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NEW STRATEGIES FOR EMERGING DOMESTIC SOVEREIGN BOND MARKETS

by

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PREFACE

The central thesis of the paper is that risk-based public debt management and liquid domestic bond markets are important mutually reinforcing strategies for developing countries and particularly for emerging financial markets to attain: *i*) enhanced financial stability; and *ii*) a more successful participation in the global financial landscape. It is also shown that this twin-strategies approach requires taking a policy-coherent macroeconomic perspective.

Policy discussions at the OECD¹ and elsewhere increasingly emphasise the notion that successful participation by emerging markets in this uncertain and more complex global financial landscape requires a well-functioning domestic, local currency bond market.

Until the late 1990s, domestic fixed-income securities markets were relatively underdeveloped in many countries in Latin America, Asia, emerging Europe and Africa. This situation had led to an excessive reliance on foreign financing, making the participation of these countries in the global financial system more vulnerable to shifts in expectations and perceptions. At the same time, sovereign debt management suffered from many structural weaknesses, failing to take into account international best practices. Consequently, until quite recently, emerging markets experienced serious financial crises.

But more recently, governments not only reduced their debts, they also tried to buy back nearly all of their external debt. Stocks of external debt experienced impressive contractions. They also tried to reduce the exposure to foreign exchange shocks and their subsequent debt impacts, moving away from dollar denominated bonds. Dollar bonds, in 2007, account for just 28 per cent of the outstanding debt of emerging markets economies, tracked by the JP Morgan Emerging Bond Markets Index. They also increased debt issued in local currencies, thereby helping local capital markets to become deeper and more sophisticated. Even some emerging countries running large budget surpluses and healthy finances have been issuing new securities in an effort to provide a benchmark for corporate bonds, extend the borrowing for longer periods and add liquidity to their financial systems.

Moreover, and quite crucially, public debt management in emerging markets has become much more sophisticated by adopting leading practices from OECD countries, including a market-based issuance process, an integrated and risk management approach to public debt, the

1. The OECD Global Forum on Public Debt Management and the OECD/World Bank/IMF Global Bond Forum hold annual discussions, both under the aegis of the OECD Working Party on Debt Management.

use of benchmarks, and an emphasis on the importance of establishing liquid secondary government bond markets.

The focus on a risk-based approach to debt management, with the establishment of interest rate-, liquidity- and currency benchmarks, has contributed, as shown in the paper, to a more prudent risk profile of the government balance sheet while it has also helped more generally to improve the transparency, predictability and liquidity of domestic fixed income debt markets. As a result, an increasing number of emerging markets countries are creating the conditions for a more successful participation in the global financial system.

Prof. Louka T. Katseli
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April 2007

RÉSUMÉ

Le paysage des marchés de capitaux internationaux a changé de manière drastique au cours de ces dernières années. Un levier particulièrement puissant de ces changements a été celui de l'internationalisation des marchés financiers au cours des deux dernières décennies, les marchés émergents acquérant en particulier un nouveau protagonisme. Cette réémergence s'est, dans le passé récent, accompagnée de crises et de turbulences, la dépendance à l'égard des flux de portefeuille étrangers s'accompagnant d'une vulnérabilité accrue de la part des économies émergentes, tributaires des changements d'anticipations et de perceptions prévalant sur les marchés internationaux. La stratégie de la gestion de la dette d'État a ainsi pâti de nombreuses défaillances, se trouvant notamment incapable de prendre la pleine mesure des meilleures pratiques internationales en matière de financement budgétaire et de développement de marchés de capitaux locaux solides. En conséquence les marchés émergents ont aligné les épisodes de crises financières. Le papier ici présenté met en perspective les évolutions les plus récentes et avec elles la profonde transformation en cours des marchés de capitaux émergents. Il souligne en particulier l'apparition de nouvelles stratégies de gestion des risques liés aux dettes émergentes, des stratégies plus sophistiquées prenant davantage en compte le profil des risques sous-jacents, ainsi que les nouvelles complexités et contraintes dominant les marchés émergents. La thèse centrale du papier est que la combinaison des gestions actives des risques de dette publique et la prise en compte des liquidités affluant vers les marchés de dettes domestiques sont des stratégies qui se renforcent mutuellement pour : *i)* atteindre une plus grande stabilité financière ; *ii)* optimiser l'intégration de ces économies dans le système financier international.

Mots clefs: marchés obligataires émergents, finance globale, gestion des risques.

Classification JEL: G15; G32; N26.

ABSTRACT

The forces shaping the revolution in banking and capital markets have radically changed the financial landscape during the past three decades. A remarkable feature of this changing new landscape has been the astonishing rate of internationalisation of the financial system in the last two decades, with emerging markets becoming increasingly important participants. At times, this participation led to an excessive reliance on foreign financing, making the participation of these countries in the global financial system more vulnerable to shifts in expectations and perceptions. The sovereign debt management strategy suffered from many structural weaknesses, failing to take into account international best practices in financing budget deficits and developing domestic government securities markets. Consequently, emerging markets experienced serious financial crisis episodes. Against this background, the paper focuses on new and more sophisticated strategies to develop domestic bond markets, taking into account the risk profile, complexities and other constraints of emerging markets. The paper's central thesis is that risk-based public debt management and liquid domestic bond markets are important, mutually reinforcing strategies for emerging financial markets to attain: *i)* enhanced financial stability, and *ii)* a more successful participation in the global financial landscape. It will also be shown that this twin-strategies approach requires taking a macroeconomic policy perspective.

Key words: emerging bond markets, global finance, risk management.

JEL Classification: G15; G32; N26.

I. INTRODUCTION

The world's financial markets have been enjoying unprecedented growth and strength over the past decades. The total value of world's financial assets, including bank deposits, public and private debt securities as well as equity securities, has been multiplied by 10 over the past quarter of century, jumping from \$12 trillion in 1980 to \$136 trillion by the end of 2004. During that period global financial depth has been steadily increasing, the value of global financial assets growing from an amount roughly equalling the global GDP to more than three times its size (McKinsey & Company, 2006).

This boom has been accompanied by substantive structural changes in international finance. Global finance experienced a striking shift away from banks toward market institutions as the primary financial intermediaries. New actors have emerged, the share of debt and equity securities has exploded while the relative size of bank deposits in global financial stock has shrunk from nearly 45 per cent in 1980 to 29 per cent today. The forces shaping the revolution in banking and capital markets have therefore radically changed the financial landscape². A remarkable feature of this changing new landscape has been the astonishing rate of internationalisation of the financial system in the last two decades, the multiplication of actors and the increasing use of complex products such as derivative contracts, whose notional amount is rapidly approaching \$300 trillion in 2006, according to the BIS.

Emerging markets have benefited from this financial globalisation process via enhanced cross-border trade in goods and services, increased foreign direct investment flows and the implementation of cross-border portfolio investment strategies³. An increasing number of takeovers of developed markets companies by leading multinationals from emerging economies took place in 2006, for an amount exceeding \$55 billion out of a total \$70 billion that involved emerging multinationals (on the emergence of these firms see van Agtmael, 2006; and on *multilatinas* Santiso, 2007). These economies became particularly active in global financial markets. In 2005, emerging market equity funds absorbed more than \$20 billion in net inflows, five times more than the previous year and beating the record of 2003, according to data from *Emerging Portfolio Fund Research*, a US company that tracks fund flows around the world. Emerging bond markets also soared, breaking the previous record of inflows of more than \$10 billion in 2005 against a meagre \$3 billion in 2004. Moreover, foreigners invested a net

2. See Blommestein, 1995; and Blommestein, 1998.

3. BIS estimated that total net private capital flows to emerging economies reached a record high of \$254 billion by the end of 2005, of which the bulk was concentrated in foreign direct investment (\$212 billion), the remaining being portfolio investment (39) and other private flows (3).

amount of \$61.5 billion in emerging equities in 2005 (12.5 per cent of the private flows to developing countries, compared to 7.5 per cent of the total in 2000) and nearly \$240 billion in direct investments. Total shares on exchanges in emerging markets were valued at \$4.4 trillion at the end of 2005, more than a doubling since the beginning of the decade.

The search for yield explains much of this story. Historically low interest rates in OECD countries and soaring global liquidity, combined with structural macroeconomic improvements in the emerging markets asset class, prompted a widespread search for yield that benefited emerging markets (see Canela, Pedreira, and Santiso, 2006, for an analysis and discussion of these recent financial trends in emerging markets). Although financial policy makers from emerging markets have done much to raise their creditworthiness, they are still facing extraordinary challenges in developing efficient financial markets and maintaining financial stability (Blommestein, 2000). In particular, emerging markets (open to financial flows while closed to trade flows) remain highly vulnerable to crashes (Rey and Martin, 2005). Some suffered heavily from sudden stops (Calvo and Talvi, 2005; Calvo, 2005), a pattern that has great resonance to events in the first era of globalisation between 1880 and 1914, especially the events in the late 1880s and early 1890s (Bordo, 2006). More in general, the new financial system has the capability to rapidly transmit at a historically unprecedented speed the consequences of errors of judgement in private investments, unsound public policies and other shocks, around the globe (Santiso, 2003). Recent crisis episodes⁴ that have emerged out of this new, complex financial structure appear different in important ways from those occurring during the earlier periods of high capital mobility⁵. The form and structure of global finance - in particular the existence of complex, sometimes highly-leveraged positions on underlying market instruments, the widespread use of derivative technology and margin calls in response to rapid price movements in financial market instruments - had a major impact on the dynamics of these more recent crises.

Policy discussions increasingly emphasised that successful participation by emerging markets in this uncertain and more complex global financial landscape requires a solid domestic bond market. Until the late 1990s, domestic fixed-income securities markets were relatively underdeveloped in many countries in Latin America, Asia, emerging Europe and Africa. This situation had led to an excessive reliance on foreign financing⁶, making the participation of these countries in the global financial system more vulnerable to shifts in expectations and perceptions. At the same time, sovereign debt management suffered from many structural weaknesses, failing to take into account international best practices. Consequently, emerging markets experienced serious financial crises episodes.

Against this background, we will focus on new (more sophisticated) strategies to develop domestic bond markets, taking into account the risk profile, complexities and other constraints of emerging markets. The paper's central thesis is that risk-based public debt management and liquid domestic bond markets are important mutually reinforcing strategies for emerging

4. In the period 1995-2006 crisis episodes include Asia (Thailand, Korea, Indonesia), Latin America (Mexico, Brazil, Argentina) and Europe (Russia, Turkey and Ukraine).

5. The earlier periods refer to 1870-1914 and the 1920s.

6. Initially mainly in the form of bank loans but later also foreign currency bonds.

financial markets to attain: *i*) enhanced financial stability; and *ii*) a more successful participation in the global financial landscape. It will also be shown that this twin-strategies approach is directly linked to macroeconomic policies.

The paper is organised as follows. In the following second section we analyse the major financial dynamics that shaped emerging markets in the current period of financial globalisation. We follow with in a third section with an analysis of the key challenges that emerging markets are facing in order to deal with these ongoing developments, stressing in particular the issues of underdeveloped bond markets and of vulnerabilities linked to their debt risk profiles. Finally, in the fourth section, we show how a risk management perspective on public debt management is essential for both addressing current challenges and developing domestic bond markets.

II. A HISTORICAL PERSPECTIVE ON FINANCIAL DYNAMICS

To gain a better perspective on current constraints and complexities faced by emerging markets during the current globalisation period, we will analyse why the crises that have emerged out of the complex new financial landscape appear different in important ways in comparison to earlier periods.

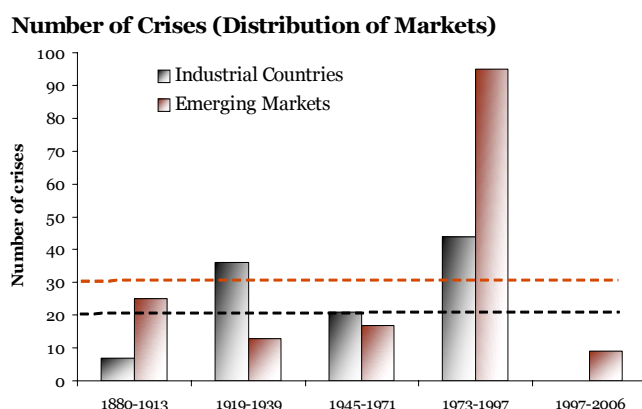
Before we need however to define what we understand by an emerging market. Strictly speaking the concept as we understand it in the paper is related to the countries included in JP Morgan's Emerging Markets Bond Index (EMBI), produced since the mid-1990s. However if we take an historical point of view, some of the most well known emerging markets of today were quite developed and sophisticated economies in early 1900s: Argentina for example ranked by that time as one of the most developed countries and the United States looked by the early years of the 20th Century as the pure prototype of an emerging economy. Even today some of the most established OECD countries are hard to classified: Turkey, South Korea and Mexico are all emerging economies and also OECD countries while some have been arguing that European or OECD countries like Greece could be classified as emerging economies (see for a discussion on Greece Argyropoulos, 2006).

The asset class defined as emerging markets has been therefore a moving and evolving notion. As already mentioned, a century ago, the US breakthrough as a global financial powerhouse was not obvious at all and the emergence of this economy came only after the chaotic years of the First World War. In 1914, the US economy was still a curious hybrid of developed and emerging market as stressed by William Silber in a recent book (Silber, 2006), prone to domestic financial crisis, with weak monetary institutions, vulnerable to sudden stops of capital flows from Europe. In 1914, when the crisis broke, the country did not even have a central bank. The Federal Reserve was still on the drawing board, just authorised by the Congress a year before, while the Bank of England existed since 1694. By that time, financiers like JP Morgan were the lender of last resorts, the only ones able to avoid cities like New York defaulting, as was the case in 1914 when the banker agreed to bail out the city of Wall Street, which came close to defaulting on \$82 million in foreign debt.

But even the notion that emerging markets are also economies that have specific propensities to suffer economies crises is also questionable This diagnosis is in some ways less straightforward than sometimes is assumed because it is not a priori clear whether recent crises are more frequent or deeper than in the past, or just triggered more readily. Like in the past, serial defaulters continue to be alive, the massive historic default of Argentina in 2001, for example, being the 5th of a long series of defaults (see for an historical perspective Reinhart and Rogoff, 2004). Historically, they are not only occurring in emerging markets, although during the

20th Century they became less frequent in the more advanced economies (See Graphs 1, 2 and 3). Sudden stops of capital flows and financial crashes abound, even if during the past decade they remained below the historical average. Political cycles and financial crises continue to go hand-in-hand in emerging markets (Santiso, 2005) and asymmetries of information continue to play an important role (Nieto and Santiso, 2007). The main reason is that, despite all the structural changes since the earlier period of high capital mobility⁷, the potential sources of cyclical variability in capital flows remain the same: divergent macro-economic conditions in capital-exporting and capital-importing countries, and crises in individual capital-importing countries⁸.

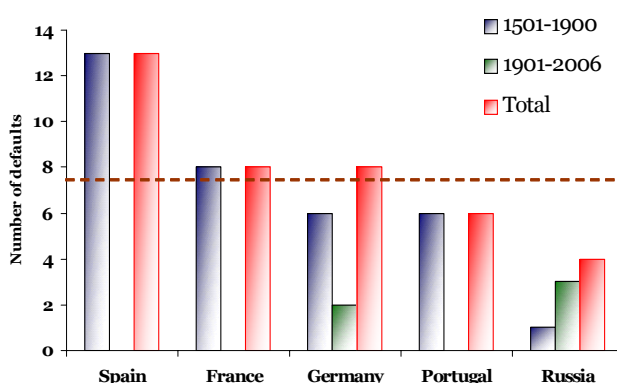
Graph 1: Serial Defaults and Crisis in Emerging Markets, 1500-2006



Source: OECD Development Centre, 2007; Own up-date based on M. Bordo and B. Eichengreen (2002); and N. Roubini and B. Setser (2004).

Note: Recent crisis episodes in the period 1997-2006 include Brazil (1998, 2002), Ecuador (1998), Pakistan (1998), Ukraine (1998), Turkey (2000), Argentina (2001) and Uruguay (2001).

Graph 2: Serial Defaults in Developed Countries, 1500-2006

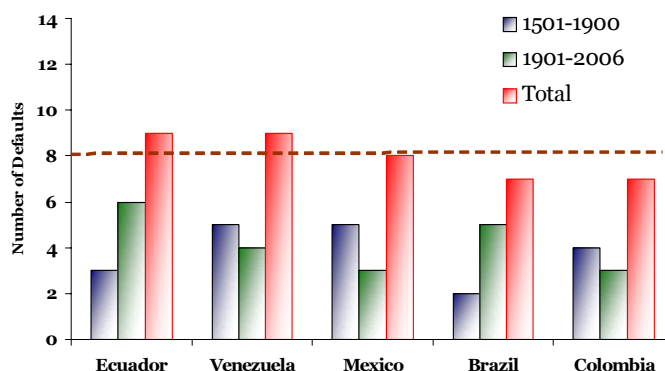


Source: OECD Development Centre, 2007; Own up-date based on Reinhart, C., Rogoff, K., and M. Sevastano (2003).

7. The earlier periods refer to 1870-1914 and the 1920s.

8. See IMF, 1997.

Graph 3: Serial Defaults in Developing Economies, 1500-2006



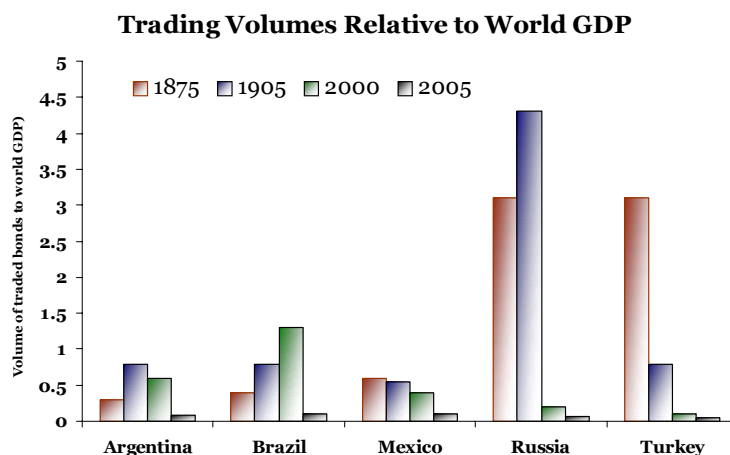
Source: OECD Development Centre, 2007; Own up-date based on Reinhart, C., Rogoff, K., and M. Sevastano (2003).

But also the latest emerging markets boom needs to be put in a longer historical perspective. Although flows to emerging markets reached in 2006 record levels with emerging bond prices at all-time highs, this boom is not new. During the late nineteenth century, Latin American countries, for example, experienced during the first globalisation era massive foreign investment booms. A major part of the financial inflows took the form of sovereign debt, with bonds being traded in European financial centres. By that time, the market value of emerging market debt traded in London was impressive: at the turn of the 20th century, in 1905, its value was equivalent to 12 per cent of world GDP. Almost hundred years later, in 1999, during the current globalisation era, the total volume of emerging market debt traded was a meagre 2.7 per cent of world GDP. The recent attractiveness of emerging markets has seen the value of debt trading jump to \$5 500 billion in 2005 (roughly 12 per cent of world GDP), which is simply a return to a position already reached 100 years ago during the first globalisation era .

Therefore, even if in nominal terms we are witnessing a strong expansion of bond and equity flows towards emerging markets⁹, this trend pales in comparison to the previous globalisation era when one takes the size of economies (as measured by GDP) into account. The trade volumes of various large emerging markets, relative to GDP, were in 2005 not as remarkable as they were a century ago in 1905 (or in 1875). Although for some the levels reached in 2005 were at historical highs (Brazil for example), for other major emerging markets levels remained well below these highs reached during the first globalisation era (Russia and Turkey in particular but also Argentina and Mexico; Graph 4).

9. According to BIS syndicated lending to, and bond issuance by, emerging markets reached record highs in 2005, respectively 200 and \$231 billion (BIS, 2006).

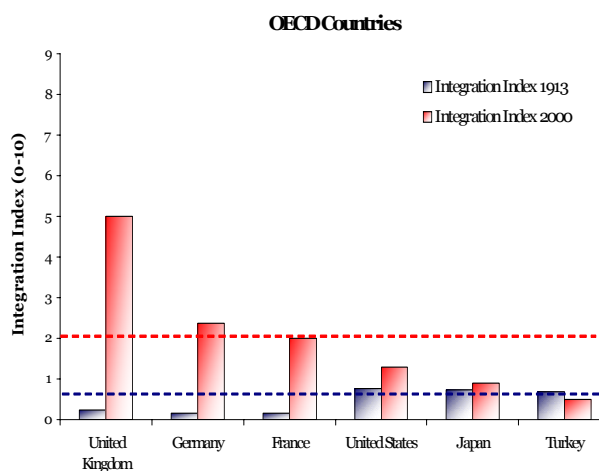
Graph 4: Trading Volumes Relative to World GDP



Source: OECD Development Centre, 2007; Own up-date based on Mauro, P., Sussman, N. and Y. Yafeh (2002 and 2006); and Bank of International Settlements (2006).

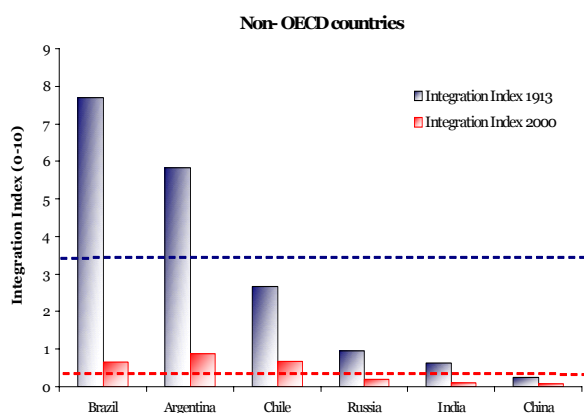
The next indicator we use to compare the two globalisation eras is based on a Financial Integration Index. This measure is calculated as the ratio between the share of international investments and the share of world GDP. This index is currently lower for emerging markets lower than at the end of the previous globalisation era (while the advanced market countries experienced a much stronger financial integration over the same period; Graph 5).

Graph 5: Financial Integration Index of OECD Countries



Source: OECD Development Centre, 2007; based on Schularick, 2006 and GDP figures from Maddison (1995, 2001).

Financial Integration Index of Non-OECD Countries



Source: OECD Development Centre, 2007; based on Schularick, 2006 and GDP figures from Maddison (1995, 2001).

Not only was the previous era of global finance much more open in terms of total capital flows¹⁰, but emerging markets, as an asset class¹¹, were also a more important part of the portfolios of London-based asset managers and banks. The largest bondholder of long-term cross border investments at the turn of the 20th Century was the United Kingdom, accounting for nearly half of all cross-border investments in the early 20th Century. At the time, about 30 per cent of its investments were in government debt, 40 per cent in railways, 10 per cent in mining, and 5 per cent in utilities. According to estimates by Mauro et al. (Mauro *et al.*, 2002; and Mauro et al., 2006; della Paolera and Taylor, 2006; and Ferguson and Schularick, 2006), by 1905, the total market value of *emerging* markets bonds traded in London reached 25 per cent of all government bonds traded in the City! By comparison, in recent years, US institutional investors allocated barely 10 per cent of their portfolios to foreign securities, with a meagre fraction of that investment devoted to emerging markets.

10. H.J. Blommestein. (2000), The New Global Financial Landscape under Stress, in: R. French-Davis, S. Zamagni and J.A. Ocampo, eds., *The Globalization of the Financial Markets and its Effects on the Emerging Countries*, Santiago de Chile, ECLAC

11. Emerging markets as an homogenous asset class is a somewhat fluid concept, especially over longer time periods. During the most recent period (let's say the last 10 years), investors seem to treat assets from emerging markets less as an homogenous asset class than in earlier periods. There is tentative evidence that investors increasingly discriminate between countries and regions. [I. Odonnat and I. Rahmouni (2006), Do merging market economies still constitute a homogenous asset class?, *Banque de France, Financial Stability Review*, No. 9, December, pp. 39-48.] This fluidity makes distinctions such as 'emerging markets' versus 'advanced markets' or OECD versus non-OECD less clear-cut. Nonetheless, it is possible to make a distinction in terms of structural obstacles such as relatively higher volatility and difficulties in benefiting from efficient domestic or international risk-sharing. Moreover, the recent episode of ample liquidity and global shortage of creditworthy hard real assets mask to an important degree the real improvement in creditworthiness of emerging markets. The 'real' test will come when risk premia will rise again.

Many international pension funds like ABP, the largest Dutch pension fund and no. 3 in the world, increased their foreign exposure to recent historical highs, but their emerging markets equity exposure barely reached 3 per cent of total outstanding assets by the end of 2005. As stressed by all the literature that deals with the famous Feldstein-Horioka puzzle, i.e. the home bias in investment allocation and the fact that net foreign assets have a very small redistributive impact on world wealth, the 'home bias' still characterizes the early XXIth century either (see Kraay, Loayza, Ventura, 2005). It seems that, in spite of the impressive re-allocation of capital flows towards developing markets, countries that are dubbed 'emerging' nowadays were more integrated in the global financial system in the gold standard era. Over the first half of the 2000s we also noticed that these same emerging markets could have significant impacts on more mature equity markets as stressed by a recent European Central Bank papers (Cuadro-Sáez, Fratzscher, Thimann, 2007).

On the other hand, what *is* clearly different from earlier periods is the greater technical capability of the new financial system to rapidly transmit and process news about (the consequences of) errors of judgement in private investments and public policies around the world at a historically unprecedented speed. Moreover, in contrast to earlier contagion or crisis periods, the form and structure of global finance - in particular the existence of complex, sometimes highly -leveraged positions on underlying market instruments, the widespread use of derivative technology and margin calls in response to rapid price movements in financial market instruments - had (and are having), a major impact on the dynamics of more recent crises (Blommestein, 2000). Nonetheless, these features do not sufficiently explain the severity of financial market turmoil in the last 10 years.

Let's take a closer look at some recent crises. The Mexican crisis of 1994/1995 can be characterised as the first crisis of this new globalised financial system, preceded perhaps by the 1992/1993 ERM crisis and the generalised turbulence in 1994 in the major OECD bond markets. The crisis that started in East Asia in July 1997 is its second. The Russian crisis of August 1998, followed by the rescue of LTCM in September 1998, is the third. The Argentina crisis in 2001 can also be considered as a defining moment in the manifestation of extra-ordinary financial turmoil in the global financial landscape.

The Mexican crisis had many of the weak fundamentals of earlier financial crises, primarily a very large current account deficit and a vulnerable external debt profile¹². Also many of the more recent crises, from Thailand to Russia, have similar conventional causes – fiscal and trade imbalances, and/or imprudent borrowing denominated in foreign currencies. But the size of the decline in the growth of output, the intensity of the disruptions, and certainly the size of the financial rescue operations, seemed larger relative to the underlying causes than comparable previous episodes¹³. This is especially the case when we consider how outsized, for example, the distortions were in Latin America in the early 1980s, relative to not only the size of the financial

12. Current account deficits as a percentage of GDP and the ratio of short-term external debts and reserves were lower in the most recent financial crises in Mexico and Argentina than in the 1980s. (See Table 2 in Kamin, 1999).

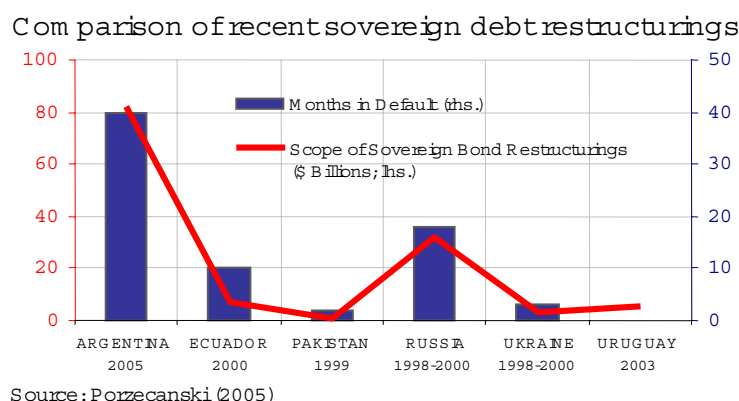
13. See Blázquez and Santiso, 2004; and Santiso, 1999.

rescue packages but, even more so, to the time-frame of the various initiatives to resolve the Latin American debt crisis¹⁴.

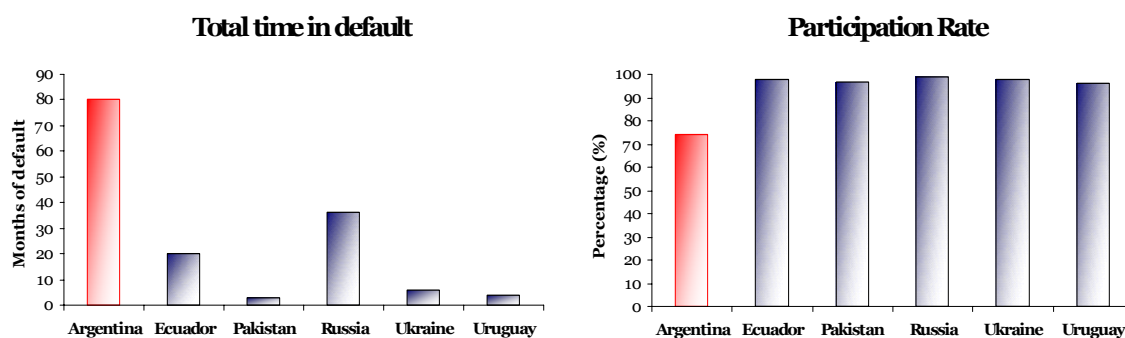
The scale of the Argentinean crisis of 2001 was huge (see Graph 6 below) and broke a historical record, with \$81 billion in defaulted debt involving 152 varieties of paper denominated in six currencies and governed by eight different jurisdictions. But also its resolution process broke previous historical records of debt restructuring. The post default process was extraordinary slow, while the participation rate in the debt restructuring process was exceptionally low (in this regard it has been very different from the Uruguayan debt restructuring that took place by more or less the same time; see on the Uruguayan debt markets structure de Brun, Gandelman, Kamil, and Porzecanski, 2006). Moreover, and above all, the exit from the default was unusual, because it occurred without the help and umbrella of the IMF, while it took place on the basis of the tough conditions proposed by the defaulter.

The crisis itself was also original because in spite of the massive default, one of the biggest ever registered in the recent history of financial markets, it hardly shocked other emerging markets, in other the immediate was spillover effects hardly went beyond the neighboring Uruguay. It is possible however that we are facing a new kind of financial contagion with Argentine, not the classical spillover effect, either financial or commercial, but a more indirect, subtle and slow domino effect linked to a cognitive contagion: the perceived costs of defaulting might have lowered, not only because Argentina was able to restructure at his conditions and came back to (local) financial markets, but because theoretically the country could be issuing bonds a spreads comparable in 2007 to the ones of Brazil. This track record is impressing countries like Ecuador for example, tempted in early 2007 to follow Argentina's own way of dealing with huge debt services, liquidity and solvency issues. More generally, and from an academic point of view, the so-called output costs of defaults are more related to the anticipation of a default than to the default itself (Levy-Yeyati and Panizza, 2006).

Graph 6: Argentina Debt Default and Restructuring during the 2000s



14. The Latin American Debt crisis of the 1980s started with the default of Mexico in 1982 followed by various rescue plans or initiatives as part of the so-called evolving international debt strategy (Cline plan, Baker initiative, Brady plan) See O'Brien, Blommestein and Dittus, 1991.

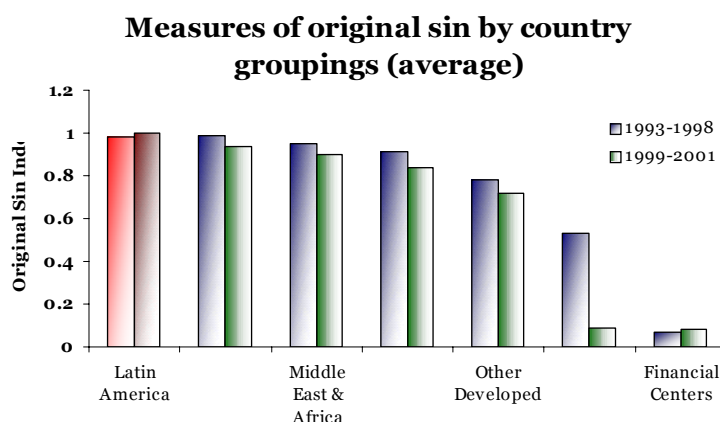


Source: OECD Development Centre, 2007; Based on A. Porzecanski (2005).

Financial turbulence experienced by Brazil in 2002 was typical of the magnitude of the crisis that some countries experienced. The crisis was overcome this time without leading to a crash. Around that time most Brazilian external debt was indexed to foreign exchange (see on the Brazilian episode Giavazzi, Goldfajn, and Herrera, 2005). This is a classical example of “original sin” (Eichengreen and Hausmann, 2005) – situation in which emerging markets are unable to raise bonds in international markets denominated in their own currencies (Graph 7).

The Brazilian crisis also highlighted the crucial role of political factors, the emergence of a left-wing candidate (Lula) being the trigger for the widening of Brazilian spreads and the slump of the Real, that led the country to a nearly default by the time of the Presidential elections in October 2002 (Santiso, 2006). Since the 2002 financial turbulences, Brazil started to reduce foreign currency-linked debt, as part of its new public debt strategy. As a result, the amount of fixed-rate bonds increased, reaching close to 30 per cent of marketable liabilities by the end of 2005, against 15 per cent in 2000. Progress has also been particularly notable in other countries of the region, in particular in Mexico, where fixed-rate securities amounted to 40 per cent of the total by the end of 2005, versus less than 5 per cent in 2000.

Graph 7: Original Sin in Emerging Markets



Source: OECD Development Centre, 2007; based on Eichengreen, B. Hausmann, R. and U. Panizza (2003); and Eichengreen and Hausmann (2005).

The Original Sin Index for country i is defined as:

$$OSIN_i = \max \left\{ 1 - \frac{\text{Securities in currency}_i}{\text{Securities issued by country}_i}, 0 \right\} \quad (1)$$

In all crisis episodes, both the unsound structure of outstanding debt and the underdeveloped stage of bond markets played a significant role, sometimes, like in the Asian crisis, a decisive one.

As in the period phase of financial globalisation, financial crisis, original sins or home bias, have been also common in the more recent one. The current phase is in many aspects quite comparable to the previous one. There has been however many developments that deserve attention and have been reshaping the way to deal with risk debt management in emerging countries as we want to stress in the following section.

III. THE KEY CHALLENGE FOR EMERGING MARKET POLICY MAKERS: UNDERDEVELOPED BOND MARKETS AND A VULNERABLE RISK PROFILE.

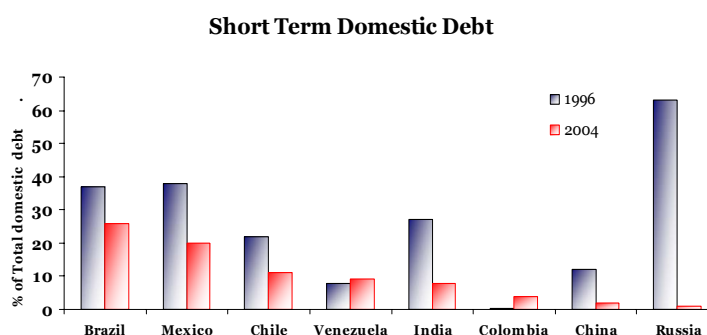
Until the late 1990s, domestic fixed-income securities markets were relatively underdeveloped in many countries in Latin America, Asia, emerging Europe and Africa. In mid-1990s, total outstanding domestic debt securities in emerging markets were only 20 per cent. This situation had led to an excessive reliance on foreign financing¹⁵ (direct or intermediated via domestic banks), making the participation of these countries in the global financial system more vulnerable to shifts in expectations and perceptions. For example, the series of international financial crises in 1997-98 brought sharply into focus the risks and costs associated with underdeveloped fixed-income securities markets, in particular, that *underdeveloped domestic* bond markets have encouraged excessive reliance on foreign and domestic bank financing. The crisis of the 2000s also underlined the risks and costs associated with excessive reliance on bond markets and, in particular, on external debt denominated in foreign exchange or linked to foreign currency.

As a consequence, a policy shift took place during the 2000s so as to avoid or reduce some of the previous vulnerabilities. First, all emerging countries tried to reduce both their global level of external indebtedness and their level of short-term debt. Changes in debt composition, maturities and structure have been witnessed in all the asset class. The reduction of debt maturities has been particularly impressive in Russia, relative to the total of domestic debt, but this trend could also be observed in other emerging markets (Graph 8). Exchange rate-indexed debt also has been reduced, the most impressive case being Brazil where the share of such indexed debt in total public debt fell from 37 per cent in 2002, the year of the crisis, to 2.3 per cent at the start of 2006. However, the reallocation towards more local currency debt is also inducing a change in the risk profile of sovereign issuers. Foreign currency debt is decreasing, although this meant in some countries that debt maturity became shorter¹⁶ (even if things are changing quickly as some other emerging bond issuers are starting to be able to issue bonds in local currencies with maturities now over ten years as for example Mexico).

15. Initially mainly banks loans but later also foreign currency bonds.

16. See for details on this trade-off between debt maturity risks and debt currency risks (Blommestein, 2005; and Alfaro and Kanczuk, 2006). Recently, however, some countries were also successful in securing longer maturities.

Graph 8: Short Term Domestic Debt in Emerging Markets



Source: OECD Development Centre, 2007; based on Global Financial Stability Report, IMF (2006).

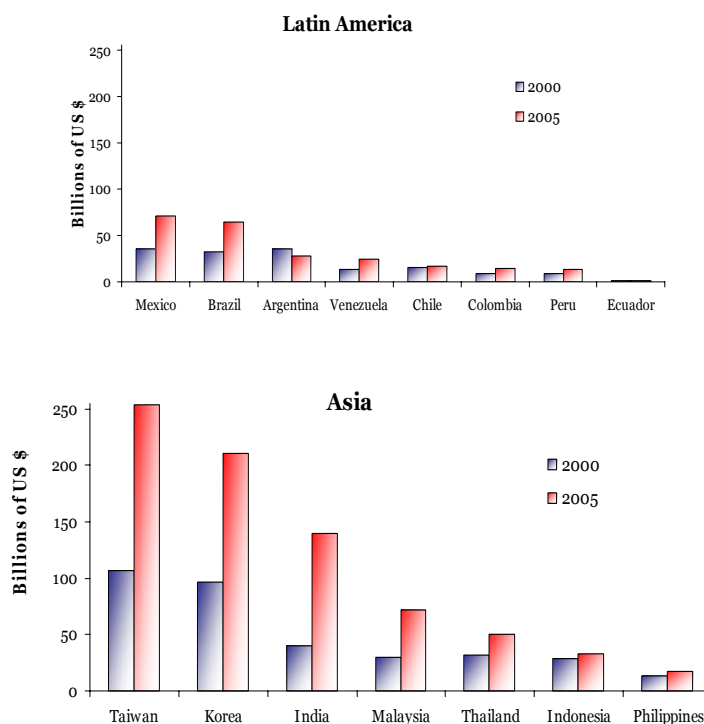
At the same time, during the 2000s, current account surpluses in most emerging markets enabled several countries to reduce their external debt¹⁷. Foreign reserves have jumped to record levels in many countries, particularly in Asia and oil-exporting countries, acting as a mechanism of endogenous insurance (Graph 9). By the end of 2005 they reached nearly \$2 500 billion and crossed the level of \$3 000 billion in 2006, helped in particular by China's impressive \$1 000 billion.

In some cases external debt levels have been reduced drawing on these foreign reserves. Russia, for example, cleared its debt to the IMF and repaid also the Paris Club in 2005. The same year Brazil also paid the IMF, the Paris Club creditor countries and in 2006 it paid off all its remaining Brady bonds (\$6.6 billion), the securities that kick-started the emerging market bonds boom in the 1990s (albeit partly funded by new external debt), closing officially the debt restructuring process of the 1980s¹⁸. Argentina followed also the Brazilian example, repaying its outstanding debt to the international financial institutions. In 2006, Nigeria became also the first African country to cancel its Paris Club debt (totalling \$30 billion; one third being repaid and the remaining being forgiven). These mechanisms of self-insurance through increased levels of reserves continue to be pursued even after repayments as underlined by the Brazilian and Argentinean examples (see Graph 10). In parallel, emerging countries increased also their

17. They have also helped reduce one major source of vulnerability (to liquidity crisis in particular), the net open forward positions in hard currencies taken by central banks of some emerging countries. These NOFP were aimed at supporting the local currency by taking short positions on hard currencies and long ones on the local currency without having foreign exchange reserves to cover these positions (actually the use of the NOFP instrument was a way to make up for the low level of FOREX reserves in the central bank's coffer). NOFP played a key role in the collapse of the Thai baht in 1997 and was regarded as a major source of vulnerability for South Africa until the trimming down of its forward book in 2003. Factoring in NOFP, Forex reserves of South Africa were actually negative!
18. Of the total global volume of the 175 billion dollars in Brady bonds that was issued, just over 10 billion of dollars remained in circulation early 2007, after buybacks, amortizations and restructurings. Latin American countries already retired more than 97 per cent of the \$82 billion of Bradys issued (IADB, 2006, p.82).

national saving rates, as counterpart of this external debt repayment strategy and current account surpluses. One notable example is Latin America, a region that saw its domestic saving rates increasing from levels around 17 per cent in the early 2000s to more than 22 per cent by the end of 2005¹⁹.

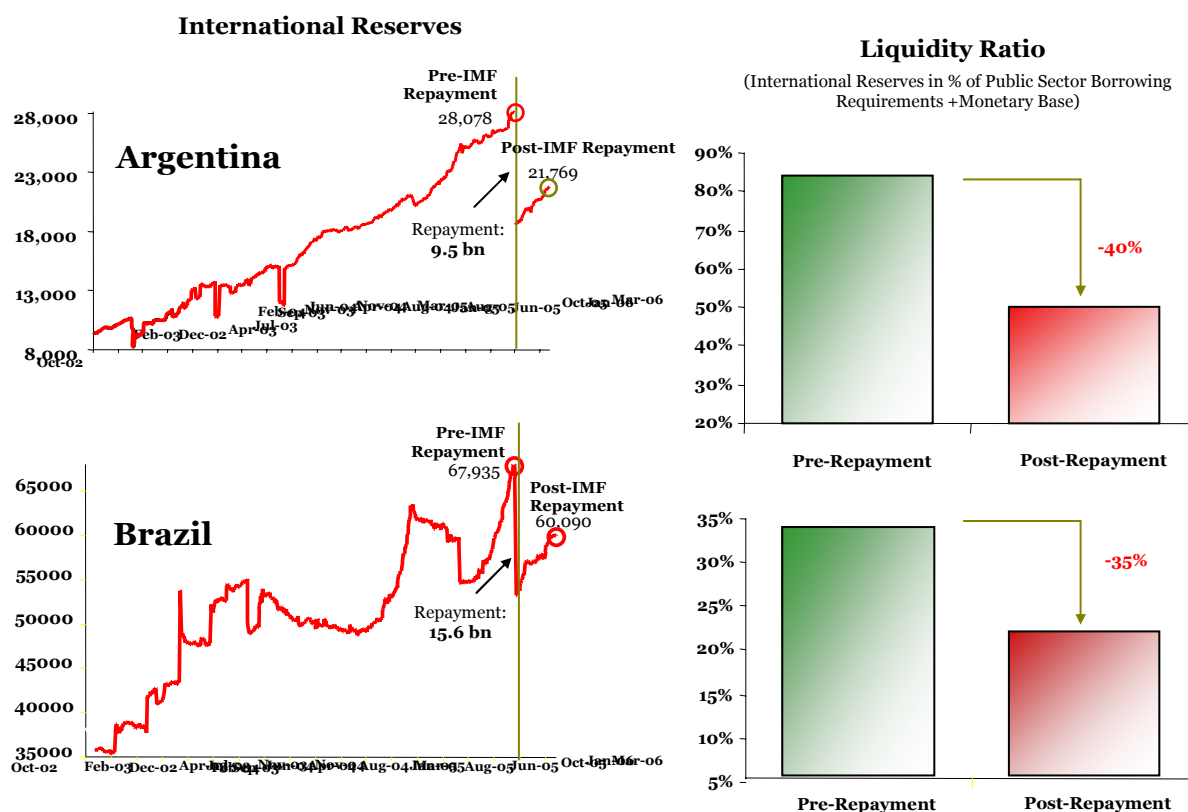
Graph 9: Foreign Reserves in Latin America and Asia during the 2000s



Source: OECD Development Centre, 2007; based on International Financial Statistics, IMF and Central Banks information, 2006.

19. This boom of reserves has prompted some academic authors to suggest new ways for using them in the most efficient way. Eichengreen, for example, suggested to explore pooling reserves in Latin America in order to use them for emergency lending in response to sudden stops or, more promisingly, to use a portion of the reserve pool, along with borrowed funds, to purchase contingent debt securities issued by Latin American governments and corporations (domestic currency inflation indexed bonds; GDP indexed bonds; commodity price indexed bonds). This would reduce, according to Eichengreen, their vulnerability to disturbances (Eichengreen, 2006). However, it is not clear how these kinds of schemes can function properly in practice as well-functioning institutional institutions for cross-border operations are missing. A more realistic route is to adopt for each country a strategic asset and liability framework that would allow an integrated risk management approach to both assets (including reserves) and government liabilities (Blommestein, 2005).

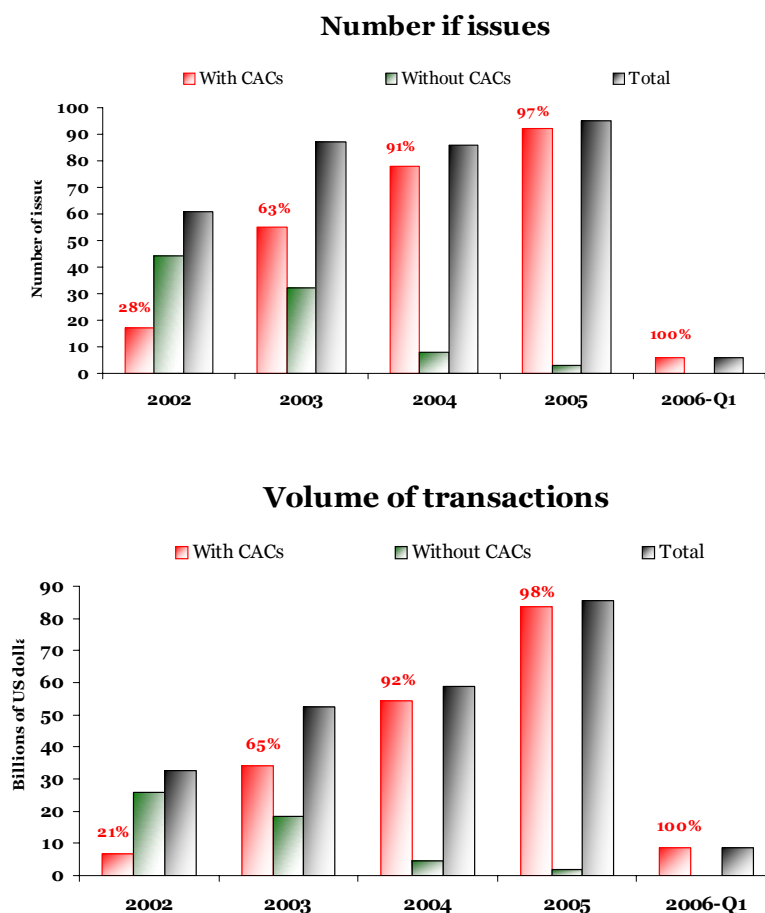
Graph 10: International Reserves after Repayments in 2006: Argentina and Brazil



Source: OECD Development Centre, 2007; based on International Financial Statistics, IMF and Central Banks information, 2006.

Second, some improvements have been reached in emerging financial markets with the appearance of new instruments like international bond issuances with Collective Action Clauses (CACs). Both the numbers and volumes of bond issuances with CACs increased, without implying higher risk premiums for the sovereign bond issuers (all the bonds issued with CACs benefited from the lower spreads that characterized the recent risk aversion period) (Gugiatti and Richards, 2003; Drage and Hovaguimian, 2004). By the beginning of the 2000s, a meagre 30 per cent of emerging markets bonds was issued with such clauses. By mid-decade nearly 97 per cent included such clauses (see Graph 11). More interesting: in early 2007, Belize successfully achieved the first debt restructuring based on CAC's. Largely unnoticed, the Central American nation has taken advantage of the once controversial mechanism – known as a collective action clause – to facilitate a quicker restructuring of about half of its \$1.1 billion of debt, a process that started in August 2006 and ended in February 2007. In doing so, it has become the first country in more than 70 years to use a collective action clause (CAC) to restructure a sovereign bond governed by New York law.

Graph 11: Emerging Markets Bond Issuances with CACs during the 2000s



Source: OECD Development Centre, 2007; based on IMF 2006, Dealogic, and Turégano and Santiso (2005).

Third, as shown in Graph 12, emerging markets have also tried to overcome original sin, both through more bond issuance denominated in their own currencies in international financial markets as well through the development of their domestic bond markets. Latin America has been particularly successful in this regards (see for a closer analysis also Borensztein, Eichengreen, and Panizza, 2006b).

Countries like Colombia, Mexico or Peru achieved to issue international bonds denominated in their currencies, reducing in an impressive way their original sin index (see Graph 12). At the end of 2003, for example, Uruguay started issuing a global bond denominated in real pesos (via indexing inflation). The following year, the country issued another bond, this time in nominal pesos. Colombia launched also nominal peso issues in 2004 and 2005, while Brazil started in 2005 to issue large bonds of \$1.5 billion with long maturity and denominated in nominal *reais* (for a more detailed analysis see Borensztein, Eichengreen, and Panizza, 2006a; 2006b). Not only local investors have been active in these local markets but also foreign investors.

In Mexico, for example, they bought 80 per cent of the domestic long-term bonds issued in 2004 by the Mexican government (Castellanos and Martínez, 2006)²⁰.

In recent years, domestic bond markets became an increasingly source of financing in emerging markets. Latin American economies in particular, made a lot of progress, with the amount of local currency bonds, issued both by sovereign and corporations in the seven largest economies of the region, jumping by nearly 340 per cent between the end of 1995 and the end of 2005, to nearly \$900 billion²¹. This amount is equivalent to nearly 40 per cent of those seven countries' combined GDP. This trend is outpacing the one we witnessed in international debt markets, expanding by "only" 65 per cent over the same period, topping \$265 billion.

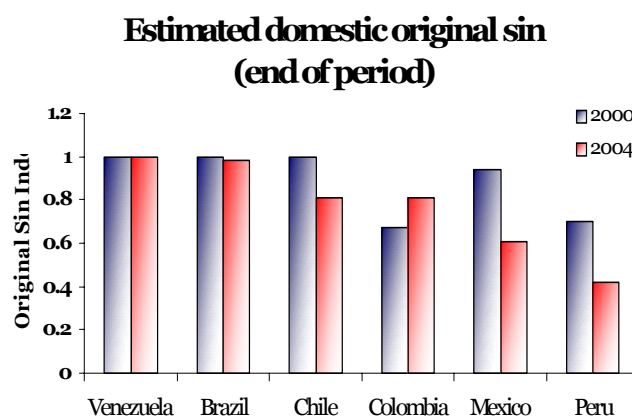
As a result of this trend, local fixed-income markets and local currency bonds sold in international markets have become the dominant source of funding for both Latin American sovereigns and corporations. According to BIS analysts (Jeanneau and Tovar, 2006; in BIS, 2006*b*), the total amount outstanding of domestic bonds and notes issued by Latin American borrowers rose from \$228 billion in 2000 to \$379 billion in 2005. During the same period, external debt securities fell by \$17 billion. Global investors reallocated part of their portfolios towards domestic bonds, while local pension and other institutional players became increasingly important. This shift from external to domestic financing has helped to reduce the original sin resulting from currency mismatches. As a result, and emphasised by the IADB in its latest annual report and in earlier OECD publications²², analysts and policymakers should not only focus on external debt levels but also on domestic debt so as to have a complete and integrated picture of public debt dynamics (see also Cowan, Levy-Yeyati, Panizza, and Sturzenegger, 2006). For example, in the Latin American region, one could observe an ongoing decline in external debt ratios that was partly compensated for by an increase in domestic debt (IADB, 2006).

20. In parallel to this trend other countries tried to reduce their currency mismatches through dedollarisation of their liabilities (Fernández-Arias, 2006).

21. BIS 2006 annual report (BIS, 2006*a*).

22. Blommestein, 2002, 2005.

Graph 12: Decrease in Origin Sin in Latin American Emerging Markets



Source: OECD Development Centre, 2007; based on Mehl, A. and J. Reynaud (2005).

Also in Asia this trend can be observed. These governments amassed nearly \$3 trillion (\$2.7 billion by mid-2006) of foreign exchange reserves. With such a large pool of liquidity, they are now looking to diversify their portfolio investments beyond US Treasuries and other OECD securities. Consequently, important progress has been made in developing the once neglected domestic bond markets, in a region that has been traditionally relying on bank finance. While Asian local-currency bond markets are still tiny and unsophisticated²³, with a total value of the outstanding bonds amounting for less than \$2 trillion at the end of 2000s²⁴, the interest for these instruments is increasing. Expanding local bond markets is also perceived as an insurance against another financial crisis like the one experienced in 1997-98 when Thailand, South Korea and many other Asian countries were quite vulnerable due to an excessive reliance on short-term foreign currency borrowing and cross-border bank financing. International organisations such as the Asian Development Bank (ADB) and OECD²⁵ are encouraging and supporting efforts and initiatives to develop local-currency fixed-income markets. The ADB has raised local-currency bonds in China, the Philippines, Thailand and Malaysia. More work is needed in view of the modest size of these markets, relatively low liquidity and in some cases also poor transparency. Reliable information is scarce with too few rating agencies covering local companies. However, Asian policymakers have indicated that they are determined to continue to develop deeper, more liquid and transparent local bond markets.

23. This is in part due to the relatively low borrowing requirements of Asian governments.

24. According to BIS statistics.

25. Asian governments are active participants in two OECD-led Global Forums (the annual OECD Global Debt Management Forum and the annual OECD-World Bank-IMF Global Bond Forum), while there is a separate OECD-China Forum on Public Debt Management and Government Securities Markets.

In the wake of the crises of the 1990s, a consensus therefore emerged that both a sound banking system and a liquid domestic capital market are key elements of a robust financial infrastructure. This essential condition should be in place so as to allow emerging financial markets to participate in the international financial system without making them excessively vulnerable to large, unanticipated withdrawals and speculative attacks. Various studies have presented evidence that the degree of financial sector development is a key determinant of an economy's volatility and vulnerability to financial crises²⁶. There is also a growing consensus that emerging economies should avoid excessive foreign-currency debt levels, while continuing to boost both the issuance in local bond markets as well as international issuances denominated in their own currencies²⁷. In the remainder of this section we shall explain in more detail why a more robust financial infrastructure is crucial for emerging markets, starting with a simple theoretical framework.

The following simple two-period model provides a stylised picture of the impact of the degree of underdevelopment on volatility by highlighting some of the key mechanisms and channels involved²⁸. In period $t=1$, a firm receives a random cash flow amount (θ) and decides how much to invest in working capital (W) to produce output (Y) in period $t=2$:

$$Y = (K^\alpha + \beta W^\alpha)^{1/\alpha} \quad (2)$$

with K fixed (physical) capital and $0 < \alpha < 1$. The constraint in making investment decisions is determined by the notion that the firm cannot invest more than a multiple $\lambda > 1$ of its capital-adjusted cash flow $K\theta$ ²⁹:

$$W \leq \lambda K \theta \quad (3)$$

The *degree of financial market development* is given by λ . That is, for a given level of assets, a firm can borrow more when the financial market is more developed. Good and bad times (volatility) can be expressed via the size of cash flows, with θ_H the cash flow in good times (with probability P) and θ_L the cash flow in bad times (with probability $1-P$); with $\theta_H > \theta_L$. The parameter β can be interpreted as the liquidity needs of the firm (see Annex A).

Typically, simple models of this kind do not incorporate a specific institutional structure for the development of sound financial markets (banks, bond markets, equity, derivatives, clearing and settlement, payment systems, supervision, and so on). However, they are very useful in demonstrating in the simplest way possible why the *degree of financial development* has a potential, important role to play in reducing volatility. Based on this insight, the next step is to focus on key institutional features of financial systems that either take into account the higher structural volatility in emerging markets and/or can be expected to contribute to lower volatility and higher stability. The following features are in our view of great importance.

26. Denizer, Iyigun and Owen, 2002; and Beck, Lundberg, and Majnoni 2006.

27. For other key areas of consensus and a good survey of proposals (Mishkin, 2006).

28. Raddatz, 2006.

29. Raddatz notes that this kind of constraints can be derived from ex post moral hazard considerations.

First, *diversification of sources of finance* can help assure more stable patterns of corporate finance in other ways (Blommestein, 2000). For example, during episodes of strong credit rationing in the banking sector or a full-fledged credit crunch, the impact on corporate finance might be softened by the existence of a well-functioning domestic bond market. Bond market investors may not be subject to the same sorts of restraints, such as fears of interest rate mismatches or insufficient capital that might inhibit banks from lending. One of the main conclusions that virtually all analysts reached after the Asian crisis was that patterns of financial intermediation tended to be dominated by banking finance characterised by opaque insider relations. This meant that large financial flows were not exposed to market scrutiny. In contrast, a domestic bond market would increase the need to disclose information regularly to investors. This greater scrutiny by the market contributes to more efficient financial intermediation.

Second, the existence of well-developed *domestic fixed-income markets* with appropriate risk valuation systems is important for reducing the risks associated with the rapid movements of short-term capital flows, or “hot money”. With proper functioning bond markets, more financing can be raised from domestic sources, thereby reducing the dependency on external sources of finance. While there seems to be growing agreement that an active corporate bond market can be useful, it is also clear that these markets cannot flourish unless the proper infrastructure is in place. The development of a well-functioning government bond market can play an important role in this respect³⁰, in particular by providing: *i*) support in the form of a pricing benchmark to the private fixed-income market (both cash and derivatives); and *ii*) to provide a tool for interest rate risk management.

Third, many emerging markets need to address the challenges related to a *vulnerable risk profile* of corporations, banks and governments due to mistaken policies or inherent structural obstacles such as relatively higher volatility and difficulties in benefiting from efficient domestic or international risk-sharing. For example, how to deal with the fact that serial default on debts is in fact the rule rather than the exception in many jurisdictions³¹? There is also the need to eliminate or mitigate the *sources* of deep-seated emerging market risks, including currency and maturity mismatches, weak and ineffective prudential oversight, opaque supervisory practices often mirrored by non-transparent transactions in banking and capital markets, a weak institutional infrastructure, and an inadequate exchange rate regime.

It will be shown in the next section that these features and challenges put the spotlight on a twin-track strategy that involves a risk-based approach to public debt management with a direct link to the development of domestic bond markets.

30. Blommestein, 1999.

31. Reinhart and Rogoff, 2004.

IV. A RISK MANAGEMENT PERSPECTIVE ON PUBLIC DEBT MANAGEMENT AND CONSEQUENCES FOR DEVELOPING DOMESTIC BOND MARKETS

The effective management of the domestic and external debt of both the private and public sectors is of great importance for the successful participation of countries in the international financial system. Mismatches of maturity and/or currency have been identified as an important reason why countries experienced financial crises. Some countries in which the private sector or government issued large quantities of short-term maturity, foreign-currency denominated debt, became very vulnerable to sharp swings in the sentiment of foreign investors³².

The Asian crisis of the late 1990s prompted an important debate on the limitations of the role of macro-economic policies during financial crises. The main lesson or conclusion from that crisis episode (and later from the crisis in Argentina) is that macro-economic policy makers need to take the *structure of the domestic financial sector* (such as bank fragility, size and composition of corporate and public debt, the degree of capital market development, etc) into account when setting and executing macro policies prior and during crisis episodes. Many analysts highlighted the role of the outstanding stock of debt of firms (assets for banks) in limiting the effectiveness of monetary policy.

The 'traditional' view argues in favour of monetary tightening to limit currency depreciation and inflation. Higher interest rates will discourage capital outflows and thereby avoid a full-blown currency crisis. The 'revisionists' note that monetary tightening (higher interest rates) will have an adverse impact on the balance sheets of firms and banks (Radelet and Sachs, 1998; Furman and Stiglitz, 1998). The resulting wave of bankruptcies encourages additional capital outflows and depreciation of the exchange rate. The evidence supporting the traditional or revisionist view is mixed with ambiguous empirical results (Goderis, 2005). However, when debt levels are taken into account, a clearer picture emerges. Eijffinger and Goderis (2005) show that the impact of monetary policy on the exchange rate is non-linear and non-monotonic. They find that for relatively low corporate debt levels (i.e. for short-term debt to assets ratios between 0 and 11.7) higher interest rates lead to an appreciation of the exchange rate, while for higher debt levels (i.e. for short-term debt to assets ratios higher than 11.7) a tighter monetary policy results in a weakening of the exchange rate (see **Annex B**).

32. A government with high short-term debt has the same kind of maturity mismatch as in the classic Diamond-Dybvig bank run model because most of its assets (the present value of future tax payments) are fairly illiquid (Rogoff, 1998).

Modern risk management has become an important tool for achieving strategic debt targets (Blommestein, 2005). Conceptually, a government balance sheet perspective is very attractive (Blommestein, 2006b). This approach expands the pure liability risk management framework with public assets, resulting in an asset and liability management (ALM) framework. The central insight here is that resources (and the assets that generate them) are key for the assessment and management of risk (and not just the structure of public debt in isolation). This ALM approach can then be used to analyse the risk characteristics of the assets and liabilities of the whole government, thereby strengthening the conceptual framework for strategic debt management. Nonetheless, from a practical point-of-view, there are many obstacles to overcome, including those related to the measurement of physical assets and an adequate governance framework with proper checks-and-balances for managing these assets and liabilities.

An effective framework for the management of risk would ensure that governments and private sector participants would avoid a situation in which they would become very vulnerable to *debt runs*, either via a self-fulfilling debt crisis or a debt run due to adverse fundamentals. The risk management of government debt is therefore a crucial part of public debt management strategies in emerging markets. It is based on a risk management approach developed in the OECD area, whereby this approach has become an important tool for achieving strategic debt targets in the OECD area. Risk management policies, based on the use of formal methods, are now an integral part of debt management in most OECD jurisdictions.

A strategic benchmark plays a key role in the control of risk. The benchmark in its function as management tool requires the government to specify its risk tolerance and other portfolio preferences concerning the trade-off between *expected* cost and risk. To that end, debt managers need to have a view on the optimal structure of the public debt portfolio. Ideally, they should be able to assess how a portfolio should be structured on the basis of cost-risk criteria so as to hedge the government's fiscal position from various shocks. The *optimal debt composition* is derived by assessing the relative impact of the risk and costs of the various debt instruments on the probability of missing a well-defined stabilisation target (e.g., the stabilisation of the debt ratio at some target value, thereby reducing the probability of a fiscal crisis; see **Annex C**). In essence, the choice of debt instruments trades off the risk and expected costs of debt service. Reducing the variability in the primary surplus (or deficit) and the debt ratio (for any given expected cost of debt service) is desirable, because it reduces the probability of a fiscal crisis due to adverse shocks to the budget (that in turn might trigger a financial crisis).

This risk management approach connects public debt management to the macroeconomic framework. This link becomes very clear when one assumes that the *overall or wider* debt management objective³³ is to reduce a country's fiscal vulnerability via the stabilisation of the

33. This overall or wider debt management objective should be seen as encompassing the following conventional (more narrow) debt management objectives: (a) undisturbed access to markets to finance the budget deficit at lowest possible borrowing cost, subject to (b) an acceptable level of risk. This follows from the need, noted before, that debt and risk management (including the specification of a strategic benchmark) need to be integrated into a broader policy reform framework. The successful implementation of this policy reform framework is important for achieving debt management objectives (a) and (b).

debt ratio (public debt-to-GDP). In **annex C** we summarise an analytical framework³⁴ to illustrate in more detail the trade-offs between expected cost of debt service and the risk in choosing different debt instruments. In order to stabilise at time t the public debt ratio, $B_{(t)}$, the *fiscal authority* decides to implement a fiscal reform programme. Success of this stabilisation programme is by definition uncertain. As a result, a debt-cum-financial crisis cannot be prevented with certainty. When a debt crisis arises, the debt ratio increases rapidly:

$$\bar{B}_{(t+1)} - \tilde{A}_{(t+1)} + \varepsilon > B_{(t)} \quad (4)$$

This risk management framework allows the pricing of risk against the expected cost of debt service. This price information makes it possible to calculate the optimal combination along the trade-off between cost and risk minimisation³⁵ [See Annex C for details]. This expression can also be interpreted as including the notion that the debt ratio must exceed a critical threshold for a crisis to arise, by interpreting \tilde{A} as the sum of expected adjustment and the difference between $B_{(t)}$ and its threshold³⁶. This threshold can, for example, be based on a threshold for short-term debt found in the empirical literature (see Annex B).

This means that the choice of debt instruments that a government should issue depends in large part on the structure of the economy, the nature of economic shocks, and the preference of investors. For example, fixed-rate nominal debt (expressed in local currency) would help hedge the budgetary impact of supply shocks, while inflation-indexed debt are better hedges than nominals in case of demand shocks. This example also makes clear that cost-effectiveness (although very important) should not be the sole decision criterion when governments and debt managers assess which (new) instruments to issue or not.

Also the specification of *strategic benchmarks* in emerging markets³⁷, requires the articulation of a consistent view on the optimal structure of the public debt portfolio. Also in this case the optimal portfolio can be derived from the overall debt management objective of minimising a country's fiscal vulnerability. But since this means that the choice of debt instruments depends in large part on the structure of the economy, the nature of economic shocks, and the preference of investors, debt managers operating in emerging markets are generally facing greater challenges than their counter-parts managing sovereign debt in the more advanced markets (Blommestein, 2004). The structure or composition of the outstanding debt in emerging markets is in most cases much more complex, while volatility in the macro

34. This model is based on Giavazzi and Missale, 2004, *ibid.*

35. See, for example, Giavazzi and Missale, 2004.

36. See Giavazzi and Missale, 2004, *ibid.*

37. Representing the desired structure or composition of a liability (and asset) portfolio in terms of financial characteristics such as currency and interest mix, maturity structure, liquidity, and indexation.

environment is usually much higher than in advanced markets. An increasing body of research shows that emerging market economies lack the natural stabilising structural characteristics that allow the use of effective counter-cyclical policies (see García and Rigobón, 2004). Moreover, emerging debt managers are facing original sin (the situation in which it is difficult or impossible to borrow in nominal terms in the domestic currency; see Graph 7). Emerging debt managers are therefore facing greater and more complex risks in managing their sovereign debt portfolio and executing their funding strategies. At the same time, many emerging markets are not in the position to benefit from efficient international or domestic risk-sharing to the same extent as mature markets are.

Because of these structural difficulties, it will also be much harder to define quantitative benchmarks with desirable properties in terms of the trade-offs between costs and risk. As a result, it will be more difficult for emerging market debt managers (in comparison with their counter-parts from more advanced debt markets) to construct an optimal debt portfolio that can serve as a reliable guide for the development of domestic bond markets. A key challenge in emerging markets such as Brazil, China, Argentina and India is to develop meaningful benchmarks tools and related risk control procedures, that are at the same time relatively simple and robust to employ in a relatively more volatile environment. Implementation would be greatly facilitated when debt managers can operate in liquid government bond markets, both for cash bonds and derivatives.

Another challenge is how to deal with the fact that serial default on debts is in fact the rule rather than the exception in many jurisdictions (Reihnart and Rogoff, 2004). Because of this (in some lower-income country cases the odds of default are as high as 65 per cent) some analysts (Reihnart and Rogoff, 2004) have argued that debt managers from emerging markets should aim for far lower levels of external debt-to-GDP ratios than has traditionally been considered prudent. For example, for emerging markets with a bad credit history this may imply prudent ratios for external debt in the 15-20 per cent of GDP range³⁸. More in general, poor debt composition increased the susceptibility to interest rate and exchange rate shocks.

Moreover, advanced markets are capable to share to a significant degree their risks with their creditors³⁹, while this is not (or much less) the case for emerging market economies⁴⁰. This is an additional (though related) reason why the benchmark should incorporate the prudential notion that governments in emerging markets should hold relatively less foreign debt than those from advanced market jurisdictions, while they also need to hold higher reserves (and smaller

38. It has also been argued that emerging markets are more vulnerable for a slowdown in growth, leading to unsustainable debt levels. In this view, lower growth has a significant impact on debt ratios via a reduction in tax income and the primary surplus (Easterly, 2002). However, beyond a certain threshold, there is also evidence of reverse causality of a negative impact of high debt on growth (Patillo, Poirson and Ricci, 2004).

39. Usually the foreign debt position of advanced markets does not involve a net foreign currency exposure.

40. Interview with Ricardo Hausmann, "Does currency denomination of debt hold key to taming volatility?", *IMF Survey*, 15 March 2004.

current account deficits). The strategic benchmark (derived in principle for the entire portfolio of assets and liabilities) is also likely to show the notion that larger shares of inflation-indexed local currency debt (in comparison with many existing portfolios) are beneficial.

In view of these structural obstacles, the risk management of government debt should be part of a broader policy reform framework. What is needed is the integration of debt and risk management (including the specification of a strategic benchmark) into this framework. The paramount, overall objective in many emerging markets is reducing the country's fiscal vulnerability and restoring the credibility of monetary policy, while tackling incomplete and weak financial and insurance markets. This objective requires such standard measures as cutting public expenditures, boosting the private saving rate, broadening the tax base, and strengthening a country's capacity to export⁴¹. It also requires institutional reform measures including stronger property rights and more efficient bankruptcy procedures, thereby improving the conditions for the development of more complete and stronger markets for risk-sharing and risk-pooling. This in turn would contribute to eliminating the sources of deep-seated emerging market risks, including currency and maturity mismatches, weak and ineffective prudential oversight, opaque supervisory practices often mirrored by non-transparent transactions in banking and capital markets, a weak institutional infrastructure, and an inadequate exchange rate regime.

The complexities involved in eliminating these sources (or at least reducing their impact) has been underestimated or misjudged by many analysts and policy-makers. De la Torre and Schmukler (2004)⁴² make the important observation that many of these structural sources of risk are in fact the *endogenous outcome* of the interactions of rational agents (including debt managers) with the market environment. From this perspective these deep-seated structural weaknesses can even be interpreted as risk-coping devices. These risk-coping mechanisms are jointly determined and each of them involves trade-offs. The costs of their removal may even be prohibitive when they would be undertaken without taking into account the overall macro-economic and structural situation. The introduction of new technical debt management procedures or instruments such as letting multilateral organisations like the IMF and World Bank issue bonds in the emerging market currency or as debt indexed to the local inflation rate or bonds in a synthetic unit of account (based on a weighted basket of emerging-market currencies), will then be counter-productive or even backfire. The execution of the debt strategy needs to be attuned to the underlying macro policy stance and the situation (including assessments by investors) in the global financial market environment. This is another illustration why debt management in emerging markets is in general a much greater challenge than in more advanced markets.

It is against this backdrop of a broader policy reform agenda that a risk management framework for government debt as those used in advanced markets should be implemented, including the specification of a strategic benchmark (see Annex C for details). Nonetheless, this integrated framework should be sufficiently flexible and pragmatic to absorb various shocks so as to overcome crisis situations. This may involve a temporary deviation from a pre-announced debt issuing program based on a strategic benchmark. The specification of a benchmark portfolio

41. See also Rajan, 2004.

42. See De la Torre and Schmukler, 2004.

represents the desired *longer-term* structure or composition of the government debt portfolio. The implementation of the resulting debt strategy has therefore a direct impact on the development and structure of domestic bond markets. For example, the announced debt strategy may involve reducing the share of floating debt, increasing the share of inflation linkers and local currency bonds, and lengthening the maturity of domestic debt.

The resulting structure of domestic bond markets is therefore based on a risk-based approach that takes the weak structural fundamentals of emerging markets (such a relatively high volatile environment and other sources of vulnerability) better into account. As a result, the risk-based approach to public debt management by emerging markets contributes to both enhanced financial stability and a more successful participation in the global financial landscape. Vice versa, liquid domestic bond markets facilitate the risk-based approach to public debt management as well as better risk management by financial intermediaries.

V. POLICY IMPLICATIONS FOR LATIN AMERICA AND OTHER EMERGING MARKETS

The increasingly active participation by debt managers from Latin America, Asia, Africa and other emerging markets in OECD-led policy forums⁴³ demonstrates clearly that emerging market policymakers are giving a higher priority to a risk-based public debt management strategy based on OECD's leading practices in this policy area. Because of its link to domestic bond markets, progress in developing bond markets can be used as an indirect gauge of the success of implementing a risk-based approach to public debt management.

As noted, in the period 1997-2005, the stock of *domestic currency debt* of emerging markets has nearly tripled, to over \$3 trillion, while total outstanding domestic debt securities grew from 20 per cent of GDP to almost 40 per cent, while foreign debt has been reduced (see Graphs 13-16 below). This shift from external to domestic debt has helped reducing the risk resulting from currency mismatches. Nevertheless important challenges remain. Domestic markets vary greatly in size (the largest being the Brazilian and Mexican ones, respectively 74 per cent and 21 per cent of GDP by the end of 2005) and – as in many OECD jurisdictions-- they are dominated by the public sector. Public debt-to-GDP ratios stood at only a median value of 46 per cent at the end of 2005. There is therefore ample room for deepening domestic debt securities.

In some countries exposure to forex risk fell significantly (to 13 per cent of GDP in South Africa in 2004, for example⁴⁴), while others managed to reduce it significantly including Brazil and Russia (falling to 37 per cent and 34 per cent⁴⁵ of GDP in 2004, respectively). In Turkey the foreign currency-linked portion of debt fell from 58.1 per cent at end-2002 to 38.5 per cent in September 2006⁴⁶. But in some countries exposure still exceeds 50 per cent of GDP at the end of 2006, namely in Indonesia (55 per cent), Philippines (72 per cent), and Argentina (111 per

43. The principal forums are the Annual OECD/World Bank/IMF Global Bond Market Forum, and the Annual OECD Global Forum on Public Debt Management in Emerging Government Securities Markets.

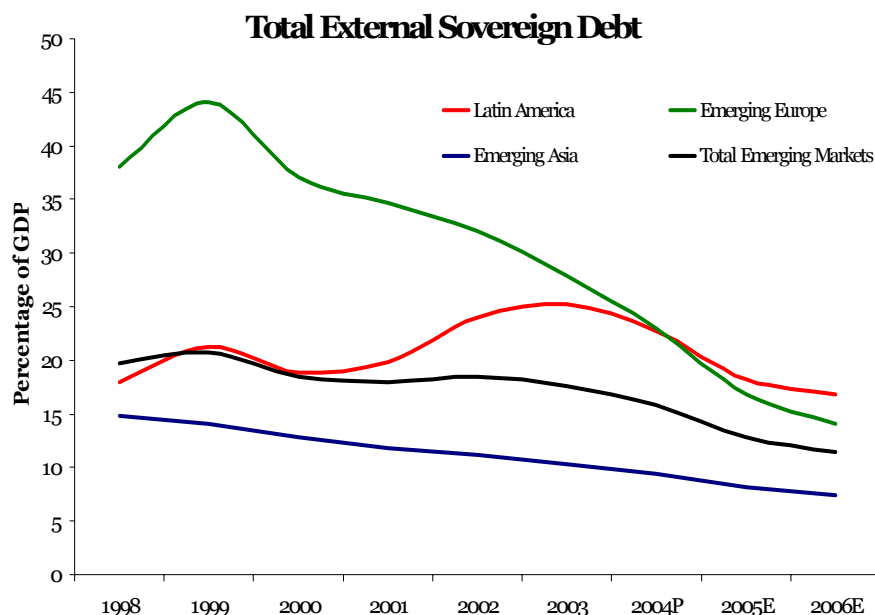
44. On South Africa's cost of capital and strategies to reduce it see the several studies produced by the OECD Development Centre (Grandes and Pinaud, 2004 and 2005).

45. Russian sovereign external debt stood in 2006 at less than 8 per cent of GDP, down from 140 per cent of GDP in 1998.

46. Source: Submission to the OECD Working Party on Debt Management.

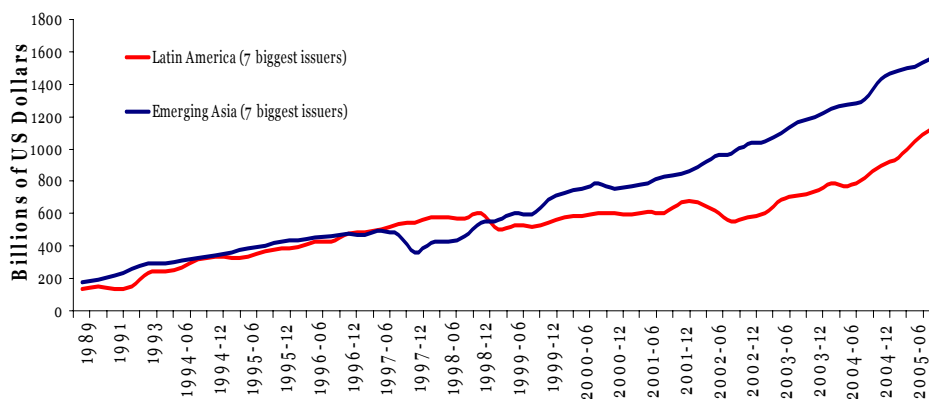
cent)⁴⁷. In other words, in spite of impressive progress, forex risk associated with foreign debt remains an important challenge for many emerging markets.

Graph 13: Total Sovereign Debt



Source: OECD Development Centre, 2007; based on IMF data, 2006.

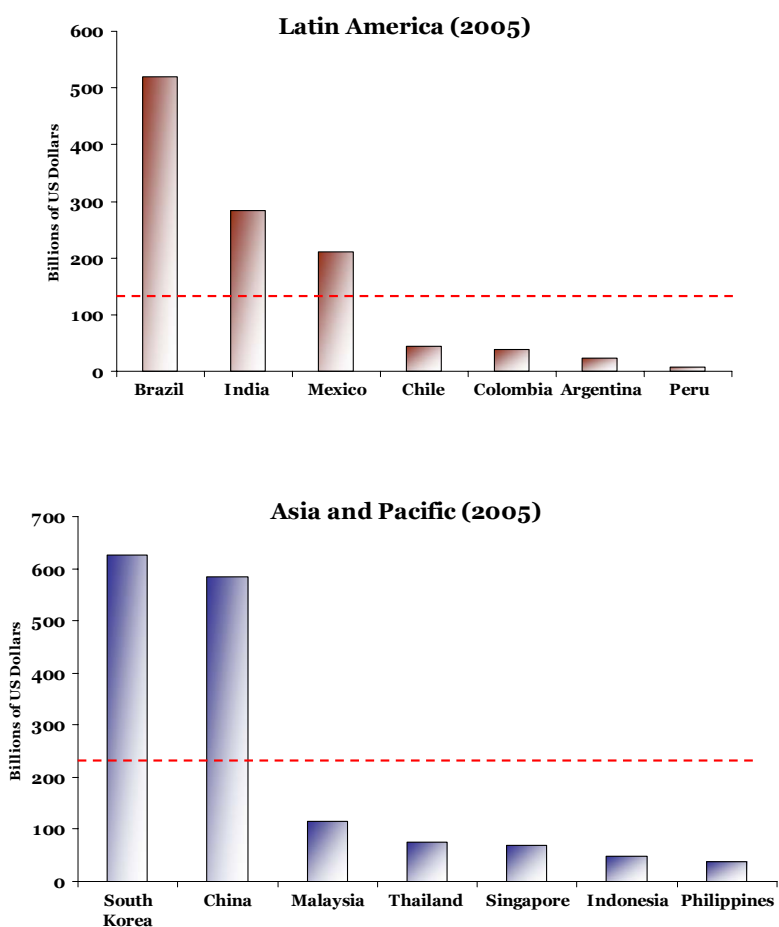
Graph 14: Increasing Domestic Debt Markets: Latin America and Asia (in \$ billions)



Source: OECD Development Centre, 2007; based on BIS, 2006.

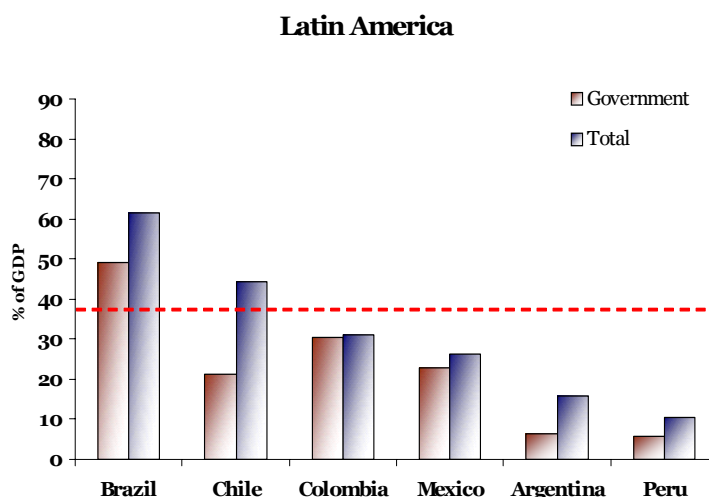
47. According to IMF statistics.

Graph 15: Increasing Domestic Debt Markets: Latin American and Asian (in \$ billions)



Source: OECD Development Centre, 2007; based on BIS, 2006.

Graph 16: Latin American Debt Securities Markets in 2005 (amounts outstanding, in per cent of GDP)



Source: OECD Development Centre, 2007; based on BIS, 2006.

Another key success indicator is the lengthening *maturities* along the yield curve. Maturity is influenced by both demand and supply factors. The latter is directly linked to implications of the risk-based approach to the debt strategy for the issuing strategy and the resulting optimal portfolio. The influence of demand factors is driven by investors' assessments of fundamentals and risk preferences. As a percentage of total domestic emerging market debt, bonds that have a residual maturity up to one year declined from 44 per cent in 1997 to 25 per cent in 2004. Several Latin American countries have made dramatic progress. For example, in 2005, Mexico issued a 20-year bond, while 10 years before it was only possible to issue securities with maximum maturities of around six months. It is currently considering issuing a 30-year bond. Chile has been issuing during the last five years securities with maturities up to ten years, up from 12 months in the past. Also Brazil, Columbia, and Peru have made considerable progress issuing 10-year *global* bonds in local currency, 15 year bonds and 20 year bonds respectively. The achievement of Peru is particularly significant given the high degree of dollarisation of the country. In contrast, maximum maturities fell in Argentina and Venezuela. Maturities of *local* bonds remain, however, considerable shorter with maturities of 6.5 years on average for a country like Mexico⁴⁸.

Liquidity is another crucial indicator to gauge the results of reforms in this area. For example, many Latin American countries have made considerable progress in the period 1997-2005. Secondary market trading in domestic bonds expanded but remained however far below activities in mature markets. According to the Emerging Markets Trade Association (EMTA), yearly trading by its members banks in the domestic markets of the seven largest economies of the region, barely reached 1.6 times the outstanding stock of securities in 2005, remaining far

48. Figures calculated by Merrill Lynch for mid-2006.

below the 22 times reached in the highly liquid US Treasury market. Two widely used measures of liquidity are bid-ask spreads and market-depth. Like maturity, also liquidity is influenced by demand and supply factors. On the demand side, liquidity is negatively affected by a narrow investor base (as measured by the concentration of bond holdings). There is empirical evidence that a concentration of bond holdings is associated with wider bid/offer spreads [Table1]. On the issuer side, liquidity is directly influenced by the *size* of individual issues as well as the *overall size* of the bond market. There is also evidence [Table 1] that positive liquidity premium exists only for individual issues and overall markets of sufficient size. Moreover, the overall size of the market has been associated with greater market depth (measured as higher trade volumes), while greater market depth correlates with tighter bid-offer spreads [Table 1]. The relationship between liquidity on the one hand, and issue size and overall market size on the other, are to some degree relative concepts. Table 1 provides minimal thresholds (based on information from mature markets) where individual issues and bond markets are considered as “liquid”.

Table 1: Supply and demand determinants of bond market liquidity

$$+\Delta \text{ Issue Size/Market Size} \rightarrow +\Delta \text{ Liquidity} \leftrightarrow -\Delta \text{ Bid-Ask Spreads (BAS)} \quad (4)$$

$$+\Delta \text{ Concentration Bond Holdings (CBH)} \rightarrow -\Delta \text{ Liquidity} \leftrightarrow + \Delta \text{ BAS} \quad (5)$$

$$+\Delta \text{ Market Size (MS)} \rightarrow +\Delta \text{ Market Depth/Trading Volume (TV)} \rightarrow -\Delta \text{ BAS} \quad (6)$$

$$\text{TV} = +0.81 \text{ MS} + 0.96 \quad (7)$$

$$\text{BAS} = -2.79 \text{ TV} + 8.84 \quad (8)$$

$$\text{BAS} = -0.98 \text{ IS} + 3.31 \quad (9)$$

$$\text{BAS} = +8.67 \text{ CBH} - 1.75 \quad (10)$$

Thresholds liquidity premiums:

▪ **Issue size (IS):**

- Corporate bonds \$1-1.5 billion (EUR 750 million-1 billion)
- AAA-government bonds \$2.5-3.7 billion (EUR 2-3 billion)

▪ **Market Size (MS):**

- \$100- 200 billion (EUR 80-160 billion)

Source: BIS; OECD Working Party on Debt Management, 2007.

It was noted above that public debt management and government securities market operations have a direct effect on the securities markets as a whole because governments play a key role in supporting the development of fixed-income securities markets. Governments are usually the largest supplier of this kind of instrument, while they are also the regulators of the market and its infrastructure such as clearing and settlement arrangements. Also transparency and adequate disclosure requirements are important elements of the financial infrastructure. Well-functioning government securities markets give public support to private fixed-income market (both cash and derivatives) in the form of a pricing benchmark, while they also provide a tool for interest rate risk management⁴⁹.

For these reasons, the development of a well-functioning government bond market will often precede, and very much facilitate, the development of a private-sector corporate bond market. The focus on a risk-based approach to debt management with the establishment of interest rate-, liquidity- and currency benchmarks, have helped to improved the transparency, predictability, and liquidity of fixed income debt markets more in general.

49. See Blommestein, 1999.

VI. CONCLUSIONS

Emerging bond markets are changing at a very rapid pace. We may be witnessing the closing of an era as symbolised by the fast disappearance of the Brady bonds, the securities issued after the 1980s debt defaults and that kick-started the emerging market bonds boom in the 1990s.

Following Brazil, also Argentina and Venezuela announced in 2006 plans to retire all their Brady bonds, closing an era that started more than two decades ago. Brady bonds were issued by governments, mostly Latin American ones, in order to facilitate a market-based exit from defaulted commercial bank loans, under an initiative named after the US Treasury secretary at that time, Nicholas Brady⁵⁰. This financial innovation enabled the transformation of huge amounts of illiquid bank claims into tradable bonds, opening the era of the emerging markets' boom of the 1990s. Once a dominant asset class, this instrument is now vanishing. It reached its peak in 1997, when the stock of dollar-denominated Brady bonds stood at a record high of \$156 billion (in total \$175 of Brady's were issued). During the 2000s, governments accelerated buy-back programmes. Mexico, the first country that issued Brady bonds in the 1990s, started to retire them in the 2000s. By 2003, this country became also the first to exit the Brady bonds era. Early 2007, the outstanding amount of Bradys is just over \$10 billion. The improvement in the creditworthiness of many emerging economies combined with improvement in market infrastructure and the excess of liquidity around the world searching for yield, facilitated this exit. As a result, governments were able to repay debt at lower rates.

Emerging markets have become more stable due to the implementation of long overdue structural changes. Ten years ago, emerging markets were registering current accounts deficits of 2 per cent on average, while they exhibited a 2 per cent surplus in 2005. Fiscal deficits that averaged more than 3 per cent of GDP ten years ago have been reduced to 1 per cent of GDP, even in countries with a history of considerable political cycles. The anchoring process of lower inflation has been even more impressive, averaging 15 per cent ten years ago and now standing below 4 per cent. This reduction is particularly impressive for Latin American countries that had experienced hyperinflation. Moreover, public debt management has become more sophisticated by adopting the best practices from OECD countries, including a market-based issuance process, a risk management approach to public debt, the use of benchmarks, and emphasising the importance of establishing liquid secondary government bond markets⁵¹.

50. IADB, 2006.

51. Many Latin American countries have benefited from discussions of these best practices during the past decade in the Annual OECD/World Bank/IMF Global Bond Market Forum, and the Annual OECD Global Forum on Public Debt Management. Mexico, a member of the OECD since 1994, also participates in meetings of the OECD Working Party on Debt management.

Ten years ago, emerging markets were registering current accounts deficits of 2 per cent on average, against a 2 per cent surplus in 2005. They have been shedding their long-standing reputation as investment destinations of last resort. Symbol of the entrance into a new era, bankers are inventing new labels for these economies, believing that more differentiation is needed for this asset class by proposing new acronyms like the famous BRICs⁵².

The flood of global liquidity has encouraged yield-hungry buyers to cast the net wider in the search for higher income producing assets. However, of greater structural importance is that an increasing number of new investors have moved into the asset class, thereby diversifying the pool of portfolio investors far beyond the Indiana Jones investors of the 1990s looking for high risky exotic returns. In addition to dedicated “emerging market” funds, there is now a wider range of foreign investors such as investment banks, pension and mutual funds, private equity arms, insurance companies, hedge funds and even retail investors. In addition, pension managers from emerging countries and even central bankers are increasingly buying local securities as well as securities from other emerging markets.

On the other hand, it is realistic to assume that not all emerging markets will be able to avoid future crisis. Risks have not disappeared. On the contrary, the possibility of sudden changes in interest rates in OECD countries, the growing use of credit derivatives contracts⁵³, and global carry trades⁵⁴, are among the many reasons to remain cautious. Although a more diversified investor base and the spread of derivatives may enhance stability in emerging markets, the dynamics of the emerging market asset class has also changed rapidly due to structural changes in the global financial landscape (see section II). New structural developments will inevitably bring new risks that may trigger new financial crises. Moreover, the recent episode of ample liquidity and global shortage of creditworthy hard real assets mask to an important degree the real improvement in creditworthiness of emerging markets, while mispricing of the true risk cannot be ruled out. The ‘real’ test will come when risk premia will rise again. For these reasons, we advocate in this paper the development of liquid local currency bond markets and the use of new risk-based debt management strategies in emerging markets. This approach requires both a macro-perspective and a need to pay attention to institutional micro-based strategies.

Both perspectives require building proper databases, including complete databases of bond holders⁵⁵. Unfortunately, many debt managers in emerging markets (but also some in more advanced markets) do not have reliable information on their investor base. The existence of these

52. Proposed and popularised since 2003 by Goldman Sachs.

53. Although credit derivatives such as credit default swaps can be used to shift credit risk away from lenders, they may distort global investment by moving monitoring incentives from banks to other financial market operators that have no close relationship with the borrower and who are less skilled in evaluating credit risk.

54. This is the practice of borrowing in low-yielding mature markets such as Japan and buying higher income producing assets in emerging markets.

55. These databases could also be used in the context of debt restructurings, thereby lowering the transaction costs of sovereign borrowers.

databases would also help in avoiding time that restructuring countries like Argentina need to spent (in the case of Argentina nearly one full year) in order to identify (even incompletely) their bondholders. (Argentina was even obliged to hire an investment bank for that purpose). Moreover, such databases are important as part of active debt management when debt managers need to communicate directly with their major bondholders, without the costly and slower intermediation of investment banks; for example, during periods of financial turbulence.

More generally, more attention should be paid to persistent problems of asymmetries of information. More research will be needed here as such micro-economic inquiries dedicated to emerging financial markets are still scarce. For example, in an attempt to address these asymmetries in bond markets, we have been conducting an empirical study that underlined how much the research by brokers on emerging markets is biased. We identified consistent asymmetries of information, with 90 per cent of the bond underwriters recommending (Nieto and Santiso, 2007), at the announcement date of the issue, to buy or to maintain in their portfolio the bonds issued by the countries where they are acting as lead managers. We showed also that investment banks' recommendations depend on the relative size of the secondary bond market. In fact, there is a phenomenon that it is called "too big to underweight" meaning that investment banks do not send negative signals to investors of countries that, given their size, are considered important for their overall business.

More detailed information disclosure by investments banks may therefore be desirable. In particular, they should release information that that would make it possible to show whether past recommendations are related to macroeconomic variables (e.g. economic activity or sovereign credit risk) and financial variables (e.g. bond indices performances) or, instead, whether they are linked to their underwriting business and secondary emerging market activities. A tremendous amount of resources has been dedicated by developing countries and international organisations in order to improve the data release by governments (Blommestein, 2006*b*). Similar efforts to limit asymmetries of information should be made by financial market participants, in particular via more detailed disclosure of underwriting activity in (emerging) bond markets (current disclosure in brokers' reports is limited to the number of sell or buy recommendations). Information could include amounts and timing. This would make emerging markets more transparent and reduce the distortions of asymmetric information.

ANNEX A: FINANCIAL MARKET DEVELOPMENT AND VOLATILITY

On the basis of the assumptions of the simple period model described in (2) and (3) on page 28 in the main text, the optimisation problem for the firm at $t=1$ can be written in the following simple way:

$$\begin{aligned} \text{MAX!} \quad & Y - RW \\ \text{subject to.} \quad & W \leq \lambda K \theta \end{aligned} \quad (\text{A1})$$

The gross market interest rate on borrowing and lending is R . The unconstrained optimum for the ratio of working capital to physical capital ($\omega = W / K$) is then given by:

$$\omega^* = [(R / \beta)^{\alpha / (1-\alpha)} - \beta]^{-1/\alpha} \quad (\text{A2})$$

When the constraint is binding, ω is given by:

$$\hat{\omega} = \text{MIN} [\omega^*, \lambda \theta] \quad (\text{A3})$$

As noted in the main text, volatility can be expressed via the variability of cash flows, with θ_H the cash flow in good times (with probability P) and θ_L the cash flow in bad times (with probability $1-P$); with $\theta_H > \theta_L$. The parameter β can be interpreted as the liquidity needs of the firm.

ANNEX B: MONETARY POLICY AND FINANCIAL CRISES

The financial crises of the late 1990s and early 2000s put the spotlight on the effectiveness of macro-economic policies to contain these crises. A consensus emerged that macro-economic policy makers need to take the *structure of the domestic financial sector* into account when setting and executing macro policies prior and during crisis episodes. Especially the role of indebtedness in explaining the effectiveness of monetary policy during crisis episodes was highlighted in academic work.

The 'traditional' view argues in favour of monetary tightening to limit currency depreciation and inflation. Higher interest rates will discourage capital outflows and thereby avoid a full-blown currency crisis. In contrast, the 'revisionist' view argues that monetary tightening (higher interest rates) will have an adverse impact on the balance sheets of firms and banks⁵⁶. The resulting wave of bankruptcies encourages additional capital outflows and depreciation of the exchange rate.

The following model was used by Eijffinger and Goderis (2005) to study the empirical impact of monetary policy on the exchange rate:

$$EX(i,t) = \alpha_0 + \alpha_1 M(i,t-1) + \alpha_2 F(i,t-k) + \alpha_3 M'(i,t-1) * F(i,t-k) + \varepsilon(i,t) \quad (\mathbf{B-1})$$

where $EX(.)$ is the empirical indicator capturing the change in exchange rate in period t for country i ; $M(.)$ is the indicator that stands for changes in the stance of monetary policy at $t-1$ in country i ; $F(.)$ is a matrix with fundamentals that can be expected to affect the exchange rate such as the size and maturity of debt, international reserves, etc.(with $k=0,1,\dots,m$); $M'(.) * F(.)$ an interaction term that captures the non-linear impact of monetary policy; and $\varepsilon(i,t)$ a stochastic error term.

The interaction term, $M'(.) * F(.)$, is used to analyse how the effect of monetary policy on the exchange rate, $\partial EX(i,t) / \partial M(i,t-1)$, changes for different levels of fundamentals:

$$\partial EX(i,t) / \partial M(i,t-1) = \alpha_1 + \alpha_3 * F(i,t-k) \quad (\mathbf{B-2})$$

56. See (Radelet and Sachs, 1998; Furman and Stiglitz, 1998).

Where α_1 a monetary policy coefficient and α_3 a vector of coefficients associated with the different fundamentals. Eijffinger and Goderis (2005) focused on debt levels, whereby they have estimated the marginal impact of monetary policy for different levels of corporate debt. They concluded that the impact of monetary policy depends on the ratio short-term corporate debt to assets. For relatively low corporate debt levels (i.e. for short-term debt to assets ratios between 0 and 11.7) the results support the traditional view (higher interest rates lead to an appreciation of the exchange rate), while for higher debt levels (i.e. for short-term debt to assets ratios higher than 11.7) the results provide support to the revisionist hypothesis that a tighter monetary policy results in a weakening of the exchange rate, thereby aggravating an ongoing financial crisis.

ANNEX C: OPTIMAL DEBT AND STRATEGIC BENCHMARK

The Risk Management Approach to Debt Sustainability

The optimal debt composition can be calculated by assessing the relative impact of the costs and risk of the different debt instruments on the debt ratio, B (debt-to-GDP). This means that the choice of debt instruments trades off the risk and expected costs of debt service⁵⁷. Reducing the variability in the primary surplus (or deficit) and the debt ratio (for any given expected cost of debt service) is desirable, because it reduces the probability of a fiscal crisis due to adverse shocks to the budget (that in turn might trigger a financial crisis).

The link between public debt management and the overall macroeconomic framework can be made explicit as follows. Let's assume that the *overall or wider* debt management objective⁵⁸ is to reduce the country's fiscal vulnerability by stabilising the debt ratio. We shall use the following debt management model⁵⁹ to illustrate the trade-offs between expected cost of debt service and the risk in choosing different debt instruments. In order to stabilise at time t the debt ratio, $B_{(t)}$, the *fiscal authority* decides to implement a fiscal reform programme, taking into account the realisation of debt returns, output, $Y_{(t)}$, inflation, $\Pi_{(t+1)}$, and the exchange rate, $e_{(t)}$. Success of a stabilisation programme is by definition uncertain. As a result, a debt-cum-financial crisis cannot be prevented with certainty. When a debt crisis arises, the debt ratio increases rapidly⁶⁰:

57. See, for example, Giavazzi and Missale (2004), *ibid*.

58. This overall or wider debt management objective should be seen as encompassing the following conventional (more narrow) debt management objectives: (a) undisturbed access to markets to finance the budget deficit at lowest possible borrowing cost, subject to (b) an acceptable level of risk. This follows from the need, noted before, that debt and risk management (including the specification of a strategic benchmark) need to be integrated into a broader policy reform framework. The successful implementation of this policy reform framework is important for achieving debt management objectives (a) and (b).

59. This model is based on Giavazzi and Missale (2004), *ibid*.

60. This expression can also be interpreted as including the notion that the debt ratio must exceed a critical threshold for a crisis to arise, by interpreting \tilde{A} as the sum of expected adjustment and the difference between $B_{(t)}$ and its threshold (cf. Giavazzi and Missale (2004), *ibid*).

$$\bar{B}_{(t+1)} - \tilde{A}_{(t+1)} + \varepsilon > B_{(t)} \quad (\text{C-1})$$

where $\bar{B}_{(t+1)}$ is the trend debt ratio⁶¹, $\tilde{A}_{(t+1)}$ is the expected fiscal adjustment; and ε is a shock to the budget (external shocks such as oil price hikes or internal shocks such as the discovery of “hidden” contingent liabilities⁶²).

Debt accumulation $\Delta\bar{B}_{(t+1)} = \bar{B}_{(t+1)} - B_{(t)}$ is driven by:

$$\Delta\bar{B}_{(t+1)} = I_{(t+1)}B_{(t)} + \Delta e_{(t+1)}b_2B_{(t)} - \bar{S}_{(t+1)} - [\Delta \ln Y_{(t+1)} + \Pi_{(t+1)}]B_{(t)} \quad (\text{C-2})$$

where $I_{(t+1)}B_{(t)}$ is total nominal interest payments on outstanding amount of debt; $e_{(t+1)}$ is the log of the nominal exchange rate; b_2 is the share of foreign currency-denominated debt; $\bar{S}_{(t+1)}$ is the trend primary surplus; $\ln Y$ is log output; and $\Pi_{(t+1)}$ the rate of inflation.

Total interest payments are equal to:

$$I_{(t+1)}B_{(t)} = i_{(t+1)}b_1B_{(t)} + [\tilde{R}_{(t)} + RP_{(t)}]B_{(t)} + \Delta e_{(t+1)}b_2B_{(t)} + [r_{(t)} + \Pi_{(t+1)}]b_3B_{(t)} + R_{(t)}[1 - b_1 - b_2 - b_3]B_{(t)} \quad (\text{C-3})$$

where b_1 is the share of debt indexed to the (average) domestic interest rate $i_{(t)}$; $\tilde{R}_{(t)}$ is the world (dollar) interest rate; $RP_{(t)}$ the risk premium; $r_{(t)}$ is the real interest rate; b_3 is the share of price-indexed debt; and $R_{(t)}$ is the nominal rate of return on nominal fixed-rate bonds.

The ratio of the trend surplus-to-GDP, $\bar{S}_{(t)}$, depends on cyclical conditions and unanticipated inflation:

-
61. This is the debt ratio that would materialise in the period t+1 in the absence of fiscal adjustments.
 62. The debt increases when implicit or explicit contingent liabilities are transformed into actual liabilities. For example, a recent World Bank Study of public debt dynamics shows that the realisation of (implicit and explicit) contingent liabilities contributes nearly 50 per cent to the increase in public debt in a sample of 21 emerging markets. [See Phillip Anderson (2004), Key challenges in the issuance and management of explicit contingent liabilities in emerging markets. Paper presented at the 14th OECD Global Forum on *Public Debt Management and Emerging Government Securities Markets*, held on 7-8 December 2004, in Budapest, Hungary.]

$$\bar{S}_{(t+1)} = E\bar{S}_{(t+1)} + \eta_1 (y - Ey) + \eta_2 (\Pi_{(t+1)} - E\Pi_{(t+1)}) \quad (\text{C-4})$$

where $E_{(t)}$ denotes expectation conditional on the available information at time t ; η_1 is the semi-elasticity of the government budget (relative to GDP or output); η_2 is the semi-elasticity with respect to the price level; and $y = \ln Y_{(t+1)}$. Hence, expression (C-4) captures the notion that $\bar{S}_{(t)}$ can be higher than expected because of output surprises and/or inflation surprises.

The optimal debt portfolio (that is, the choice of debt denomination and indexation) is based on the minimisation of the probability that the expected fiscal adjustment programme fails:

$$M \ln \{ E_{(t)} \text{Prob} [\varepsilon > \tilde{A}_{(t+1)} - \Delta \bar{B}_{(t+1)}] \} \quad (\text{C-5})$$

subject to (C-2), (C-3) and (C-4). Solving (C-5) with respect to b_1 , b_2 and b_3 yields the optimal debt structure. These first-order conditions show also the trade-off between the risk and expected cost of debt service related to the choice of debt instruments⁶³. As noted in section II, the optimal debt composition constitutes the basis for the specification of the strategic benchmark.

The risk management approach to debt sustainability goes therefore beyond the traditional debt sustainability literature that focuses simply on determining the primary deficit (surplus) and/or growth rate of GDP that would keep the debt level at a certain level. The traditional approach analyses in essence debt sustainability in the absence of risk. The risk management approach, in contrast, shows that risk is minimised if a debt instrument provides insurance against variations in the primary budget and the debt ratio due to uncertainty about output and inflation.

The next step would be to use a structural macro-economic model to investigate *how* the optimal debt portfolio depends on the type of shocks (demand, supply, spreads)⁶⁴. An alternative approach is to use a VAR methodology for modelling the links between macro variables⁶⁵.

63. See expressions (15)-(17) in Giavazzi and Missale (2004), *ibid*.

64. See Giavazzi and Missale (2004), *ibid*.

65. See Garcia and Rigobon (2004), *ibid*.

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