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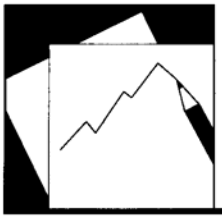

IMF Working Paper

Impact of Macroeconomic, Political, and Institutional Factors on the Structure of Government Debt in the Emerging Market Countries

Anastasia Guscina

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Impact of Macroeconomic, Political, and Institutional Factors on the Structure of Government Debt in the Emerging Market Countries

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Abstract

Debt crises that have shaken Latin America, Asia, and Russia have brought an increasing attention to the structure of debt in the emerging market countries. Using the newly released Jeanne-Guscina EM Government Debt Database (2006) this paper empirically explores the role of macroeconomic, political, and institutional factors in determining the structure of government debt. Results show that unstable macroeconomic environment, poor quality institutions, and uncertain political climate hinder the development of domestic debt market. Moreover, such instability shifts the debt structure away from long-term local currency fixed rate debt towards short-term debt or to debt indexed to foreign currency, short-term interest rates, or inflation. Original sin seems to be on the way out, as more and more countries are issuing local currency debt at longer maturities—which can be explained by successful macroeconomic stabilization policies and lessons learned from the debt crises.

JEL Classification Numbers: F34, F36, H63.

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I. INTRODUCTION

Debt crises that have shaken Latin America, Russia, and Asia in the last decade turned policymakers and economists' attention to the previously ignored topic of sovereign debt structure. Tequila crisis in Mexico, GKO[2] crisis in Russia—brought an increasing recognition that the structure of government debt has important implications both for frequency and severity of crises. "Poorly structured debt in terms of maturity, currency, or interest rate composition and large and unfunded contingent liabilities have been important factors in inducing or propagating economic crises in many countries throughout history" (Guidelines for Public Debt Management, 2003). Since some debt crisis involved government debt issued domestically, it became clear that exclusive preoccupation with external debt can no longer be justified.

While research has been done mostly on issues related to the level of external debt, lack of data on the structure of domestically issued government debt made any comprehensive analysis difficult. The structure of domestic debt is a lot more heterogeneous than the structure of international debt. While internationally issued government debt of emerging market countries is mostly denominated in foreign currency and has a medium or long-term original maturity, the structure of domestic sovereign debt differs a lot across countries and regions. While Asian economies tend to issue fixed rate debt with medium to long-term maturity in local currency, Latin American countries tend to issue debt securities that are either short-term or that are indexed to inflation or foreign currency—pursuing debt structures that are exposed to higher uncertainty. Central and Easter European (CEE) economies fall somewhere in between. In recent years there has been a shift toward local currency debt, even in those in EMs that had previously suffered from "original sin" problem. This was mainly the result of financial liberalization, adoption of floating exchange rate regimes, and sound macroeconomic policies.

There have been very few cross-country studies done on the evolution of domestic government debt in the emerging markets. Most prior research focused on the size and structure of external debt. Some papers focused on the size of government debt in the context of "debt intolerance" problem for the emerging market economies.[3] For example, Reinhart, Rogoff, and Savastano (2003) show that credit rating (or country risk) fall more rapidly as external debt rises in emerging markets than in advanced countries. Papers that have looked at the currency of denomination and maturity structure of government debt evaluated these factors in the context of financial crises. Some focused on the exchange rate shocks in the

[2] GKOs are short-term zero-coupon Russian Government Treasury Bills. The acronym became synonymous with the Russian financial crisis in 1998 when the government defaulted on its GKOs.

[3] "Debt intolerance" is defined as the inability of emerging markets to manage levels of debt that are manageable for advanced industrialized countries.

presence of foreign currency denominated liabilities, while others focused on liquidity or interest rate shocks when the maturity of liabilities is shorter than the maturity of assets.[4]

Studies that have looked at the maturity structure of government external debt tried to explain why there is excessive reliance on short-term debt in emerging markets which makes them vulnerable to sudden reversals of capital flows and liquidity crises. There are two common explanations given for such over reliance on short-term borrowing. The first explanation is that short-term borrowing can alleviate moral hazard problem and signal government commitment to the creditors. Calvo (1988), Blanchard and Missale (1994) all argue that government's incentive to inflate its way out of debt is higher when debt in nonindexed, in domestic currency, and of long-term maturity. Rodrik and Velasco (1999) and Jeanne (2000) also suggested that early debt repayments serve as a commitment device for the borrower. Broner, Lorenzoni, and Schmukler (2004) look at the investor side of international capital markets and argue that long-term bonds have a higher risk premium. They find that during crises, both risk and term premia increase, leading to shorter maturity structure of government debt.

Another body of literature focused on the currency composition of government debt. Since foreign currency debt can be cheaper than domestic currency debt, it can be an attractive option for some governments, especially in the emerging market countries. However, it also exposes governments to exchange rate risk. Levy-Yeyati (2006) discusses the problem of high domestic financial dollarization and the resulting exposure to dollar liquidity runs. Some authors have looked at the currency composition of government debt in the context of the "original sin" problem. Eichengreen and Hausmann (1999), and Eichengreen, Hausmann, and Panizza (2003) look at the reasons why emerging markets are unable to borrow internationally in their own currency (international aspect) or borrow long-term domestically (domestic aspect). They argue that the very structure of global financial markets makes it impossible for emerging market countries to borrow abroad in their own currencies.

A comprehensive study of the structure of domestic government debt has been undertaken by Missale (1999). He analyzed debt structures in OECD countries, in the context of optimal debt management. Cowan, Levy-Yeyati, Panizza, and Sturzenegger (2006) discuss the evolution of sovereign debt in the Americas, especially dealing with changes in dollarization. Another important study undertaken by Claessens, Klingebiel, and Schmukler (2004) explored the role of institutional and macroeconomic factors in explaining the currency composition of government bonds. They found that economic size and deeper financial systems (bank deposits and stock market capitalization) have larger domestic currency bond markets, and issue more debt in local currency. More foreign currency debt was associated with more foreign claims and less flexible exchange rate regimes. Their paper was limited to the question of domestic versus international bond issuance, and the currency composition of bonds.

[4] Krugman (1999), Razin and Sadka (1999), Aghion, Bacchetta, Banerjee (2000), and Jeanne (2002).

Abbas and Christensen (2007) paper explores the role of domestic debt markets in economic growth. They construct a database covering 93 low-income countries over 1975—2004 period to estimate the growth impact of domestic debt. They find that moderate levels of domestic debt have a positive overall impact on economic growth through a variety of channels: improved monetary policy, strengthened institutions, enhanced private savings, and financial intermediation. They also find that the relationship is not linear, and that when in countries with more developed financial systems, domestic debt can actually lead to crowding out and financial disintermediation. They explore a very interesting question of causality between development of domestic debt market and growth, savings, and financial development.

Using the new Jeanne-Guscina EM Debt Database 2006, this paper explores the evolution of sovereign debt structure in the emerging market countries and seeks to answer some important questions on the determinants of sovereign debt structures. Although it acknowledges the endogeneity of domestic debt, it does not explicitly address how debt structures affect macroeconomic, political, and institutional variables. Nevertheless, it seeks to answer some very important questions. Why do some governments rely more on domestically issued debt, while others issue borrow externally? What determines the maturity structure of government debt? Why are there such big differences in reliance on foreign-currency debt between regions and countries? How do macroeconomic conditions, institutional factors, and political environment influence the structure of sovereign debt? Why in response to macroeconomic instability, some countries simply shorten the maturity structure of their debt, while others would issue instruments indexed to inflation, and yet others would chose foreign currency indexation or variable interest rate debt?

The paper's hypothesis is that unstable economic environment characterized by hyperinflation, high volatility of output, lack of confidence in the institutions, and policies make it difficult to develop or sustain domestic debt market. Moreover, even if macroeconomic instability and lack of confidence in the institutions and policies do not completely destroy domestic debt market, they would effectively make it impossible to issue local currency long-term non-indexed debt instruments, referred to as DLTF (domestic currency long-term fixed rate debt).[5] As macroeconomic situation stabilizes and the government is able to achieve monetary credibility, the share of domestic debt in total debt should increase. There will be more inertia in the reemergence of DLTF debt, and it will be preceded by inflation-indexed debt or by nominal debt with short maturities. Healthy macroeconomic environment, political stability, and faith in the institutions would not only propagate the development of domestic debt market, they would result in the increased share of tradable securitized debt in both domestic and international debt. While this paper is empirical in nature, it tests priors that have been suggested by earlier theoretical and empirical research.

[5] Jeanne and Guscina (2006) explore the relationship between inflation and DLTF debt in some detail.

The paper is organized as follows. Section II discusses Jeanne-Guscina EM Database 2006 and other sources of macroeconomic and institutional variables. Section III presents some stylized facts about the evolution of domestic debt size and structure in the emerging market countries. Section IV discusses the empirical methodology and presents estimation results for various debt shares. Section V concludes and identifies further possibilities for research.

II. DATA

A. Jeanne-Guscina EM Debt Database 20066

While there has been increasing interest in the structure of government debt since the Tequila crisis, the paucity of data on the structure of central government debt in emerging markets made meaningful research quite difficult. The new Jeanne-Guscina EM Debt Database 2006 provides annual data on the structure of central government debt in 19 emerging markets observed over a period of 25 years, allowing for the analysis of the sovereign debt markets development, cross-country and cross-region comparisons, and changes in debt structure prior to and after debt crises.

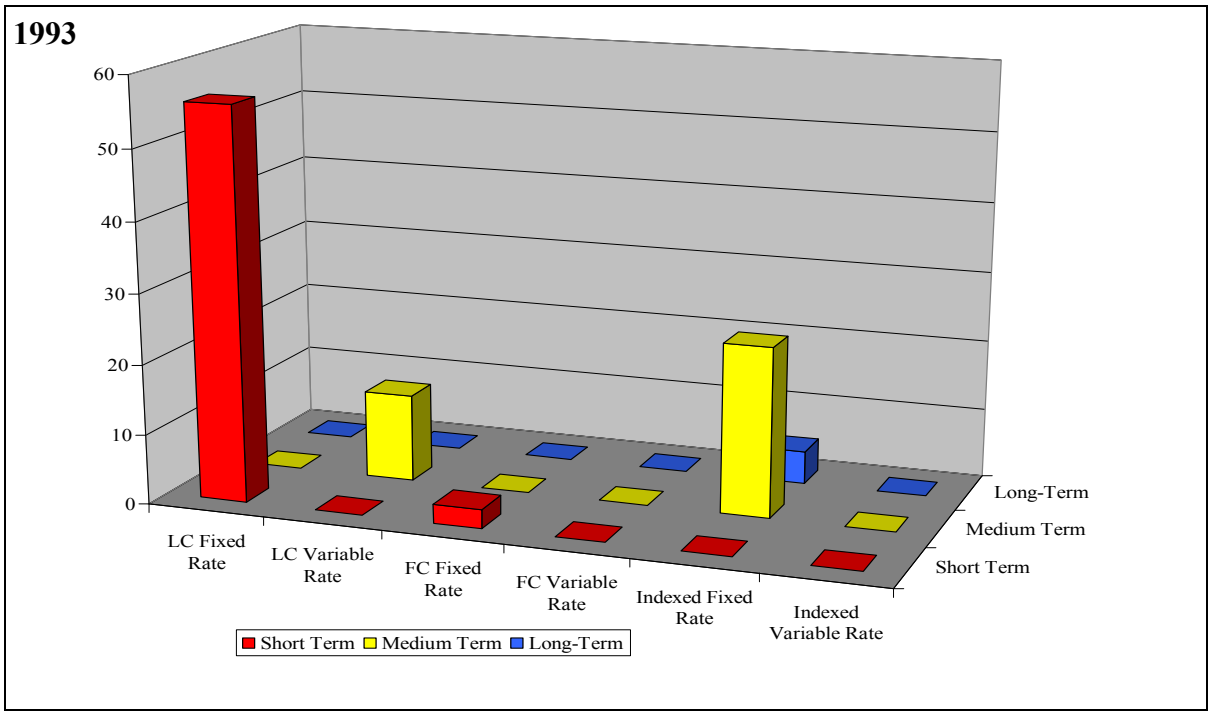
The breakdown that comes first in the decomposition between domestic debt and international debt, where these concepts are defined in terms of jurisdiction of issuance: domestic debt is debt issued domestically, while international debt is issued under a foreign jurisdiction. This is different from the concepts of domestic and foreign debt as defined in IFS-GDF, where the criterion is the residency of the debt holder.

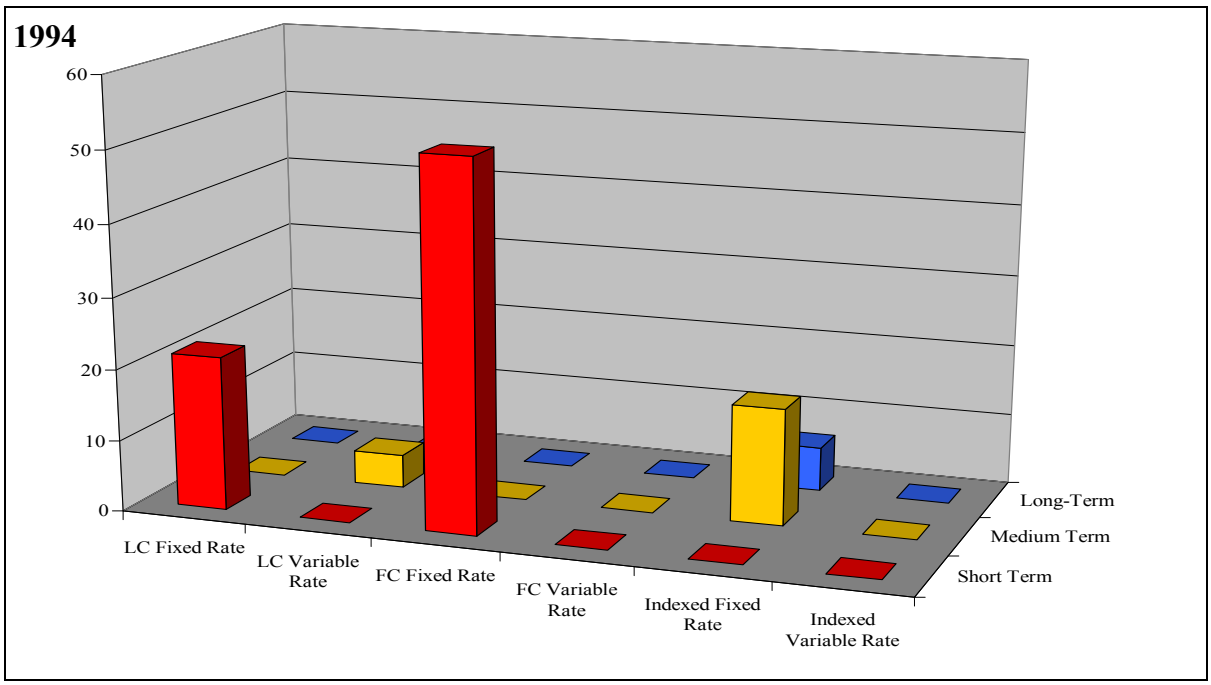
The dataset tracks the development of domestic debt market by maturity (short-term, medium-term, and long-term), currency of denomination/indexation (domestic currency, foreign currency, or indexed to the CPI) and interest rate structure (fixed of floating). The domestic debt template is presented in Appendix I . For a detailed explanation of the dataset see Jeanne and Guscina (2006).

Figure 1 provides a visual representation of the Jeanne-Guscina EM Debt Database (2006) for Mexico around the Tesobono crisis.

[6] For a detailed discussion of the dataset along with results of some empirical exercises, see Jeanne and Guscina (2006).

Figure 1. Mexico's Debt Structure around the Tequila Crisis





Source: Jeanne-Guscina EM Debt Database (2006).

B. Other Sources of Data

While the Jeanne-Guscina EM Debt Database 2006 is the main source of government debt data, other datasets are used for political, institutional, and macroeconomic variables. Institutional quality such as quality of bureaucracy, political risk, government stability, and inflation risk indices come from the International Country Risk Guide (ICRG). Other macroeconomic variables come from World Development Indicators Database published by the World Bank. International Financial Statistics (IFS) Database is another source of macroeconomic data. Appendix IV lists definitions and data sources for all variables used in the empirical analysis.

C. Dependent Variables

The empirical analysis in the paper looks at debt shares chosen in a way as to make the residual share a well-defined and understood concept. The paper focuses on the following debt shares/ratios:

- Domestic debt to GDP Ratio *(DDebt_GDP)*
- International debt to GDP Ratio *(EDebt_GDP)*
- Share of domestic debt in total debt *(S_D)*
- Share of traded debt in domestic debt *(S_{TD})*
- Share of DLTF debt in domestic debt *(S_{DLTF})*
- Share of short-term debt in domestic debt *(S_{ST})*
- Share of foreign-currency denominated debt in domestic debt *(S_{FX})*
- Share of CPI-indexed debt in domestic debt (S_{CPI})
- Share of floating rate debt in domestic debt *(S_{FLOAT})*

D. Explanatory Variables

Financial Development and Openness Variables

Financial development should be positively correlated with the development of domestic debt market. Jeanne and Guscina (2006) analyzed the relationship between domestic debt share and level of country's financial development by focusing at the correlation between time averages of these variables. I extend the analysis by exploring the time dimension as well by using panel regressions and by looking at the following proxies for country's level of financial development.

1. M2 to GDP ratio *(M2_GDP)*
2. Stock market total value traded to GDP ratio *(StkMktVal)*
3. Private credit to banks and other financial entities to GDP ratio *(PrCrBOF)*
4. Private savings rate to GDP ratio *(PrSavRate_GDP)*
5. Trade to GDP ratio *(Trade_GDP)*

Development of the banking system should go hand in hand with the development of the domestic debt market especially in EM.[7] Likewise, higher savings rate provides borrowers with the needed funds, and should be positively correlated with domestic debt share in total government debt. Private capital inflows, foreign direct investment, and trade to GDP ratio measure the openness of a country.

Macroeconomic Environment—Monetary Policy Credibility

Domestic debt share should also be positively related to measures of monetary policy credibility. When monetary policy credibility is low, interest rates on domestic debt (especially domestic currency debt) will be very high, so when faced with the choice of either borrowing externally or borrowing domestically, countries would borrow more abroad. Countries with high levels of inflation and high-inflation volatility are less able to develop their domestic debt market, and would rely to a larger extent on foreign borrowing. Monetary credibility proxies include the following:

1. Log of CPI-based inflation *(log_Inflation_CPI)*—to smooth out hyperinflation spikes.
2. Real exchange rate volatility (std. deviation) over the last 5 years *(reratevolatility_5y)*.
3. Exchange rate stability index *(ErateStability)*.

Institutional Quality and Political Stability Variables

One expects that countries with more stable government, good quality of bureaucracy, and enforceable laws are better able to develop domestic debt market and tap it for budget financing. I looked at the following institutional variables taken from ICRG database:

1. Quality of Bureaucracy *(QBureaucracy)*
2. Political Risk Rating *(PoliticalStability)*

Interest Rates

Interest rates might explain a lot about government's decisions to issue certain forms of debt. For example high-term premium on long-term debt might shift maturity profile to short-term debt. Term premium is equal to the difference between interest rates on long-term and short-term local currency bonds *(LT-ST_irate_gap)*.

Table 1 summarizes the priors about the relationship between explanatory variables and each of the debt shares is question.

[7] In more developed markets, the growth of securities markets could crowd out banks (that is, financial disintermediation).

Table 1. Priors on Determinants of Various Debt Shares

	π	σ_{RER}	M2_GDP	PrSavRate	StkMktCap	StkMktVal	PrCrBOF	trade_gdp	PoliticalStability	Qbureaucracy
S_D	-	?	+	+	+	+	+	?	+	+
S_{TD}	-	-	?	+	+	+	+	+	+	+
S_{TE}	-	-	+	+	+	+	+	+	+	+
S_{DLTF}	-	?	+	+	+	+	+	-	+	+
S_{ST}	+	+	-	-	-	-	-	?	-	-
S_{FX}	+	+	-	-	-	-	-	+	-	-
S_{CPI}	+	?	?	?	?	?	?	?	?	?
S_{FLOAT}	?	?	?	?	?	?	?	?	?	?

π represents inflation and inflation stability and σ_{RER} represents volatility of the real exchange rate. Since macroeconomic volatility might prevent the development of domestic debt market, its securitization,[8] and borrowing long-term in local currency, inflation and exchange rate volatility will be negatively correlated with S_D, S_{TD}, S_{TE}, and S_{DLTF}, and positively correlated with S_{ST}, S_{FX}, and S_{CPI}. However, from the investor's perspective, if exchange rate is volatile, they might shun away from foreign-currency denominated debt, and so S_D and S_{DLTF} might actually rise. Which effect outweighs (supply or demand) will determine whether the total effect is positive or negative.

Financial development should be positively correlated with the development of domestic debt market, its tradability, and the share of DLTF debt in domestic debt. It should also be positively correlated with the share of bonds in externally issued debt. Broad money to GDP ratio, value of stocks traded to GDP ratio, and private credit to GDP are proxies for financial depth. Both M2 to GDP and stock market capitalization to GDP ratios are included in the regression because they operate through somewhat different channels.

Trade to GDP ratio is a proxy for the level of openness of the economy. The effect of country's openness on the debt shares in question is ambiguous. To the extent that openness leads to financial development it should have a positive effect on S_D, S_{TD}, S_{TE}, and S_{DLTF}. But it is also possible that countries with more outward orientation issue more debt externally and in foreign currency. Political risk rating and bureaucratic quality increase as institutions improve and the political environment becomes more stable. Therefore, they should be positively correlated with the development of domestic debt market, increase in its tradability and country's ability to use long-term nominal debt. The effect of financial development on the share of floating and CPI-indexed debt is not straightforward.

[8] Securitization in this context refers to the "tradability" of debt.

III. STYLIZED FACTS ABOUT DOMESTIC GOVERNMENT DEBT

A. Importance of Domestic Debt in EM Countries

A well developed domestic debt market offers a government a stable source of financing its expenditures. While foreign borrowing increases the supply of foreign exchange needed to meet import requirements, it can be quite volatile. Since most of external debt is denominated in foreign currency, it exposes a country to currency risk, which in bad times can increase foreign indebtedness even further. The development of domestic debt market has also significant spillovers to the private sector. Government securities establish benchmark yield curves that private debt issuers can use. Also, while the structure of its international debt is determined mostly by the international centers policies, the government is more in control of the maturity and currency composition of its domestic debt. By pursuing sound macroeconomic policies, EM governments would be better able to issue safe debt instruments. With proper management, a well-developed domestic debt market can reduce government exposure to interest rate, rollover, and currency risks.

As noted in Jeanne and Guscina (2006), while debt to GDP ratio doesn't vary much among Latin America, Asia, and the advanced economies, their reliance on domestic debt varies significantly. While there is significant regional variability on the reliance on domestic debt, one fact is undisputed—domestic debt is a significant and growing portion of countries' total level of indebtedness that cannot be ignored. Studies that focus exclusively on internationally issued debt are thus missing an important part of the picture. More importantly, domestic debt and international debt respond quite differently to the macroeconomic and political environments.

Most EM economies have experienced an increase in the share of domestically issued debt. This was partly the result of liberalization measures intended to ease or remove barriers to investment in locally issued debt instruments by foreign investors. India, for example, has allowed foreign residents to invest in domestic fixed income markets in 1997. As more and more countries adopted floating exchange rate regimes, borrowing in foreign currency (either domestically or abroad) was no longer needed for signaling government's commitment to maintaining foreign-exchange peg. As countries abandon fixed exchange regime, they have more incentive to borrow in local currency. But for the most part increasing reliance on domestic debt market has been a result of sound macroeconomic policies. EM countries success in controlling inflation and movement towards floating exchange rate regimes has given domestic and foreign investors the confidence to buy domestically issued debt instruments.

B. Increase in Tradability of Domestic and International Government Debt

As pointed out by Kaminsky and Schmukler (2001) and more recently by Jeanne and Guscina (2006) there has been an observable trend of financial liberalization in the emerging market countries. Many EM countries have increasingly turned toward market-based financing of budget deficits, resulting in growth of sovereign bond markets.[9] Not only is this phenomenon occurring in the external debt markets, but also in the domestic debt market. This process has its pros and cons. On the one hand, it makes international capital markets more efficient and diversified. Also, it makes government less reliant on the central bank for financing budget deficit, thus reducing the need for potentially damaging monetary financing of deficits. A broader investor base helps spread out risks. A well-developed domestic bond market can strengthen the transmission and implementation of monetary policy. Development of government bond market has positive spillover effects on the development of corporate debt market by providing a pricing benchmark for other securities.

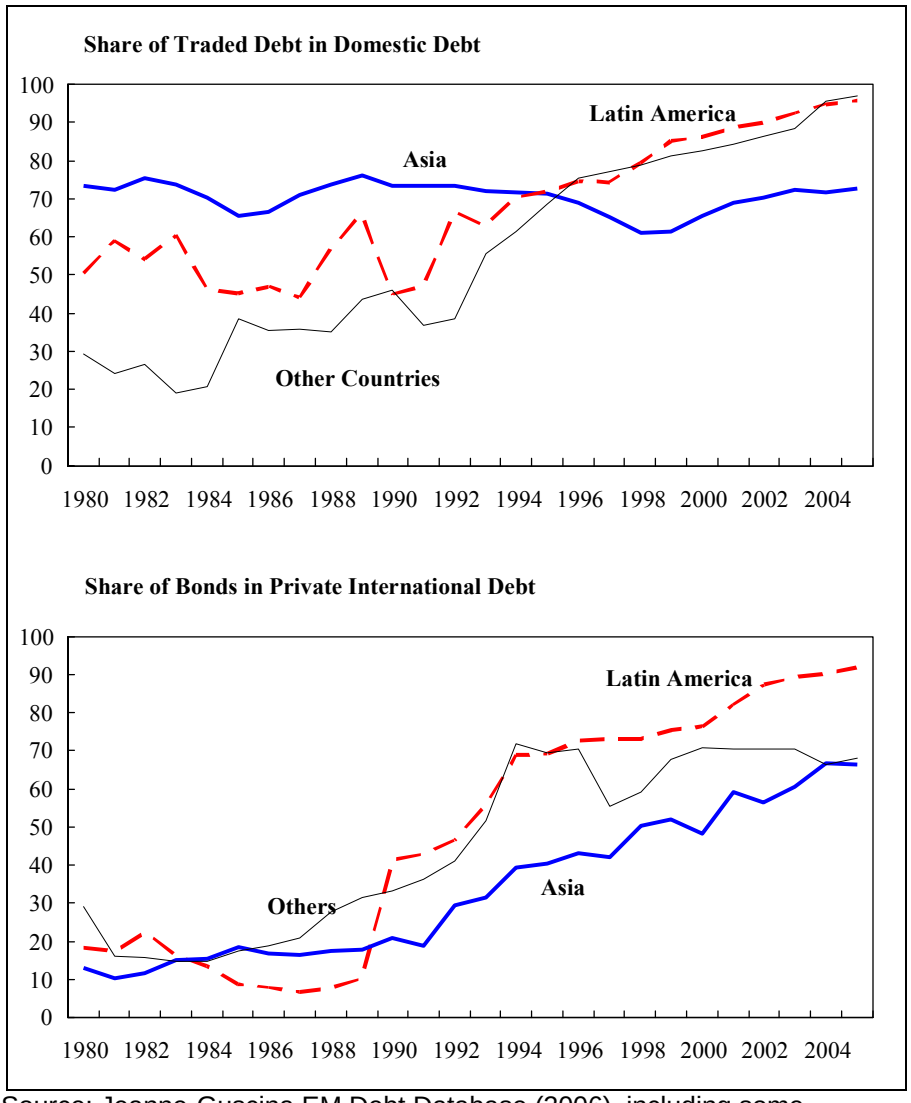
Bond financing may also help avoid concentrating intermediation directly on the banks. "With banks being highly leveraged, such concentration may make the economy more susceptible to crises. The damage caused to the real economy by such crises is generally much higher, and the necessary restructuring more protracted, in the absence of a well-functioning bond market" (*Bond Market Development in East Asia,* December 2003). Although initially bond financing of deficits may imply higher costs of issuance and less control over financial institutions, it is needed for the development of the market and for maintaining monetary policy independence. When domestic bond market is underdeveloped, it may be cheaper to borrow from domestic financial intermediaries or from abroad. The Asian crisis of 1997–98 illustrated the danger associated with excessive reliance on foreign and domestic bank financing.

Government's ability to issue tradable debt depends on stability of macroeconomic environment and government credibility. Low level of inflation, openness, transparency, and fairness in government funding operation, as well as strong legal system that assures that creditors are paid what they were promised—creates an environment conducive to development of domestic and international bond market. Likewise, countries with better developed financial system, would find it easier to issue debt securities, while countries, without the necessary preliminary infrastructure might have to take on loans. Figure 2 shows the share of traded debt in domestically issued government debt and the share of international Bonds in private international debt. Tradability of domestic debt has increased in Latin America and transition economies especially in the mid 1990s. Asia has had a drop in tradability of government domestic debt around the Asian crisis in 1998, but has gradually

[9] The nontraded debt in Jeanne-Guscina EM Debt Database 2006 includes not only loans but also debt securities that are placed with captive investors. In some countries, government pension funds are required to hold government securities. In some instances banks are required to hold government debt securities as a certain percentage of their deposits.

increased since then. Increase in the share of bonds in private international debt has been even more pronounced, starting in the late 1980s. There is also a positive correlation between financial liberalization in the domestic market and a shift from bank loans to bonds on the international debt markets. International bond market has preceded the development of domestic bond market by about 7–10 years.

Figure 2. Share of Traded Debt in Domestic and International Government Debt in Latin America, Asia, and Other countries



Source: Jeanne-Guscina EM Debt Database (2006), including some unpublished data.

Coverage: Latin America includes Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela. Asia includes China, India, Indonesia, Korea, Malaysia, the Philippines, and Thailand. Other countries include Czech Republic, Hungary, Poland, Israel, Russia, and Turkey.

C. The Domestic Original Sin Is On the Way Out

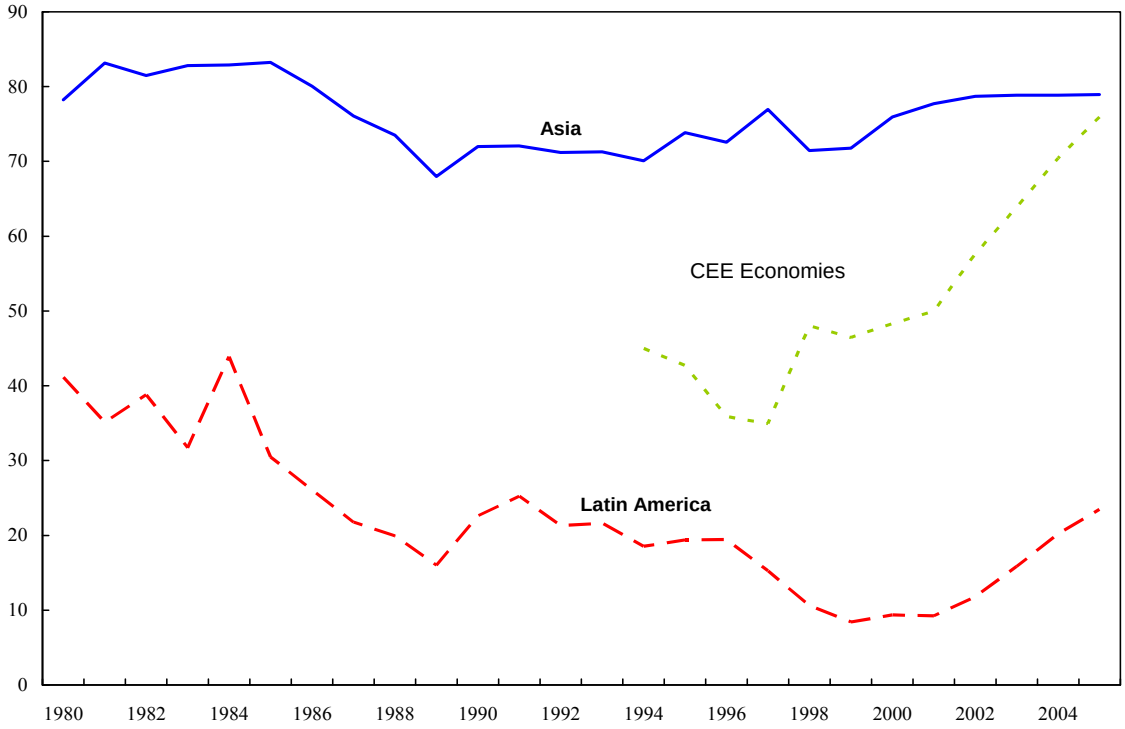
Eichengreen and Hausmann (1999), and Eichengreen, Hausmann, and Panizza (2003) explored the reasons why emerging markets are unable to borrow internationally in their own currency (international aspect) or borrow long-term in local currency domestically (domestic aspect). While EM economies have a long way to go to overcome "international original sin," many of them are increasingly able to borrow in local currency domestically. Thus "domestic original sin" seems to be on the way out, as countries issue more and more long-term local currency fixed rate debt (DLTF).

DLTF debt is the safest form of debt from the standpoint of the debtor, since it is the creditor who would bear the cost of currency depreciation or inflation. Since the real value of such debt is reduced with the higher inflation, it acts as a hedging instrument against certain types of shock. An argument against the nominal debt is related to government's incentive to inflate the economy in order to monetize this form of debt (Calvo, 1988). In order for creditors to accept this kind of debt they have to view government policies as credible, and believe that the economy is based on strong fundamentals.

Country's ability to issue DLTF debt primarily depends on its macroeconomic stability. Inflationary expectations based on past inflation rate and its volatility might make it quite difficult to extend the yield curve beyond very short maturities, or would lead to a shift in a debt structure towards inflation-indexed or foreign currency indexed debt, and a corresponding decline in the DLTF debt share. Countries with more stable political and economic environment, well-developed financial system, are more likely to issue DLTF debt.

Figure 3 shows the evolution of DLTF debt in Asia, Latin America, and CEE economies. One can immediately see that domestic original sin has not been a problem for the Asian economies. Latin American region suffered more from domestic original sin historically, but there is a positive trend in recent years. CEE economies started out with relatively low share of DLTF debt in domestic central government debt, but have been able to build it up over the years.

Figure 3. Evolution of DLTF Debt Share in Central Government Domestic Debt in Asia, Latin America, and CEE Economies



Source: Jeanne-Guscina EM Debt Database (2006).

Coverage: Latin America includes Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela. Asia includes China, India, Indonesia, Korea, Malaysia, the Philippines, and Thailand. CEE Economies include the Czech Republic, Hungary, Poland, and Russia.

D. Lengthening of the Maturity Structure of Government Debt

The maturity structure of government debt has serious implications for the costs and risks associated with it. Greater reliance on short-term debt reduces costs but raises rollover risks. Although short-term debt can reduce the financial cost of debt because investors do not require high term/liquidity premia, it is associated with vulnerability to sudden changes in market sentiment. Also, worsening perceptions of the country's creditworthiness can quickly feed into higher interest costs, and perpetuate vicious circles (Borenzstein et al, 2003). Issuance of short-term debt in an unstable macroeconomic environment increases the credit risk exposure of long-term debt holders, since short-term debt holders will be paid before them. It hurts the development of domestic debt market in the long-run. However, it also can be used to reduce the credibility risk and to signal an anti-inflationary compromise by a reduction in the monetization of government deficits (Blanchard and Missale, 1990).

Maturity composition of government domestic debt depends on monetary stability. Inflation level and inflation volatility might make it very difficult for countries to extend the yield

curve beyond short maturities. Political and institutional risk, as proxied by political risk and quality of bureaucracy indices—should be associated with the higher share of short-term debt in total debt. Political instability increases the expected costs of servicing debt and thus reduces the average maturity of the debt. Countries with higher level of financial development and better fiscal position are better able to extend the maturity profile of their debt. Finally, in countries with a very high differential between short-term and long-term interest rates, we should expect more reliance on short-term debt. Although the short-term debt is riskier, the government is more tempted to issue it, if it promises significant cost-savings today.

Overall one can say that there has been a trend towards extending the maturity structure of sovereign debt in many emerging market countries. This could partly be explained by the lessons learned from debt crises of the last decade. There has been a lot more fluctuations in the maturity profile of domestic debt in Latin America as compared to Asia. Former Soviet block countries have issued lots of short-term debt in the beginning of their transition to market-based economies. But the share of short-term debt in total domestic debt has experienced a rapid decline. Now there is no significant regional variation in the share of short term debt.

Figure 4 shows a decline in the share of short-term debt in domestic government debt especially in CEE economies. Not all shifts in the maturity structure of government debt have been market based. In some cases these were corrections following defaults.

Figure 5 shows the share of short-term debt in domestic debt in the Russian Federation. The drop between the end of 1997 and the end of 1998 was due to August 1998 default on Russian treasury bills GKOs.

Figure 4. Share of ST Debt in Domestic Debt in Latin America, Asia, and CEE Economies

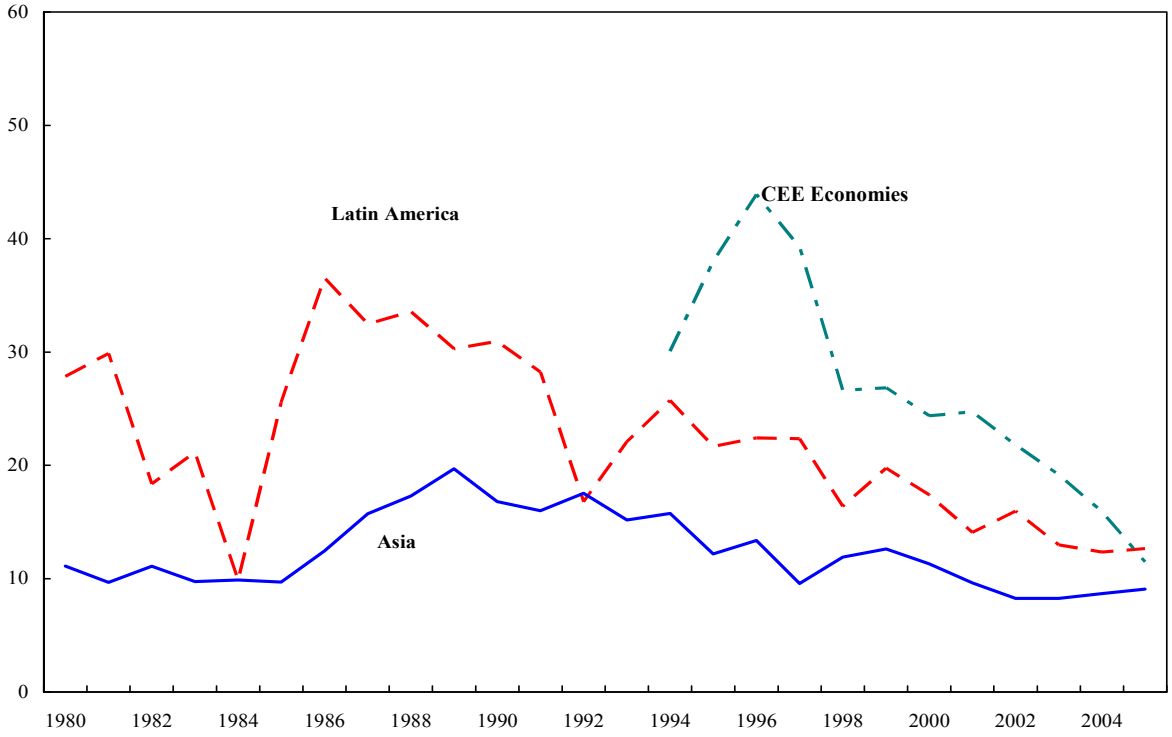
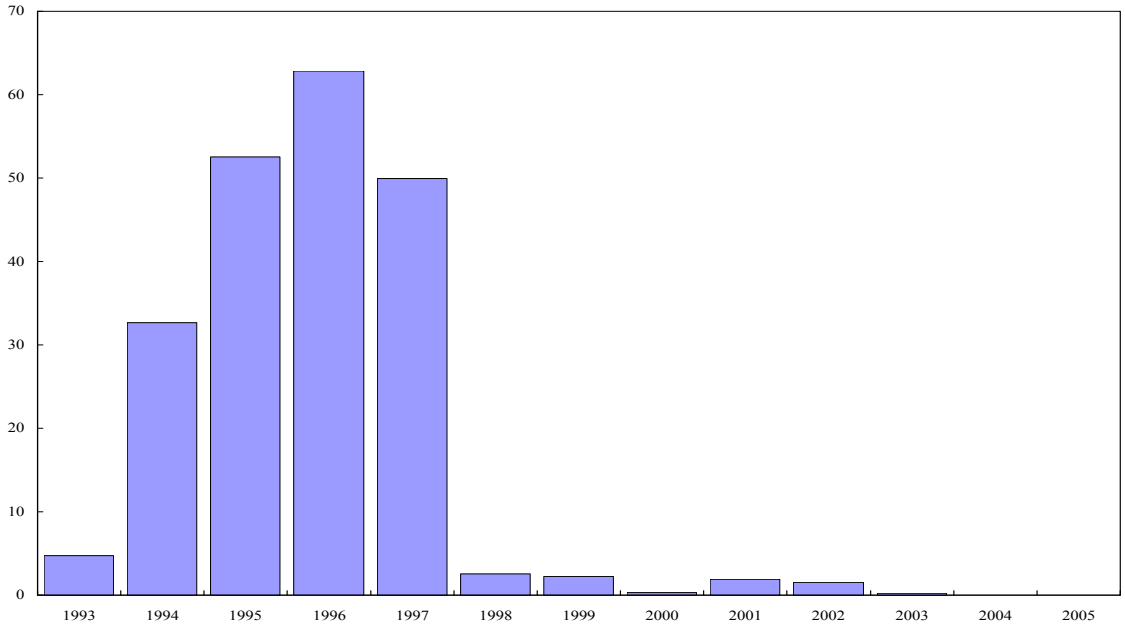


Figure 5. Short-Term Domestic Debt Share in Russia



Source: Jeanne-Guscina EM Debt Database 2006.

E. Dedollarization Trend in the Currency Composition of Domestic Debt

Currency of denomination of government debt received some attention in Claessens, Klingebiel, and Schmukler (2004). They focus only on the currency of denomination of debt, without any regard to the place of issuance. In this paper, I only look specifically at the currency of denomination of domestically issued debt.

While debt denominated in foreign currency doesn't suffer from the time inconsistency problem of DLTF debt, there are many advantages to having most of the debt issued in local currency. "Local currency debt markets promote more efficient financial markets by generating a range of market yields that reflect the opportunity cost of funds at each maturity in the local currency, an essential element for efficient investment and financing decisions" (*Bond Market Development in East Asia* December 2003). Inflation dilutes the real value of government obligations during realization of bad shocks, and is quite attractive from the borrower's perspective.

Despite all the benefits inherent in DLTF debt, many emerging market countries are unable to issue it, either locally or abroad. While international aspect of the "original sin" has more to do with the policies established in the world financial centers, the domestic aspect of the original sin has a lot to do with faulty policies and macroeconomic instability in the debtor countries. As pointed out by Bohn (1990), foreign currency debt can seem like a good alternative when domestic inflation is uncertain, a country is highly exposed to economic world cycles (its GDP highly correlated to the global economy), and internal monetary market is more volatile than the foreign monetary market.

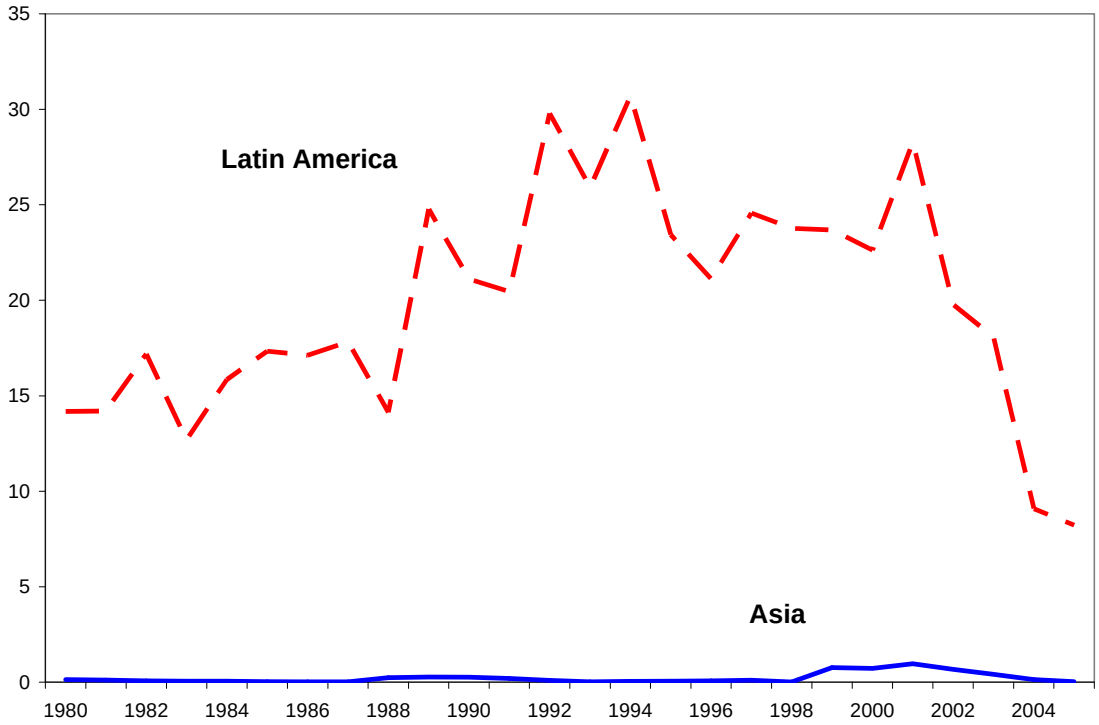
Over reliance on foreign currency denominated or foreign currency-indexed debt is very risky. While foreign currency debt may appear, ex ante, to be less expensive than domestic currency debt of the same maturity (given that the latter may include higher currency risk and liquidity premia), it could prove to be costly in volatile capital markets or if the exchange rate depreciates. Foreign currency debt may appear to be cheaper in a fixed exchange rate regime because the regime caps exchange rate volatility. However, such debt can prove to be very risky if the exchange rate regime becomes untenable as the 1997–98 Asian financial crisis has demonstrated. Foreign currency debt taken by the banking industry became a serious problem when Asian countries were unable to keep their exchange rate fixed due to speculative attacks.

It is important to note that while macroeconomic fundamentals, political stability, and quality of institutions play an important role in determining currency composition of sovereign domestic debt, causality goes both ways. A higher share of foreign currency debt, might lead to a debt crisis, and thus weaken macroeconomic fundamentals and political stability.

Significant cross-country and regional differences exist when it comes to countries' reliance on foreign currency denominated or indexed debt. Figure 6 shows the share of foreign currency denominated or indexed debt in Latin America and Asia. While central

governments in the Asian region rely almost exclusively on local currency debt for financing their deficits, Latin American countries have a much bigger share of foreign currency debt.

Figure 6. Share of Foreign Currency Denominated/Indexed Debt in Domestic Debt in Latin America and Asia



Source: Jeanne-Guscina EM Debt Database (2006).

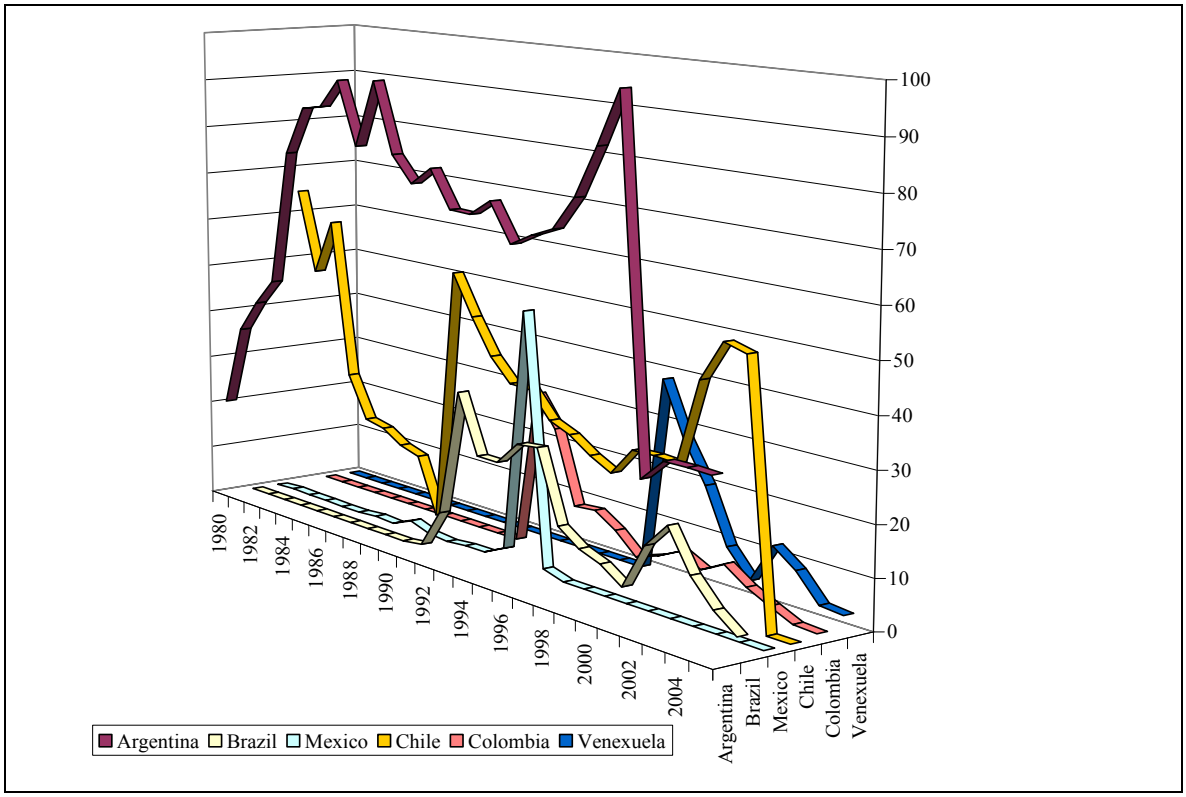
Coverage: Latin America includes Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela. Asia includes China, India, Indonesia, Korea, Malaysia, the Philippines, and Thailand.

Even within the Latin American region, significant country differences exist. Figure 7 shows the evolution of foreign-currency denominated or indexed debt in Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela. Argentina had a historically high level of dollarization of its sovereign domestic debt. There is a great deal of fluctuations with a significant drop in 2002 due to debt pesification plan—a process during which foreign-currency denominated debt has been converted to peso-denominated (mostly long-term) inflation-indexed debt. A sharp increase in the share of foreign currency denominated debt followed by an immediate drop a year later in Mexico corresponds to Tesobono crisis in 1994.

Dedollarization of domestic debt has occurred in all Latin American countries in our sample over the last few years. This has happened partly as a result of a more stable macroeconomic

environment (inflation has stabilized in the entire region), as well as conscious policy choice to limit exchange rate risk in government borrowings.

Figure 7. Share of Foreign Currency Denominated/Indexed Debt in Central Government Domestic Debt in Latin American countries



Source: Jeanne-Guscina EM Debt Database (2006).

Coverage: Argentina, Brazil, Chile, China, Colombia, Mexico, and Venezuela.

The graph suggests that in countries with a history of hyperinflation, economic and political instability, there is more foreign currency indexed domestic debt than in relatively more stable economies. Relatively few investors are willing to invest in currencies that do not have a long track-record of stability. As previous researcher have found out, high-inflation episodes erode the share of debt made of long-term local-currency instruments. Moreover, even after successful disinflation and fiscal adjustment programs, foreign-currency and indexed debt continues to be the dominant form of domestic debt—reflecting the fact that it often takes a long time for countries to gain anti-inflationary credibility (Jeanne, 2003).

The share of foreign currency denominated debt should depend on monetary policy credibility, exchange rate stability, the gap between interest rates on local and foreign currency denominated debt, and level of political stability. Monetary policy credibility is

necessary for the development not only of domestic market, but of local currency domestic debt instruments especially. As Jeanne (2003) suggested that on "the empirical grounds, lack of monetary credibility seems more convincing as an explanation for the currency composition of domestic debt than it is for international debt. International debt currency composition has more to do with financial practices in the center of the international financial system than with monetary policy in its periphery (4)."

Some have argued that foreign currency debt structures is a symptom of countries' inability to commit to good policies, and that such inability results from weak domestic institutions.[10] It is also quite likely that dollarization of government debt—both domestic and external, as well as dollarization of corporate liabilities has more to do with government's attitudes towards dollarization that with just macroeconomic environment per se. For example, there has been some movement in the 1990s in Latin America to replace domestic currency with the U.S. dollar because it supposedly would lower interest rates to U.S. levels and allow domestic firms and government to issue long-term international bonds. However, as experience with foreign-currency debt crisis has demonstrated, these potential cost savings from dollarization have to be set against the adjustment costs avoided by a flexible exchange rate system in the face of negative shocks that require a depreciation of the real exchange rate. In the last few years there has been a strong towards dedollarization in Latin America. For example, the pesification program in Argentina in 2002, converted most of domestic debt denominated in U.S. dollars into CPI indexed debt of the same maturity.

F. Indexation to Inflation as an Alternative to Foreign Currency Indexation

Inflation-indexed debt guarantees a constant real rate of return and protects investors against unexpected inflation. Nominal fixed rate debt has some advantages for the government, as the higher the inflation the lower the real value of the cost of the debt. If rational agents correctly perceive government's incentives to inflate its debt away, the government can find it difficult to place large amounts of nominal debt or has to do it at elevated costs. Inflation-indexed debt eliminates the incentive for the government to inflate its way out of debt and sends a signal of its commitment to anti-inflationary policy. Since macroeconomic instability raises the risk premium for non-indexed debt, debt indexation might effectively reduce debt cost particularly in countries where the different macroeconomic variables are highly volatile.

Inflation-indexed debt allows governments to lengthen the maturity structure of its debt, thus reducing rollover risk inherent in short-term debt. Without inflation-indexed bonds, the financial markets of Brazil and Israel would not have developed as they did in the face of accelerating inflation. For example, in Brazil indexed bonds (ORTNs) were seen by investors

[10] Some authors have suggested that borrowing in foreign currency has a disciplining effect by ensuring that the government doesn't inflate its way out of debt (Calvo 1996; Bohn, 1990). It also signals government commitment Jeanne (2000), Aguiar (2000), Chamon (2001), Aghion et al (2001). Inability to commit is the reason for prevalence of foreign currency debt.

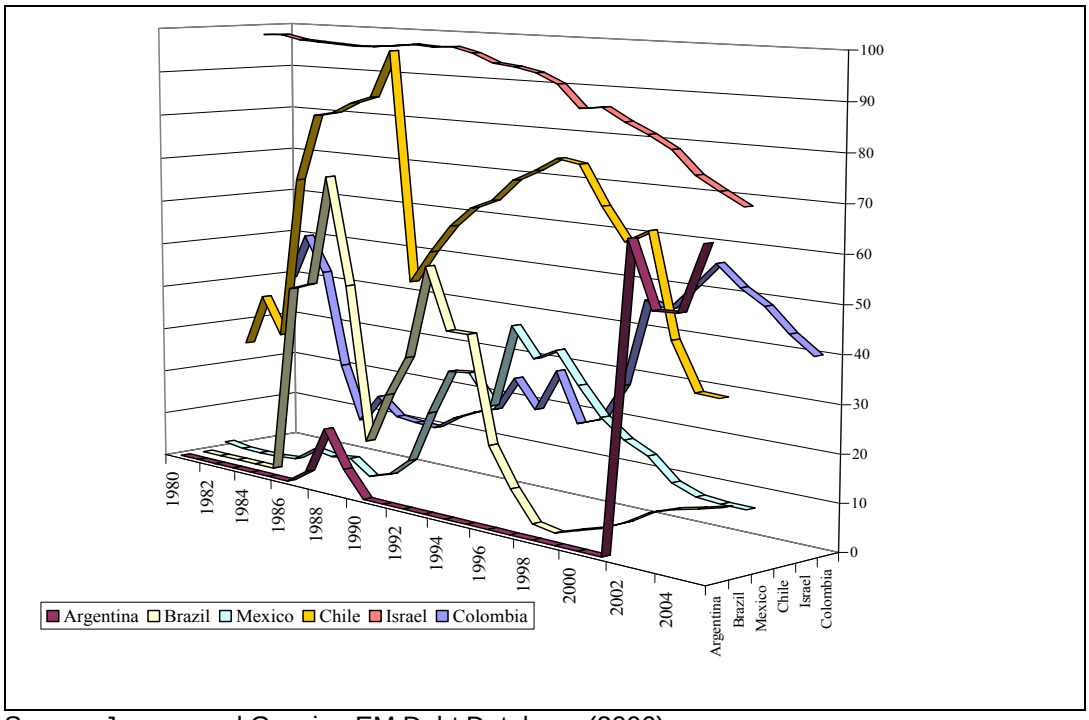
as a hedge against erosion of their financial wealth by inflation. The fall in inflation-indexed debt began in 1994 as a result of Real Plan, and reflected a policy decision to stop issuing inflation-indexed bonds, which were deemed inflationary.[11]

On the demand side, "the development of domestic private pension funds often creates a natural base of investors seeking the protection against changes in the purchasing power that CPI indexation provides" (Borenzstein et al, 2004). CPI indexation has always been prevalent from in Israel, and acquired some prominence in Latin America. In fact, in Argentina, most of foreign currency domestic debt has been converted to CPI-indexed debt during the so-called debt-pesification program of 2002.

As can be seen from Figure 9, Asian countries issue very little CPI-indexed debt or not at all. Quite a few countries (Argentina, Brazil, Colombia, and Chile) experienced a sharp decline in CPI-indexed debt in late 1980s, followed by a rebound. There seems to be a certain threshold level of inflation that induces government to issue CPI-indexed debt. In countries were inflation did not exceed 10 percent very little debt was indexed to inflation, in countries with hyperinflation, the choice was with foreign currency denominated debt (Argentina), for countries in the middle, the choice was inflation-indexed debt instruments (Israel, Turkey, Chile). The critical threshold of 9 percent annual inflation was found by minimizing mean squared error of the regression of CPI-indexed debt on various inflation dummies. With inflation rate exceeding 15 percent per year, most countries opt to issue foreign-currency debt instead of CPI-indexed debt.

[11] Price (1997) discusses that academic literature so far could not find the link between indexed bonds and inflation. It looks as if inflation emerges due to policies and circumstances independent of debt indexation. If anything, indexed debt enhances government credibility by neutralizing the inflation tax.

Figure 8. Share of CPI-Indexed debt in Domestic Debt in Argentina, Brazil, Chile, Colombia, Mexico, and Israel



Source: Jeanne and Guscina EM Debt Database (2006).

G. Floating Rate Debt Share in Domestic Debt

Floating rate debt (whether domestic or foreign currency-denominated) is another alternative available to the government. It may appear to be a less expensive way of financing over the long run. It does, however, expose the country to some of the same problems as short-term debt. Floating interest rate implies that changes in global interest rates and in country's own perceived creditworthiness will immediately be reflected in the government's interest bill. It may discourage the central bank from raising interest rates to manage inflation or support the exchange rate because raising the short-term interest rate to which lots of floating rate debt is indexed would worsen the government's financial position, at least in the short-run. Indexing debt to short-term interest rate may reduce monetary policy credibility—because of a tradeoff between tight monetary policy to contain inflation and budgetary impact of higher short-term interest rates.

When compared with interest rate indexation, CPI-indexation is preferred because floating-rate debt implies higher debt repayments during bad times, whereas inflation-indexed debt it usually provides a slight hedge (Borenzstein et al, 2004). When debt is indexed to the short-term interest rate, it provides no protection from interest rate hikes. It is better to index it to slowly-moving variables like inflation than to financial variables like exchange rates and short-term interest rates that respond instantaneously to shocks.

IV. Empirical Methodology and Results

A. Panel Data Analysis

The priors discussed above about the impact of different determinants of the debt structures, are explored using a panel of 19 emerging market countries over a period of 25 years. The panel is unbalanced, since the transition economies of Czech Republic, Hungary, Poland, and Russia do not enter the dataset until early 1990s. Panel data framework was chosen specifically to explore the richness of Jeanne-Guscina EM Debt Database (2006). Panel data analysis allows controlling for heterogeneity between countries. Since panel data has a cross-section dimension (and thus more variability), it is less likely to be plagued by colinearity between variables. Because, panel data provides information on variation between countries and within countries (has more informative data), one can produce more reliable parameter estimates, with more degrees of freedom and more efficiency.

The panel data equation can be written as such:

$$Y_{it} = \alpha_i + \beta X_{it} + u_{it,} \quad i=1,..., N, t=1, ..., T$$

where Y*it* is the dependent variable in question (for example, share of domestic debt in total debt), X is a matrix of explanatory variables, u_i is the error term, and the βs represent estimated coefficients.

Since some of dependent variables (for example share of domestic debt in total debt) show high persistence it might be necessary to allow for dynamic process by including lagged dependent variable in the estimation. If the model has unit effects and a lagged dependent variable it can be written as such:

$$Y_{it} = \varphi Y_{it-1} + \beta X_{it} + \alpha_i + u_{it,} \quad i=1,..., N, t=1, ..., T$$

If this model were to be estimated with country fixed effects,[12] it can be written as:

$$Y_{it} = \varphi Y_{it-1} + \beta X_{it} + u^*_{it}, \qquad \text{where } u^*_{it} = \alpha_i + u_{it,}$$

We are assuming that errors are mean zero and there is no serial autocorrelation.

$$Y_{it-1} = \varphi Y_{it-2} + \beta X_{it-1} + \alpha_i + u_{it}$$

If we look at lagged dependent variable, we notice that both u^*_{it} and Y_{it-1} contain $\alpha_{i,}$. This implies that one of the dependent variables is correlated with the error term, and thus

[12] Since there exists high degree of heterogeneity between countries, country fixed effects are highly significant, and ideally should either be included in the regressions or controlled for by first-differencing.

estimates of β and φ are biased and inconsistent. One possible solution is estimating in first-differences. By differencing the series we get rid of cross-sectional effects.

$$Y_{it} - Y_{it-1} = \varphi(Y_{it-1} - Y_{it-2}) + \beta(X_{it} - X_{it-1}) + (\alpha_i - \alpha_i) + (u_{it} - u_{it-1})$$

Which is the same as:

$$\Delta Y_{it} = \varphi \Delta Y_{it-1} + \beta \Delta X_{it} + u_{it,}$$

By using first differences we can get rid of the cross-sectional effects. But correlation between dependent variable and the errors is still a problem. Cases of significant autocorrelation, can be resolved this through use of instrumental variables. Just need to find instruments that are highly correlated with Xs but not with the errors. If there is no serial correlation, Y_{it-2} and ΔY_{it-2} would be suitable instruments because they are correlated with Y_{it-1} and $\Delta Y_{it-1,}$ but uncorrelated with $u_{it..}$

In Section IV I report the results of country fixed effects and difference-on-difference specification, but the results for other estimation techniques—OLS, and censored Tobit model[13]—are reported in the Appendix III. The regression results for the most part are robust to changes in the estimation method.

B. Determinants of Domestic Debt Share in Total Debt

Bivariate regression results that of the determinants of domestic debt share, domestic debt to GDP and external debt to GDP are summarized in Appendix Table A.II. These regression results confirm the priors summarized in Table 1.

For the multivariate regressions, one proxy from each category of the explanatory variables is chosen to avoid multicollinearity problems. Table 2 summarizes the results for level-on-level and delta-on-delta specifications. Difference-to-difference estimation deals with autocorrelation problem by getting rid of time-invariant country effects. The second lag or its difference can be used as an instrument for the first lag of s_D. Detailed results for country fixed effects, difference-on-difference, OLS and censored Tobit estimations—are reported in Appendix Table A.III.1.

[13] Since LHS variable is bound between 0 and 1 (in the case of various debt shares) censored Tobit estimation might be necessary.

Table 2. Determinants of Domestic Debt Share in Total Debt—Summary

	$L.S_D$	π	σ_{RER}	M2_GDP	PrSavRate	PrCrBOF	trade_gdp	PolStab
Priors	+	-	?	+	+	?	?	+
FE	0.80***	-0.80**	-0.26	0.11*	0.28***	-0.13***	0.04*	0.13**
DD	0.03	-1.04*	-0.85	0.13	0.07	-0.23***	-0.13*	0.15*

In sum, the results suggest that low and stable inflation is associated with higher domestic debt share in total central government debt. This result is robust to using various inflation measures, different combinations of explanatory variables, and various estimation techniques.[14] Level of financial development as measured by M2 to GDP and value of stocks traded to GDP ratio is associated with higher reliance on domestic debt, although effect is not always statistically significant or robust. This suggests that governments in countries with a higher level of financial development are better able and willing to raise necessary funds domestically. Significant positive coefficient on political risk rating confirms that the development of domestic debt market and reliance on domestic debt is correlated with a positive perception of governments' stability and commitment to law and order.

One interesting result is that coefficient on trade is negative in first differences estimation. One possible explanation is that regressions in levels represent the long-run effect, while D-D estimation represents short-term effect. Countries that are more open appear to have better developed domestic debt market, while a difference in trade is not really a true measure of openness but of some underlying phenomenon—such as exchange rate fluctuations.

One surprising result of the estimation is the negative correlation of private credit by deposit money banks and other financial institutions to GDP ratio with the share of domestically issued debt in total debt when one controls for country heterogeneity. This could be due to the fact that while on average countries with better developed banking sector tend to rely more on domestic debt, the ratio of private credit to GDP includes nonperforming loans and hence disregards the quality of credit allocation. Countries that had experienced banking crises due to the poor quality of credit allocation, had experienced a shift towards external debt, leading domestic debt share in total debt (s_D) to fall.

C. Determinants of Tradability of Domestic Debt

While there has been an observable increase in the tradability of domestic and international debt in EM countries, it is important to empirically test which factors seem to propagate the process of debt securitization. Table 3 summarizes multivariate regression results for traded debt share in domestic government debt using country fixed effects and difference-on-

[14] More detailed results for various combinations of explanatory variables are available from the author.

difference specifications.[15] The results confirm to the priors and are especially strong for unstable macroeconomic environment (proxied by inflation).

As was shown in Figure 1, development of domestic bond market is usually preceded by development of international securitized debt market by 5–10 years. For this reason, in addition to independent variables used to explain the share of domestic debt in total debt, I also include the 5-year lag of bonds in international privately held debt as an additional explanatory variable. And indeed, for a percentage point increase in tradability of international debt 5 years ago, the share of traded domestic debt today increases by about 0.05 of a percentage point.

Table 3. Determinants of Tradability of Domestic Debt—Summary

	$L.SD_T$	π	σ_{RER}	M2_GDP	PrSavRate	StkMkt	trade_gdp	Qbur	$L5.SE_T$
Priors	+	-	?	?	+	+	?	+	+
FE	0.72***	-1.27*	0.02	-0.07	0.54***	0.04*	-0.07	0.47	0.05**
DD	-0.12**	0.04	-0.18	-0.18	0.47**	0.01	-0.21*	1.7	0.02

As one can see from the regression results, unstable monetary environment, characterized by high inflation and real exchange rate volatility is associated with a lower share of traded debt in domestic government debt. The effect is statistically significant even for difference-on-difference specification. Private savings rate to GDP ratio has a positive effect on the share of traded debt in domestic debt. This effect is very strong. For one percentage point increase in private savings rate to GDP ratio, the share of traded debt in domestic debt increases by 0.47 of a percentage point (in the preferred D-D specification). The effect is significant at 5 percent level, for most specifications. M2 to GDP seems to be negatively correlated with the share of traded debt in domestic debt, and the effect is often significant. This implies that in countries with better developed financial system government rely more on bank loans than on bonds. Private credit to GDP ratio has a negative coefficient as well. Possible explanation for this was given in the previous section. Value of stocks traded to GDP ratio has the expected (positive) coefficient in all specifications, although the effect is not always significant. Quality of bureaucracy (used as a measure of institutional quality) doesn't have a significant effect on the development of domestic securitized debt market, when one controls for macroeconomic fundamentals and level of financial development. Political risk rating has the expected positive coefficient, but it is not statistically significant.

[15] Detailed regression results for FE, difference-on-difference, OLS and censored Tobit estimations are reported in Appendix Table A.III.2.

D. Determinants of DLTF Debt in Domestic Debt

This section focuses on the determinants of a country's ability to issue DLTF debt. Since some countries don't issue DLTF debt in certain years, there are lots of zeros—indicating a need for censored regression. The preferred specification is thus a censored Tobit estimation, which is reported along with country fixed effects specification in Table 4. Detailed regression results and alternative specifications are reported in Appendix Table A.III.3.

Table 4. Determinants of DLTF Debt Share in Total Domestic Debt – Summary

	$L.S_{DLTF}$	π	σ_{RER}	M2_GDP	PrSavR	StkMkt	trade_gdp	Qbur	DServ
Priors	+	-	?	+	+	+	?	+	+
FE	0.42***	-1.67**	1.92	0.20***	-1.08***	-0.09***	0.16**	3.33**	-0.64**
CTobit	0.63***	-3.93***	2.11*	0.15**	-0.17	-0.04	0.03	3.67**	-1.01***

The results confirm the priors that there is a negative relationship between inflation and the share of DLTF debt in domestic debt, and that DLTF debt share is more sensitive to macroeconomic volatility than the share of domestic debt in total debt or traded debt in domestic debt (that is, that S_{DLTF} is more sensitive to macroeconomic volatility than S_{TD}, which in turn is more sensitive than S_D). This implies that inflation will first of all damage a country's ability to borrow long-term in local currency and to some extent will hinder the development and securitization of domestic debt market.

One unusual result is seemingly negative impact of private savings rate to GDP ratio on the share of DLTF debt that implies that higher savings rate does not necessarily translate to safer debt structures. Negative coefficient on debt service to GDP ratio implies that highly indebted countries would find it problematic to issue DLTF debt and would have to issue debt and shorter maturities or indexed to CPI or US dollar. An increase in debt service to GDP ratio by one percentage point decreases DLTF debt share by anywhere between 0.5 to 1 percentage point. Institutional quality (as proxied by quality of bureaucracy index) has a positive effect on countries ability to issue DLTF debt, as was expected.

E. Determinants of Short-term Debt Share in Domestic Debt

The results of multivariate regressions of short-term domestic debt share on various macroeconomic, institutional, and political variables for D-D and censored Tobit specifications are summarized in Table 5. More detailed results are reported in Appendix Table A.III.4.

Table 5. Determinants of ST Debt Share in Total Domestic Debt—Summary

	$L.S_{ST}$	π	σ_{RER}	M2_GDP	PrSavR	StkMkt	trade_gdp	Qbur	int_gap
Priors	+	+	+	-	?	-	?	-	+
DD	0.05	1.37**	0.16	0.09	0.14	0.04	0.01	0.34	0.13***
CTobit	0.32***	-1.91	1.40	0.02	-0.08	-0.03	0.11**	-7.08***	0.10

Consistent with the priors, better institutions decrease the share of short-term debt. Real exchange rate volatility shortens the maturity of domestic debt, but the effect is not significant.[16] More heavily indebted countries (as proxied by debt service to GDP ratio) have problems extending the maturity structure of their debt, but the effect is not always significant. High inflation shortens the maturity profile of domestic debt when one controls for country specific effects and autocorrelation using D-D estimation.

The gap between long-term and short-term interest rate is used to proxy for the cost of borrowing at various maturities. Higher interest rate on long-term debt serves as a deterrent to extending the maturity structure of debt. The results suggest that the high-term premium paid on longer-term debt increases the share of short-term debt. The effect is positive for all various specifications, and is significant in the difference-on-difference preferred specification.

F. Determinants of Foreign-Currency Denominated/Indexed Debt Share

Since there are many countries in our sample that did not issue foreign currency debt, or didn't issue it in all periods, it is important to censor the dependent variable. The results of Censored Tobit and country fixed effects specifications are summarized in Table 6. Detailed regression results, along with alternative specifications are reported in Appendix Table A.III.5.

Table 6. Determinants of Foreign Currency Debt Share in Total Domestic Debt—Summary

	$L.S_{ST}$	π	σ_{RER}	M2_GDP	DService	StkMkt	trade_gdp	Qbur	S_{E_FX}
Priors	+	+	?	-	?	-	?	-	+
FE	0.15**	-0.21	-2.63***	-0.11	-0.37*	0.03	0.02	-0.17	0.09
CTob	0.28***	-0.50	-3.12**	-0.22**	0.02	-0.03	0.06	-0.35	0.13***

[16] The coefficient on another proxy for exchange rate volatility (ErateStability Index) suggests that a stable exchange rate lengthens the maturity structure of domestic debt and the effect is significant for both OLS and D-D specifications.

The results demonstrate a negative relationship between the quality of domestic institutions increase and the share of foreign currency denominated debt, but the effect is not statistically significant. Real exchange rate volatility and the share of foreign-currency seem to be negatively correlated with the share of foreign currency debt in domestic debt. While unstable macroeconomic environment would lead to more foreign currency borrowing due to country's inability to borrow "safely," more foreign currency borrowing can also act as a commitment device, and thus lead to less volatility. The results thus lend support "moral hazard" theory of foreign-currency borrowing.

The share of dollar debt in international debt has a positive and significant effect on the share of foreign currency denominated debt—dollarization of international and domestic debt go hand in hand. Higher level of financial development allows countries to issue more local currency debt, and less debt denominated in or indexed to a foreign currency. For a 1 percentage point increase in M2 to GDP ratio, the share of foreign currency debt falls by 0.2 of a percentage point.

V. CONCLUSION

The structure of government debt has important implications for the probability of financial crises and their severity. While the structure of international debt is to a large extent determined by international financial markets, the structure of government domestic debt is more under control of the government.

This paper conducted an empirical analysis on the role of macroeconomic, political and institutional factors in determining the structure of government debt in EM countries. Results show that unstable macroeconomic environment, poor institutional characteristics and political uncertainty hinder the development of the domestic debt market and its securitization. In cases where domestic debt market develops despite poor macroeconomic fundamentals, the government might find it very costly to issue long-term local currency nonindexed debt. If investors are unsure about the future, they will demand debt instruments denominated or indexed to U.S. dollar, inflation rate, or debt issued at short maturities. High and volatile inflation, real exchange rate volatility shortens the maturity structure of government debt and/or leads to either foreign currency or inflation indexation. Moreover, foreign currency and inflation indexation linger even after a country has achieved disinflation and fiscal readjustment, reflecting the fact that it takes time to rebuild the anti-inflationary reputation.

Governments should keep in mind that while it is possible to get out of a bad equilibrium, it takes time for investors to trust governments not to inflate their way out of debt and accept long-term nominal debt. This implies that macroeconomic and political stability, soundness of institutions are crucial for the development of domestic debt market, increased securitization of both domestic and international government debt, and higher reliance on long-term debt denominated in local currency. Results suggest that "domestic original sin" is on the way out—many emerging market countries are able to issue DLTF debt, especially

countries in Asia and transition economies—partly as an outcome of successful stabilization policies and lessons learned from debt crises involving dangerously structured domestic debt.

While the structure of government's external debt is largely a result of policies established by the international financial centers, government has more control over the structure of its domestic debt. By pursuing sound macroeconomic policies and establishing well-functioning institutions, governments can establish a good reputation among investors, who would be willing to hold long-term nominal debt, making debt crises less likely for the government.

APPENDIX I. GOVERNMENT DOMESTIC DEBT TEMPLATE

Table A.I. Government Domestic Debt Template from Jeanne-Guscina EM Debt Database 2006

Local currency millions	**1980**	**...**	**2005**
Total Central Government Domestic Debt			
% of Total CG Domestic Debt			
Domestic Currency Fixed Interest Rate			
short-term maturity (<1 year)			
medium-term maturity (1-5 years)			
long-term maturity (>5 years)			
Domestic Currency Variable Interest Rate			
short-term maturity (<1 year)			
medium-term maturity (1-5 years)			
long-term maturity (>5 years)			
Foreign Currency Fixed Interest Rate			
short-term maturity (<1 year)			
medium-term maturity (1-5 years)			
long-term maturity (>5 years)			
Foreign Currency Variable Interest Rate			
short-term maturity (<1 year)			
medium-term maturity (1-5 years)			
long-term maturity (>5 years)			
Indexed Fixed Interest Rate			
short-term maturity (<1 year)			
medium-term maturity (1-5 years)			
long-term maturity (>5 years)			
Indexed Variable Interest Rate			
short-term maturity (<1 year)			
medium-term maturity (1-5 years)			
long-term maturity (>5 years)			

Source: Jeanne-Guscina EM Debt Database 2006.

APPENDIX II. BIVARIATE REGRESSION RESULTS

Table A.II. Bivariate Regression Results—OLS and Country Fixed Effects Specifications

	OLS			Country Fixed Effects		
	DDebt_GDP	EDebt_GDP	S_D	DDebt_GDP	EDebt_GDP	S_D
L.Dependent Variable	0.9127 (0.0173)***	0.8373 (0.0263)***	0.9314 (0.0182)***	0.8204 (0.0294)***	0.7203 (0.0339)***	0.8173 (0.0294)***
M2_GDP	0.1605 (0.0386)***	-0.18678 (0.0284)***	0.3699 (0.0301)***	0.0837 (0.0472)*	-0.02927 (0.0458)	0.1727 (0.0434)***
StkMktCap	0.1186 (0.0267)***	-0.15445 (0.0276)***	0.2637 (0.0265)***	-0.0263 (0.0272)	-0.0363 (0.0267)	0.0879 (0.0265)***
StkMktVal	0.0266 (0.0356)	-0.0986 (0.0209)***	0.2756 (0.0354)***	-0.0086 (0.0282)	-0.0455 (0.0251)*	0.0710 (0.0276)**
PrCrBOF	0.0231 (0.0367)	-0.2288 (0.0255)***	0.2943 (0.0310)***	-0.1994 (0.0413)***	-0.1611 (0.0419)***	-0.0763 (0.0390)*
prsavrate	0.2646 (0.1505)*	-0.4503 (0.1197)***	0.4056 (0.1459)***	0.2646 (0.1505)*	-0.2453 (0.1444)*	0.3256 (0.1375)**
Trade_gdp	0.1525 (0.0281)***	-0.0664 (0.0230)***	0.2257 (0.0236)***	0.0097 (0.0398)	-0.0388 (0.0349)	0.1242 (0.0364)***
Infl_Stability Index	-1.1360 (0.4517)**	-3.5731 (0.2959)***	3.7295 (0.3577)***	-1.3294 (0.3574)***	-2.9722 (0.3030)***	2.0129 (0.3024)***
Log_inflation	2.1377 (0.7797)***	5.4726 (0.5126)***	-5.3763 (0.6456)***	2.3543 (0.6164)***	4.1447 (0.5464)***	-2.2109 (0.5677)***
ErateStability Index	-1.1162 (0.5107)**	-2.8882 (0.3776)***	2.7417 (0.4589)***	-0.8355 (0.3289)**	-2.0115 (0.3062)***	1.5281 (0.2869)***
σ_{RER_5y}	1.0959 (0.2726)***	-0.2294 (0.1834)	1.2932 (0.2816)***	0.3086 (0.2167)	0.02429 (0.1468)	0.3388 (0.2289)
Politic.Stability Index	-0.2061 (0.1211)*	-0.5142 (0.0891)***	0.6849 (0.1052)***	-0.3685 (0.1035)***	-0.6717 (0.0878)***	0.2849 (0.0924)***
GStability	-1.5097 (0.5664)***	-2.6637 (0.4150)***	2.0987 (0.5068)***	-1.0550 (0.3616)***	-2.1437 (0.3366)***	1.6846 (0.3090)***
ICRG Index	-0.3036 (0.1290)**	-0.8888 (0.0870)***	0.8717 (0.1173)***	-0.3571 (0.1012)***	-0.7133 (0.0829)***	0.3014 (0.0933)***
QBureaucr. Index	6.9332 (1.5569)***	-4.5788 (1.1844)***	9.5009 (1.3698)***	-4.6616 (1.4335)***	-4.7958 (1.2691)***	0.0662 (1.2931)

Sources: Jeanne-Guscina EM Debt Database 2006, WDI, ICRG, and IFS Databases

APPENDIX III. RESULTS OF ALTERNATIVE SPECIFICATIONS

Table A.III.1. Determinants of Domestic Debt Share in Total Debt

	OLS		*D-D Estimation*		*Country Fixed Effects*		*Censored Tobit*	
M2_GDP	-0.04	0.01	0.003	0.13	0.02	0.08	-0.01	**0.08**
	(0.03)	(0.03)	(0.09)	(0.08)	(0.05)	(0.05)	(0.03)	**(0.04)***
l.DDebtShare	**0.94**	**0.94**			**0.83**	**0.80**	**0.92**	**0.87**
	(0.03)***	**(0.02)*****			**(0.04)*****	**(0.04)*****	**(0.03)*****	**(0.03)*****
L2.DDebtShare			0.03	0.03				
			(0.06)	(0.05)				
PrCrBOF_GDP		**-0.03**		**-0.24**		**-0.13**		**-0.08**
		(0.2)*		**(0.07)****		**(0.04)*****		**(0.03)*****
prSavRate	0.10	**0.22**	0.16	0.05	**0.25**	**0.28**	0.12	**0.24**
	(0.07)	**(0.09)****	(0.13)	(0.11)	**(0.12)****	**(0.10)*****	(0.09)	**(0.09)****
StkMktVal_GD	0.02		0.01		0.02		**0.03**	
	(0.01)		(0.02)		(0.02)		**(0.02)***	
trade_gdp	0.02	0.01	**-0.14**	**-0.14**	0.02	**0.04**	0.02	0.03
	(0.02)	(0.02)	**(0.07)***	**(0.07)****	(0.04)	**(0.03)***	(0.02)	(0.02)
log_inflation	**-0.97**	**-0.85**	**-1.42**	**-1.01**	**-1.07**	**-0.98**	**-1.16**	**-1.01**
	(0.35)***	**(0.35)****	**(0.60)****	**(0.52)***	**(0.37)*****	**(0.37)*****	**(0.37)*****	**(0.36)*****
$\sigma_{RER\ 5v}$	-0.04	0.43	-1.04	-0.85	-0.14	-0.26	-0.10	-0.14
	(0.45)	(0.44)	(0.95)	(0.79)	(0.73)	(0.65)	(0.54)	(0.57)
QBureaucr.	-0.59		1.72		**-1.35**	-0.53	-0.55	
	(0.59)		(1.48)		**(0.81)***	(0.56)	(0.64)	
PoliticStable		**0.08**		**0.15**		**0.13**		**0.13**
		(0.04)*		**(0.08)***		**(0.05)****		**(0.05)****
LA Dummy	0.12	0.86	0.06	0.26			1.19	**4.50**
	(1.33)	(1.48)	(1.07)	(0.95)			(1.63)	**(1.91)****
Asia Dummy	-1.69	0.34	-0.31	0.29			-1.51	**3.66**
	(1.30)	(1.94)	(1.07)	(0.96)			(1.63)	**(2.26)***
Constant	5.38	-3.82	1.01	1.10	8.58	0.37	5.65	-3.19
	(3.17)***	(3.96)***	(1.48)**	(0.43)**	(4.35)**	(4.39)***	(3.48)*	(3.90)
N	266	292	243	270	266	292	268	294
Overall R^2	0.90	0.91	0.07	0.11	0.89	0.89		
Wald Chi^2							1500.83	1298.98

Sources: Jeanne-Guscina EM Debt Database 2006, World Development Indicators Database, ICRG Database

Table A.III.2. Determinants of Traded Debt Share in Total Domestic Debt

	OLS		***D-D Estimation***		***Country Fixed Effects***		***Censored Tobit***	
M2_GDP	**-0.11**	**-0.08**	-0.18	**-0.38**	-0.07	-0.06	**-0.10**	-0.03
	(0.05)**	**(0.04)***	(0.13)	**(0.11)*****	(0.05)	(0.06)	**(0.06)***	(0.05)
l.TrDDebtShare	**0.85**	**0.88**			**0.72**	**0.80**	**0.84**	**0.87**
	(0.03)***	**(0.02)*****			**(0.04)*****	**(0.03)*****	**(0.04)*****	**(0.03)*****
L2.TrDDebtShare			**-0.12**	0.08				
			(0.06)**	(0.05)				
L5.Bonds_PrIntl Debt	**0.03**	0.02	0.02	0.02	**0.05**	**0.04**	**0.04**	0.02
	(0.02)*	(0.02)	(0.04)	(0.03)	**(0.02)****	**(0.02)****	**(0.02)****	(0.02)
PrCrBOF_GDP		-0.03		**-0.23**		**-0.13**		**-0.07**
		(0.03)		**(0.07)*****		**(0.04)*****		**(0.04)****
prSavRate	0.15	0.09	**0.47**	-0.03	**0.54**	**0.29**	**0.31**	**0.22**
	(0.13)	(0.10)	**(0.20)****	(0.15)	**(0.18)*****	**(0.13)*****	**(0.16)****	**(0.09)****
StkMktVal_GDP	0.03		0.01		**0.04**		0.02	
	(0.02)		(0.02)		**(0.02)***		(0.02)	
trade_gdp	0.04	**0.03**	**-0.21**	-0.10	-0.07	-0.04	0.02	0.03
	(0.02)	**(0.02)***	**(0.11)***	(0.09)	(0.05)	(0.04)	(0.03)	(0.03)
log_inflation	-0.06	-0.61	0.04	**-1.26**	**-1.27**	**-1.14**	-0.45	**-1.07**
	(0.59)	(0.54)	(1.07)	**(0.76)***	**(0.77)***	**(0.61)***	(0.70)	**(0.58)***
$\sigma_{RER\ 5v}$	**-2.01**	**-1.06**	-0.18	-0.43	0.02	0.60	-1.36	-0.33
	(0.74)***	**(0.59)***	(1.40)	(0.79)	(0.97)	(0.82)	(0.85)	(0.72)
QBureaucr.	-0.17		1.70		0.47	-0.53	-0.38	
	(0.74)		(2.38)		(1.13)	(0.56)	(0.91)	
PoliticStable		0.06		0.01		0.06		0.08
		(0.06)		(0.10)		(0.07)		(0.08)
LA Dummy	1.01	-0.28						
	(1.91)	(1.62)						
Asia Dummy	-0.88	-.14						
	(1.92)	(1.68)						
Constant	11.20	7.52	2.08	1.54	16.75	12.97	10.33	6.12
	(4.91)***	(4.68)	(0.76)***	(0.57)***	(6.12)***	(5.54)**	(5.55)*	(5.39)
N	242	268	224	248	242	268	243	269
Overall R^2	0.87	0.91	0.06	0.07	0.84	0.89		
Wald Chi^2							822.22	1368.53

Sources: Jeanne-Guscina EM Debt Database 2006, World Development Indicators Database, ICRG Database

Table A.III.3. Determinants of DLTF Debt Share in Domestic Government Debt

	OLS		***D-D Estimation***		***Country Fixed Effects***		***Censored Tobit***	
M2_GDP	-0.01	-0.04	0.01	0.02	**0.20**	**0.21**	**0.15**	0.14
	(0.06)	(0.07)	(0.03)	(0.03)	**(0.09)****	**(0.13)***	**(0.06)****	(0.09)
L2.DDebtShare	**0.85**	**0.87**	0.02	0.01	**0.42**	**0.47**	**0.63**	**0.64**
	(0.03)***	**(0.03)*****	(0.07)	(0.07)	**(0.06)*****	**(0.06)*****	**(0.05)*****	**(0.05)*****
PrCrBOF_GDP		0.04		0.11		-0.05		0.04
		(0.04)		(0.13)		(0.08)		(0.05)
prSavRate	**0.30**	0.09	**-0.82**	**-0.76**	**-1.08**	**-1.13**	-0.17	**-0.54**
	(0.16)*	(0.19)	**(0.22)*****	**(0.23)*****	**(0.25)*****	**(0.26)*****	(0.19)	**(0.23)****
StkMktVal_GDP	0.04		-0.06		**-0.09**		-0.04	
	(0.04)		(0.04)		**(0.04)*****		(0.04)	
trade_gdp	0.03	0.02	0.08	0.05	**0.16**	0.12	0.03	0.08
	(0.03)	(0.04)	(0.13)	(0.13)	**(0.07)****	(0.08)	(0.03)	(0.05)
log_inflation	**-1.47**	-1.36	-0.67	-0.24	**-1.67**	-1.27	**-3.93**	**-3.89**
	(0.86)*	(0.96)	(0.95)	(0.99)	**(0.81)****	(0.91)	**(0.92)*****	**(1.08)*****
$\sigma_{RER\ 5v}$	**1.90**		0.50		1.92		**2.11**	
	(0.98)*		(1.39)		(1.23)		**(1.11)***	
ErateStability Index		0.01		0.07		0.15		0.19
		(0.50)		(0.31)		(0.47)		(0.53)
QBureaucr.	-0.33	-0.06	0.34	0.50	**3.33**	**2.68**	**3.67**	2.20
	(1.17)	(1.23)	(2.22)	(2.42)	**(1.45)****	**(1.53)***	**(1.52)****	(1.48)
DebtService	**-0.58**	**-0.52**	-0.35	-0.21	**-0.64**	-0.35	**-1.01**	**-0.73**
	(0.26)**	**(0.23)****	(0.30)	(0.21)	**(0.30)****	(0.24)	**(0.31)*****	**(0.26)*****
Constant	4.09	8.32	0.78	-0.26	26.24	25.39	19.44	25.55
	(5.73)	(6.95)	(1.38)	(1.48)	(8.21)***	(8.84)***	(6.41)***	(8.12)***
N	200	203	182	188	200	203	201	204
Overall R^2	0.85	0.83	0.08	0.07	0.52	0.63		
Wald Chi^2							533.63	360.80

Sources: Jeanne-Guscina EM Debt Database 2006, World Development Indicators Database, ICRG Database.

Table A.III.4. Determinants of Short-Term Debt Share in Domestic Government Debt

	Censored Tobit		***D-D Estimation***		***Country Fixed Effects***	
M2_GDP	0.02	-0.09	0.09	0.13	-0.06	0.14
	(0.06)	(0.10)	(0.14)	(0.15)	(0.06)	(0.10)
L2.STDDebtShare	**0.32**	**0.51**	0.05	0.01	**0.31**	**0.36**
	(0.06)* **	**(0.06)*** **	(0.07)	(0.07)	**(0.06)*** **	**(0.06)*** **
PrCrBOF_GDP		0.03		-0.05		**0.11**
		(0.06)		(0.09)		**(0.07)***
prSavRate	-0.08	-0.30	0.14	0.26	-0.09	-0.11
	(0.18)	(0.23)	(0.17)	(0.18)	(0.18)	(0.20)
StkMktVal_GDP	-0.03		0.04		-0.001	
	(0.04)		(0.04)		(0.04)	
trade_gdp	**0.11**	**0.17**	0.01	0.01	0.05	0.07
	(0.05) **	**(0.05)** **	(0.08)	(0.08)	(0.05)	(0.06)
log_inflation	-1.91	**-3.42**	**1.37**	0.22	-0.21	-1.52
	(1.10)	**(1.19)*** **	**(0.68)** **	(0.77)	(0.83)	(1.02)
$\sigma_{RER\ 5v}$	1.40		0.16		0.79	
	(1.17)		(1.00)		(0.99)	
ErateStability Index		-0.48		**-0.07**		-0.22
		(0.50)		**(0.03)** **		(0.36)
QBureaucr.	**-7.08**	**-5.08**	0.34	2.14	**-5.83**	**-5.30**
	(1.44)* **	**(1.40)*** **	(2.22)	(1.61)	**(1.16)*** **	**(1.26)*** **
DebtService	0.15	0.33	0.12	0.16	0.17	-0.08
	(0.27)	(0.23)	(0.20)	(0.20)	(0.23)	(0.19)
(LT-ST) interest *Interest rate gap*	0.10	0.11	**0.13**	**0.18**	0.07	0.09
	(0.11)	(0.10)	**(0.06)** **	**(0.06)*** **	(0.10)	(0.11)
Constant	28.17	26.04	-0.34	-0.48	27.08	27.61
	(6.70)***	(7.77)***	(0.52)	(0.54)	(6.70)***	(11.31)**
N	167	164	146	133	166	163
Overall R^2			0.08	0.12	0.57	0.66
Wald Chi^2	96.19	172.84				

Sources: Jeanne-Guscina EM Debt Database 2006, World Development Indicators Database, ICRG.

Table A.III.5. Determinants of Foreign Currency Debt Share in Domestic Government Debt

	OLS		*D-D Estimation*[17]		*Country Fixed Effects*		*Censored Tobit*	
M2_GDP	**-0.10**	**-0.09**	0.05	0.06	-0.11	**-0.13**	**-0.22**	**-0.24**
	(0.04)**	**(0.04)***	(0.15)	(0.15)	(0.07)	**(0.07)****	**(0.09)****	**(0.09)*****
L2.FCDDebtShare	**0.65**	**0.64**	-0.09	-0.09	**0.15**	**0.14**	**0.28**	**0.26**
	(0.04)***	**(0.05)*****	(0.05)	(0.05)	**(0.07)****	**(0.07)*****	**(0.07)*****	**(0.08)*****
StkMktVal_GDP	0.02	-0.0002	0.01	0.01	0.03		-0.03	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)		(0.04)	(0.08)
trade_gdp	-0.002	-0.03	0.13	0.14	0.02	0.01	0.06	0.06
	(0.03)	(0.03)	(0.10)	(0.10)	(0.06)	(0.05)	(0.05)	(0.05)
log_inflation	0.53	-0.68	0.52	0.52	-0.21	0.16	-0.50	-0.32
	(0.73)	(0.73)	(0.75)	(0.75)	(0.83)	(0.69)	(1.05)	(1.04)
l. $\sigma_{RER\ 5v}$	**-1.54**	**-1.41**	-1.04	-1.13	**-2.63**	**-2.51**	**-3.12**	**-3.09**
	(0.71)**	**(0.70)****	(1.16)	(1.16)	**(1.02)****	**(1.02)****	**(1.22)****	**(1.22)****
QBureaucr.	-0.93		-0.94	2.14	-0.17		-0.35	
	(0.89)		(1.82)	(1.61)	(1.22)		(1.48)	
Political Stability Index		**0.14**		0.16		**0.16**		0.15
		(0.09)*		(0.11)		**(0.10)***		(0.13)
l.DebtService	**-0.57**	**-0.44**	0.25	0.24	**-0.37**	-0.23	0.02	0.17
to GDP Ratio	**(0.20)*****	**(0.20)****	(0.22)	(0.22)	**(0.22)***	(0.22)	(0.29)	(0.29)
USD_ExtDebt	-0.03	-0.02	0.03	0.04	0.09	0.09	**0.13**	**0.13**
	(0.02)	(0.02)	(0.07)	(0.07)	(0.06)	(0.06)	**(0.05)*****	**(0.05)*****
Year 1994	-3.72	-4.37			-1.42	-2.02	-2.59	-3.12
	(3.04)	(3.04)			(2.59)	(2.60)	(4.67)	(4.67)
Year 1998	4.59	4.06			3.29	2.98	3.92	3.65
	(2.86)	(2.86)			(2.34)	(2.33)	(4.04)	(4.02)
Constant	13.69	2.28	-0.07	-0.25	12.69	2.40	11.87	1.85
	(4.45)***	(6.69)	(0.60)	(0.61)	(5.36)**	(7.90)	(6.94)*	(10.37)
N	203	203	185	185	203	203	205	205
Overall R^2	0.64	0.64	0.05	0.06	0.32	0.35		
Wald Chi^2							56.08	60.12

Sources: Jeanne-Guscina EM Debt Database (2006), World Development Indicators Database, ICRG Database

[17] D-D regression results are reported as a robustness check. Autocorrelation is not a problem in this case, but having too many zeros is. Censored Tobit is thus the preferred specification.

APPENDIX IV. SOURCES OF DATA

Table A.IV. Data Sources and Descriptions

Acronym	Variable Name	Source
DDebt_GDP	Domestic debt to GDP Ratio	Jeanne-Guscina EMDD-2006
EDebt_GDP	External debt to GDP Ratio	Jeanne-Guscina EMDD-2006
S_D	Share of domestic debt in total debt	Jeanne-Guscina EMDD-2006
S_{TD}	Share of traded debt in domestic debt	Jeanne-Guscina EMDD-2006
S_{TED}	Share of bonds in privately held external debt	Jeanne-Guscina EMDD-2006
S_{DLTF}	Share of DLTF debt	Jeanne-Guscina EMDD-2006
S_{ST}	Share of short-term debt in domestic debt	Jeanne-Guscina EMDD-2006
S_{DFX}	Share of foreign-currency denominated debt in domestic debt	Jeanne-Guscina EMDD-2006
S_{CPI}	Share of CPI-indexed debt in domestic debt	Jeanne-Guscina EMDD-2006
S_{FLOAT}	Share of floating Rate debt in domestic debt	Jeanne-Guscina EMDD-2006
S_{EFX}	Share of US$ denominated debt in external debt	Jeanne-Guscina EMDD-2006
L10. S_{TED}	10 year lag of the share of bonds in private international debt	Jeanne-Guscina EMDD-2006
ICRG	Composite ICRG Index	ICRG Database
GStability	Government Stability Index	ICRG Database
QBureaucracy	Quality of Bureaucracy	ICRG Database
Debt Service	Debt Service to GDP ratio	World Development Indicators
M2_GDP	M2 to GDP ratio	World Development Indicators
StkMktCap	Stock market capitalization to GDP ratio	WB Financial Development Database
StkMktVal	Stock market total value traded to GDP ratio	WB Financial Development Database
(LT-ST) i_gap	Difference between government bond and T-Bill interest rate	International Finance Statistics (IFS)
PrCrBOF	Private credit by deposit money banks and other financial entities to GDP ratio	WB Financial Development Database
DBa_GDP	Deposit Money Banks Assets to GDP ratio	WB Financial Development Database
prsavrate	Private savings to GDP ratio	World Development Indicators
Trade_GDP	Trade to GDP ratio	World Development Indicators
π	Annual change in CPI index in logs	World Development Indicators
Infl_Stability	Inflation Stability Index	ICRG Database
σ_{RER_5y}	Real exchange rate volatility (std. deviation) over the last 5 years	World Development Indicators

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