominated in U.S. dollars – which is the relevant measure for countries that borrow in dollars – is an order of magnitude more volatile.

Our empirical analysis suggests that domestic reforms, by themselves, are unlikely to eliminate original sin anytime soon, given that the quality of domestic institutions and policies goes only so far in explaining prevalence of the problem. This suggests that an international initiative may be needed to solve the problem.

The preceding chapters have left us with the building blocks for such an initiative. We have seen that the global portfolio is concentrated in the currencies of a few large economies and international financial centers. We have seen how history, combined with transaction costs in a world of heterogeneous countries, can explain this bias toward this 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 non-residents, who then swap their debt service obligations into their currency of choice, allowing the residents on the other side of the swap to offload

their currency risk just as if they had borrowed in local currency. We have suggested that the role of non-residents may be related to their comparative advantage in separating currency risk from credit risk, something that residents 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.

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

We are not the first to come up with ideas for increased international risk sharing. The World Bank attempted to promote the development of insurance markets for terms of trade risk in the 1990s (World Bank 1999). 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. Caballero (2003) has advocated the development of instruments indexed to the prices of the principal commodity exports of emerging-market borrowers. Borensztein et al (2002), in the proposal closest to our own, have promoted the idea of GDP-linked bonds, the coupons on which would fluctuate with the growth in real GDP.<sup>1</sup> Thus, our proposal is one more attempt, in the spirit of these predecessors, at completing incomplete markets. 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.

## **2. The Proposal**

Our plan has four steps. Step 1 is the development of an inflation-indexed basket of currencies of emerging and developing countries, “the EM index.” Step 2 is for multilateral institutions such as the World Bank to issue debt denominated in this index and possibly also to convert a portion of their existing loans into claims denominated in it. Step 3 is to deepen and broaden the EM market by having G-10 sovereigns issue a portion of their debt in this instrument and swap their currency exposure with the countries in the EM index. And step 4 is to then encourage institutional investors and mutual funds to create products that add credit risk to the index and as a way of further encouraging the development of the market.

**Step 1. Develop an appropriate index based on a basket of emerging-market currencies.** For developing countries to be able to borrow abroad in local currency, the foreign investor – the proverbial Belgian dentist – will have to take a long position in the currencies of emerging markets. However, it is hard to imagine a dentist managing a portfolio that includes the currencies of many small, poorly-diversified economies. We therefore propose the creation of a unit of account that would include a well-diversified

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<sup>1</sup> To the extent that GDP fluctuations are strongly correlated real exchange rate movements, especially in

set of emerging-market and developing-country currencies. This unit will represent claims on a more diversified economy and hence will be more stable, since shocks – such as changes in export prices – that are positive for some economies will be negative for others.<sup>2</sup>

For illustrative purposes, we have constructed two such baskets: one with the 20 largest countries for which *International Financial Statistics* has quarterly data on exchange rates and consumer price indexes since 1980, and another that includes the largest 22 countries with the same continuous data since 1993. We refer to these indices as “EM 1980” and “EM 1993.” Tables 2 and 3 list the countries and weights used in the construction of our representative indices and show their historical values. We weight the countries by their GDPs at purchasing power parity in order to avoid setting weights in a manner that favors countries that do not behave prudently, as would happen if we weighed countries by the market dollar value of the GDP or by the value of their foreign debt.<sup>3</sup> To deal with the incentive to debase the currency faced by net debtors borrowing in local currency, we index the debt to the consumer price level of each country, calculating the index as the end-of-period exchange rate divided by the consumer price index (CPI) in the same month.

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

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bad times, these instruments may be seen as substitutes of our proposal.

<sup>2</sup> We should not be surprised by the fact that we need a new index. 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.

indexing the claims to the real exchange rate, which is a relative price.<sup>4</sup> This gives our two EM indexes some important characteristics. First, if the real exchange rate is stationary, the index should display long-run stability. Averaging over 20 countries further increases this stability. Second, the real exchange rate tends to appreciate in good times and depreciate in bad times. This makes debt service move in line with countries' capacity to pay, which is the opposite of what happens with dollar debts, in turn eliminating the destabilizing vicious circle associated with original sin. Finally, the index has a long run tendency to appreciate. To the extent that developing countries tend to grow faster than industrial countries, this generates a Balassa-Samuelson effect that causes trend real appreciation of the real exchange rate. In addition, since the index does not incorporate inflation in dollars or any other reference currency, while adjusting to the inflation of developing countries, there is a trend appreciation in line with the inflation of the reference currency.

Figure 1 shows the value of the two indexes together with the yen-dollar and Deutsche mark-dollar exchange rate.<sup>5</sup> The graph shows that the indexes are less volatility than the yen and the mark. Strikingly, the period of the Asian and Russian crises show a depreciation of the index vis a vis the dollar, but by less than the deutsche mark.

Table 4 calculates the volatility of the EM indexes vis-a-vis the U.S. dollar for various sub-periods and shows that their volatility, so normalized, is in line with that of other major currencies. Table 5 shows the average return, the volatility and the

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<sup>3</sup> The second criteria would favor heavily indebted countries, while the first would favor those with overvalued currencies.

<sup>4</sup> We say similar and not 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 US. Here we are not doing the latter step. The implications of this are discussed below.

correlation with real private consumption in seven large developed economies for the period over which each index is defined. The indexes exhibit a trend appreciation of about 2 percent for the typical country, volatility of 10 to 13 percent, and a negative correlation with real private consumption growth in these countries. These characteristics should make such indexes an attractive form of diversification for institutional and retail investors.

**Step 2. Have the World Bank and other international financial institutions issue debt denominated in the EM index.** As noted in Chapter 9, the experience of countries escaping original sin has been led not by residents but by foreigners, and by the international financial institutions in particular, which have issued obligations denominated in the currencies of these specific countries. We have argued that the markets do it this way in order to separate credit risk from currency risk, since residents of a country that has original sin are bound to have a positive correlation between them. Foreigners can issue instruments that incorporate currency risk with an uncorrelated (and, ideally, very low) credit risk.

We therefore propose that the World Bank and other international financial institutions should issue debt in an index such as the one described above. Their AAA rating allows them to access institutional investors. The bonds they issue would be made more attractive by the trend appreciation of the index, their relatively low volatility, and their low correlation with consumption in the countries in which they are marketed. A

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<sup>5</sup> The indexes are presented on a per dollar basis so that increases in the index imply depreciations.

push by the World Bank and the other international financial institutions could stimulate the development of a market with sufficient liquidity to make the bonds easily tradable.<sup>6</sup>

This initiative would require no sacrifice on the part of the international financial institutions themselves. Institutions like the World Bank will find it easy to shed the currency mismatch incurred as a result of their issuance of EM-indexed bonds: they could simply convert the dollar loans they have made to the countries in the index into local currency CPI-indexed loans, something that the emerging-market borrowers in question would find attractive. The multilaterals would then have nicely matched EM-denominated debts and EM-denominated assets, precisely eliminating their own exposure to EM currency fluctuations.<sup>7</sup> Moreover, the multilaterals would thereby eliminate the currency mismatch generated by their own lending, thus becoming a solution instead of a source of original sin.<sup>8</sup>

If issuance by the World Bank is large enough, the EM will form part of the standard market bond indexes, such as the Lehman Global Bond Index, that many institutional investors follow. As the EM becomes a growing part of the Lehman index,

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<sup>6</sup> 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.

<sup>7</sup> 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 currencies underlying the index. 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 effect of reducing the currency mismatch of the respective countries.

<sup>8</sup> 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.



there will be increasing demand for EM bonds by institutional fixed-income investors that need to track the index.<sup>9</sup>

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, for their doing so would just substitute exchange rate risk vis a vis the EM for exchange risk vis a vis the dollar. (This is because any one emerging market currency will only account for a minority of the EM basket.) Instead, countries would denominate their obligations in constant units of their domestic consumption basket (that is, they would issue domestic currency bonds indexed to their CPIs). The World Bank would aggregate the loans of the countries making up the index in order to create a basket of loans with the same currency composition as the EM bonds it issues.

Notice that by adopting this strategy, the World Bank is not taking on any additional balance-sheet risks or net lending. The only effect of its financial operations would be to repackage the currency risk that was previously on the books of the developing countries, and to place it with international investors through issuance of EM-denominated World Bank debt issuance. The emerging markets that borrow from the World Bank, for their part, have off-loaded the currency risk in their debt service. 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 will in fact go down, other things equal.<sup>10</sup>

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<sup>9</sup> In fact, some coordination between issuance and adjustment of the index should be feasible, as suggested to us by Andrew Wong.

<sup>10</sup> In addition, there would be no additional convertibility risk as countries should pay their debts in foreign assets – say in dollars – but the amounts to be paid would be indexed to units of the domestic consumption basket.

The cost of the loan will depend on the yield that private investors will demand on the EM-denominated bond. This should differ from the yield of a dollar denominated World Bank bond due to three factors: first, the expected change in the exchange rate between the dollar and the EM over the long life of the bond (we have argued that the EM tends to appreciate, so on average this effect should lower the interest rate); second, the risk premium that the foreign investor would demand for holding the EM exchange rate risk; and, third, the liquidity premium which investors will demand due to the lower tradability of the new instrument. It is hard to know ex ante what these costs would be and how they would evolve as the market develops. But given the reduction in risk, the expected appreciation and the large gap between the cost of World Bank loans and the opportunity cost of borrowing of client countries, there should be enough room to make this a feasible option.

Private investors might become more reluctant to hold EM securities if emerging markets, now free of the currency-mismatch problem as a result of this international initiative, allow their exchange rates to fluctuate more freely. However, EM securities would be denominated in a composite of the currencies of a number of separate countries, whose exchange rates are imperfectly correlated; hence, much of this exchange risk would be diversified away. In addition, the absence of original sin would reduce the incidence of currency collapses, reassuring investors worried mainly about extreme realizations.

**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-indexed debt, there will then be an opportunity for other high-grade non-residents to develop the market further.

The governments of the U.S., Euroland, Japan, the UK and Switzerland, the countries that issue the five major currencies, are natural candidates to do so. They have a large stock of debt issued in their currency relative to the debt issued by their residents and hence are at the opposite end of the currency-of-denomination spectrum from emerging markets. More broadly, they are not immune from the global instability created by original sin, giving them an interest in solving the problem.

Thus, we propose that these countries should issue EM-indexed debt in order to transform the structure of the global portfolio. However, once issued, they would presumably want to swap out of EM-denominated debt in order not to take on an inconvenient currency mismatch in their own fiscal accounts, i.e. having their tax base tied to their nominal GDP in their own currency and their debt service in EMs. To do this, however, they would need to undertake currency swaps with each individual country in the index. This would allow the counterparties to swap out of their dollar exposures. These swaps could be organized by investment banks or could be started with some participation of the World Bank.

It is important to highlight some aspects of the performance risk associated with these swaps. First, the net flows will be such that emerging markets would have to pay into the swap when their currencies are strong, while they would get money from it when their currencies are weak. If real appreciation (depreciation) tends to occur in good (bad) times, then the performance risk is concentrated in good times. At times of crisis, on the other hand, when the currencies of the emerging markets in question weaken significantly, those countries would be receiving net income from their swaps. By implication, they would have no incentive to default. This minimizes the relevance of

ability to pay for performance risk, which is the opposite of what happens with dollar debts.

Second, a swap can be thought of as an exchange of bonds between the two final parties to the transaction. This means that if the emerging market were to default on its swap obligation, i.e. on the bond it has issued, then the industrial country would simply take back its bond. Default risk would be limited to the potential difference in value of the two bonds since the time they were issued. Again, performance risk (equivalently, sovereign risk) would be minimal.

The net cost of borrowing to the G-7 country, after taking into account the swap, should be equal to or smaller than borrowing directly in its own currency. As we argued above, countries that suffer from original sin would presumably be willing to pay for the privilege of off-loading their currency mismatch. However, to allay fears that this might not happen naturally, it can be made part of a formal contractual engagement of the members of the EM index and the issuing governments. In practice, this would mean that the governments of emerging markets would agree to swap with the issuing government at a pre-arranged price. The issuing government would exercise this de-facto put option in the event that it did not find a more attractive swap alternative in the market.

The development of a self-supporting private market for 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. Our initiative will facilitate the development of the market, but additional measures should also be encouraged. Regional development banks such as the Inter-American Development Bank could issue debt denominated in the (inflation-indexed) currencies of its member countries in order to develop a benchmark

long term bond market that would also be devoid of sovereign and convertibility risk. This market would then allow investment banks to create the relevant swaps.

Creating put options on the swap would require a political negotiation among the member countries and the international community, as many emerging market countries are grouped together in the index. Countries unwilling to enter into these agreements would be excluded from the index.

**Step 4. Further develop the EM index market.** Imagine that, as a result of the preceding steps, there develops a market in the EM index. It is reasonable to assume that institutional investors and mutual funds will attempt to 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 enough, the role of industrial country governments and international institutions can be scaled back, just as has happened with the issuance of individual exotic-currency debt.

### **3. Concluding remarks**

International financial integration has not worked as promised. It 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 capital flows have fallen to economically insignificant levels.

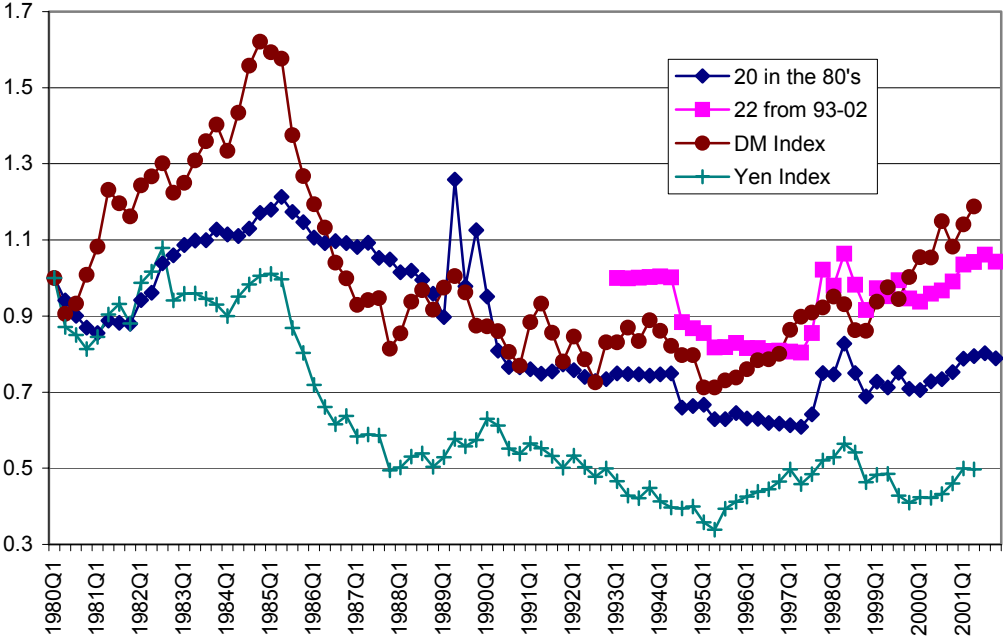
The condition we refer to as original sin is central to these problems. Unhedged aggregate dollar liabilities -- an unavoidable condition when a country suffering from original sin incurs a net foreign debt -- played a key role in the Asian, Russian and Latin

American crises that so soured international investors on emerging markets. But even where the impact is not so extreme, it is clear that the inability of emerging markets to borrow abroad in their own currencies weakens economic performance. Efforts to reconcile economic stability with international capital mobility – which is the ultimate goal of the effort to develop a new international financial architecture – is unlikely to succeed absent a solution to the problem of original sin.

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 90 percent of the population and the GDP of the developing world to escape original sin is for the international policy community to commit to an initiative to develop an emerging market index and a market in claims denominated in it. This chapter has sketched how they might go about this.

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



**Table 2: 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         |
|    |                | <b>100</b> | <b>100</b>   |



**Table 3: 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 4: Exchange rate changes vis a vis the US dollar**

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

**Table 5: 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 <sub>1</sub> | Avg. Return             | St Dev | Consumption Correlation <sub>1</sub> |
| 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                                |

<sup>1</sup>Note: 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.