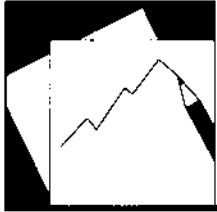


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Foreign Participation in Emerging Markets' Local Currency Bond Markets

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Monetary and Capital Markets Department

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Abstract

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This paper estimates the impact of foreign participation in determining long-term local currency government bond yields and volatility in a group of emerging markets from 2000-2009. The results of a panel data analysis of 10 emerging markets show that greater foreign participation in the domestic government bond market tends to significantly reduce long-term government yields. Moreover, greater foreign participation does not necessarily result in increased volatility in bond yields in emerging markets and, in fact, could even dampen volatility in some instances.

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I. INTRODUCTION

A vibrant and deep local currency domestic bond market promotes financial stability and economic growth. The macroeconomic and financial dislocations in emerging markets (EMs) following the crises of the late 1990s have led to increased efforts in these countries to develop local bond markets as an alternative source of debt financing for the public and corporate sectors (IMF, 2005). Local currency bond markets can help financial stability by reducing currency mismatches and lengthening the duration of debt. Such markets also help economic efficiency by generating market-determined interest rates that reflect the opportunity costs of funds at different maturities (Committee on the Global Financial System, CGFS 2007).

Foreign investors could act as catalysts for the development of local bond markets, particularly by diversifying the institutional investor base and creating greater demand for local EM debt securities. Domestic institutional investors are typically buy-and-hold investors, while foreign investors are more likely to trade and therefore contribute to a more liquid market. Selected case studies in emerging and mature government bond markets provide qualitative evidence that foreign participation can be supportive of increased market liquidity and thus lower yields (World Bank and IMF, 2001). However, there remains a lack of strong empirical evidence on the benefits and costs of foreign participation in bond market development, due to lack of data (Daniel, 2008). This paper attempts to quantify the impact of foreign participation in reducing local currency EM bond yields by compiling a novel database of foreign participation in a representative group of 10 EMs over the last decade.

An increased foreign presence could also result in greater volatility in local bond markets. Experience shows that EMs can be seriously hit by the sudden drying-up of capital flows resulting from an increase in risk aversion, sometimes irrespective of a country's fundamentals (see Calvo and Talvi, 2005). Thus, foreign involvement in the bond market can make host economies more susceptible to market volatility (World Bank and IMF, 2001, and BIS, 2002). This is borne out by the fact that the EM financial markets and institutions most exposed to foreign investors (e.g., EM equity markets rather than bond markets and banks in Central and Eastern Europe that were reliant on foreign borrowing) took the brunt of the spillovers of the 2008 global financial crisis.

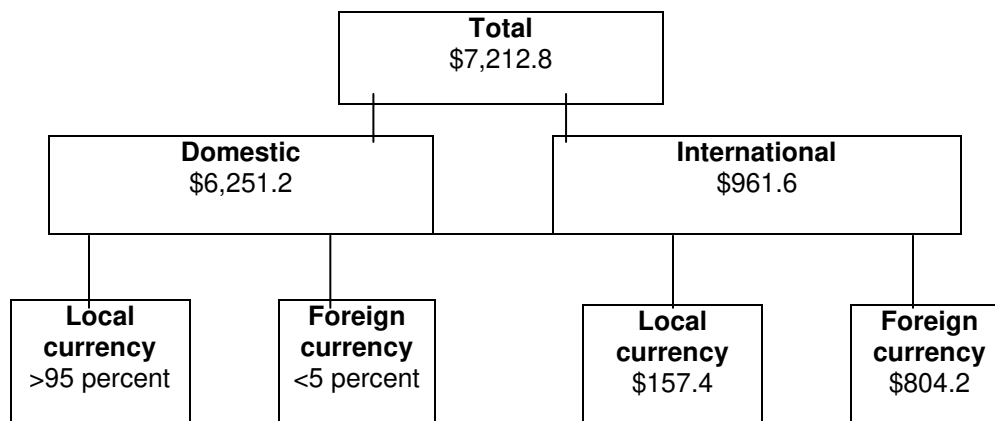
This paper, estimates the impact of foreign participation in determining long-term local currency government bond yields and volatility in a group of emerging markets. It is structured as follows. Section II briefly discusses recent bond market developments in EMs. Section III reviews the relevant literature and addresses three questions: (i) Can foreign participation lower bond yields? (ii) Does foreign participation increase bond market volatility? (iii) What does the empirical evidence show? In section IV, we pursue a panel data framework to estimate the impact of foreign participation in determining long-term local currency government

bond yields in a group of 10 EMs from 2000–2009.¹ A time series approach is also used to estimate the impact of foreign participation in domestic government bond markets on the volatility of long-term government bond yields. Section V concludes.

II. EM DOMESTIC BOND MARKET DEVELOPMENTS

Emerging markets’ domestic bond markets have grown rapidly since the 1990s (CGFS 2007, 2009). The outstanding stock of domestic bonds now exceeds \$6 trillion compared with only \$1 trillion in the mid-1990s, according to the BIS’s quarterly statistics. This is a multiple of the stock of outstanding EM bonds issued in major international markets (i.e., international bonds), which amounted to about \$1 trillion at end-2008.² Although data on the currency of denomination of domestic bonds are not collected by the BIS, the share of foreign-currency denominated domestic debt has been declining and is very small according to CGFS (2007). This highlights the shift from foreign currency to local currency denominated bond issuance by EMs and contrasts with the “original sin” hypothesis that EMs can typically borrow only in foreign currency (Eichengreen and Hausman, 1999).

Table.1 BIS Quarterly Statistics on Bonds and Notes Outstanding Issued by Residents of EMs (in \$ billions, at end-2008)



Source: BIS

Along with the growing size of domestic bond markets, foreign participation has also increased in many EMs (Figure 1). Data on foreign participation in the domestic bond markets of EMs are not available from a common source (Daniel 2008). However, the CGFS (2007) analysis, based on national data and information from the Emerging Markets Trade Association (EMTA), shows that the non-resident bond holdings of nine EMs increased sevenfold between 2002 and 2006. For this study, we compile a new time series database of foreign participation in

¹ This paper narrowly focuses on the role of foreign participation in local government bond markets in EMs rather than corporate bond markets due to data limitations on foreign participation in the latter, although one could expect the impact of foreign participation on the yields and volatility of corporate bonds to be somewhat similar, in theory (see section IV).

² About \$157 billion of such bonds were issued in the currency of the EM issuer.

domestic government bond markets from the Asiabondonline database of the Asian Development Bank (ADB) and from the IMF's country desk data for 10 large EMs.³ The data clearly show a growing share of foreign participation in EM domestic government bond markets, as in CGFS (2007), with a dip in late-2008 related to the global crisis (Figure 1).

Figure 1a. Foreign Participation in the Bond Market

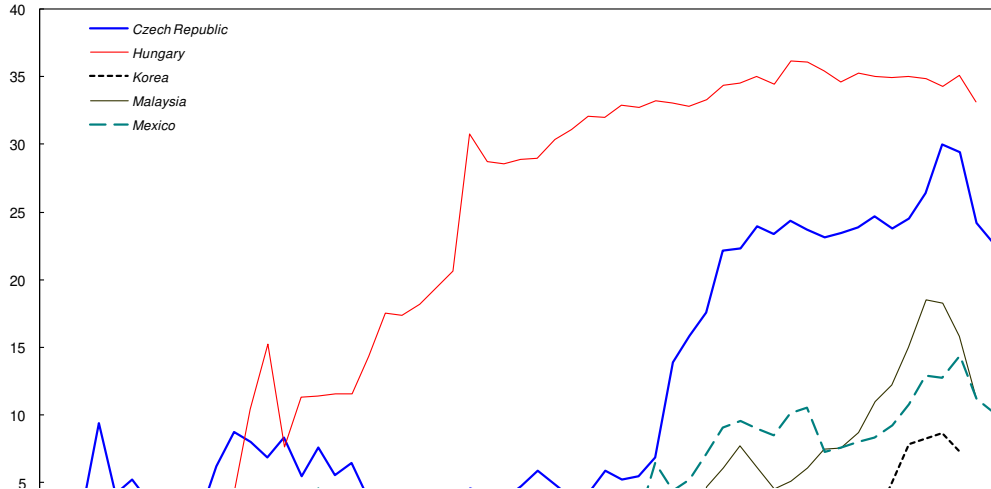
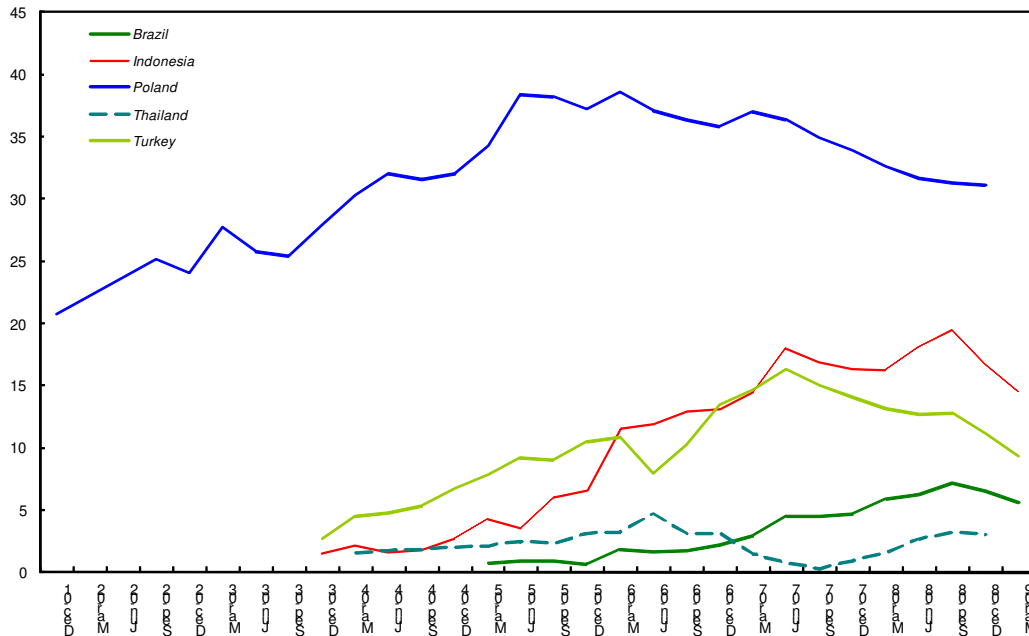


Figure 1b. Foreign Participation in the Bond Market



³ The 10 EMs included are Brazil, Czech Republic, Hungary, Indonesia, Mexico, Malaysia, Korea, Thailand, Turkey, and Poland.

Nevertheless, domestic banks still dominate EM domestic government bond markets. Banks continue to be the largest domestic investors in EM domestic government debt, holding 42 percent of all domestic debt securities in 2005 compared to 28 percent in 2000 according to the CGFS (2007). The share is nearly four times the average percentage seen in industrial countries. Both supply and demand factors explain the increase in holdings of domestic government debt:

- On the demand side, following the Asian financial crisis in the late-1990s, non-financial firms adopted more prudent financial practices, including a substantial deleveraging of their balance sheets;
- An equally important factor has been the increased risk aversion among banks in the aftermath of that crisis; the low risk weight in the calculation of regulatory capital for domestic government debt may have reinforced cash-strapped banks' preference for such debt, since it is better than lending to firms for which the risk weight is 100 percent; and
- Yet another contributing factor was the recapitalization of banks with government securities in Indonesia, Korea, and Turkey.

The institutionalization of the investor base in EMs has been uneven (IMF, 2007). The total share of domestic non-bank financial institutions (domestic institutional investors) in the EMs covered by the CGFS (2007) increased from 29 percent in 2000 to 38 percent in 2005. Economies like Chile, Korea, Malaysia, Singapore, and Hong Kong (China) have been the leaders. The main driving force behind their growth has been the growth of assets of the state provident funds. These economies have adopted enabling legislation and regulation to either develop privately managed pension, mutual fund and insurance sector, or to grant greater autonomy to public sector investors. One important example is Chile, which embarked on a successful pension reform drive and restricted foreign inflows into the local debt market for a long time in order to encourage the development of a local institutional investor base.

The share of fixed-rate bonds in EMs is lower than in more advanced economies. While the vast bulk of government bonds outstanding are nominal fixed-rate bonds in major industrial countries (about 90 percent), the proportion of straight fixed-rate debt in the EMs is much lower, but has increased from 65 percent to 71 percent over the past five years according to CGFS (2007). Yet there are still large variations across countries and regions, with fixed-rate bonds prevalent mainly in Asia and Central Europe, while only 23 percent of Latin American debt outstanding is in the form of fixed-rate instruments.

The maturity structure of EM domestic government debt has lengthened. Based on the *BIS Quarterly Review*, there is clear evidence that remaining maturities on domestic bonds in EMs have been lengthening, from 3.2 years in 2000 to 4.5 years in 2005. Shorter maturities and floating-rate debt generally continue to prevail in Latin America, although Brazil has lengthened its yield curve and a major lengthening of maturities has also occurred in Mexico. With the exception of China, Asia's larger economies have made marked progress in increasing average

remaining maturity, from 2.7 years in 2000 and to 6.1 years in 2005. The yield curve is rather short for many countries in Central Europe, where short-term rates tend to be low with the exchange rate anchored to the euro, complicating the pricing of the entire yield curve. Differences in investment strategies between foreign and domestic investors add to the variety of preferences for risk, return, and maturity, and this could have helped lengthen the maturity structure of EM debt.⁴

III. BENEFITS AND COSTS OF FOREIGN PARTICIPATION: A LITERATURE REVIEW

Institutional investors, both domestic and foreign, have played a critical role in developing capital markets in most mature markets and in more developed EMs (IMF, 2008). Cross country empirical evidence shows a positive association between the institutional investor base and local bond market development as the wider and more diversified investor base helps provide long-term finance (IMF, 2007). Pension reforms and the growth of insurance industries have boosted demand for longer term fixed income investments, and regulation favoring prudent and transparent risk-taking by such institutions has also allowed local bond markets to grow. Foreign investors facilitate the development of liquid benchmarks, leading to improved liquidity in the secondary markets. The domestic institutional investor base in many EMs is still at a nascent stage of development and its further development face a host of regulatory bottlenecks (CGFS, 2007). Foreign participation could thus provide a “quick win” to deepen the domestic bond market. The benefits of foreign participation, however, need to be balanced against the risks of contagion and greater volatility.

A. Can Foreign Participation Lower Bond Yields?

Foreign investors can be an important source of demand for local EM debt securities and thus help lower bond yields (IMF, 2005). Market surveys by MSCI Barra and IMF (2010) indicate that global bond funds are generally underweight EMs, providing scope for a continued stock adjustment into dedicated EM funds. The sheer size of global bond and hedge funds relative to EM bond markets means that even a marginal increase in the weight of EMs in their portfolio could lead to a substantial rise in demand for and lower yields on EM assets.⁵ Although there may be differences in investment strategies among different types of foreign investors, market participants generally perceive foreign investors as playing a supportive role in local markets (Roldos, 2004). A greater diversity of preferences and views will tend to lead to more trading, greater price discovery, and more liquid and efficient markets.

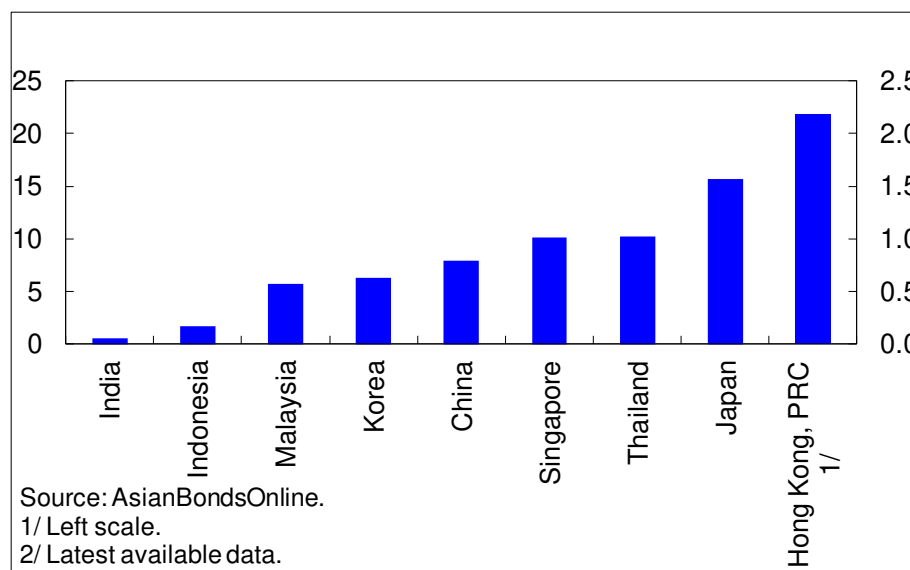
Foreign participation could also help increase the liquidity of government bond markets. The liquidity of government bond markets in EMs measured by their turnover ratio remains

⁴ The potential role of foreign participation in lengthening EM local currency debt structure is beyond the scope of this study.

⁵ For example, IMF (2010) estimates that for every 1 percent shift in the holdings of U.S.-based unlevered institutional investors of domestic securities could translate into a \$45 billion reallocation to EM securities annually, or approximately two thirds of the flows to emerging markets in 2009.

limited (Figure 2). Especially in Asia, the investor base for local debt instruments continues to be dominated by domestic institutional investors with buy-and-hold investment strategies (IMF, 2005), and hence liquidity is poor. This highlights the scope for enhancing liquidity by opening up bond markets to foreign investors. For example, the Australian market, which is relatively open to foreigners (about 45 percent of government bonds and 10 percent of private sector debt are held by non-residents), has a turnover ratio that is at times higher than that of the highly liquid United States' market, reaching 22 times its outstanding stock of debt (BIS 2002). Singapore, a small country but with a relatively high turnover ratio, has allowed foreign issuers and investors (including retail hedge funds) to play a bigger role in the local debt market, with non-residents accounting for more than 15 percent of the outstanding stock of Singapore dollar bonds (CGFS, 2007).

Table.2 Government Bond Turnover Ratios in 2008



B. Does Foreign Participation Increase Bond Market Volatility?

Foreign participation could lead to greater interest rate volatility, however. Sudden withdrawals by foreign investors from domestic bond markets, similar to what was witnessed in EMs after the collapse of Lehman Brothers in September 2008, could introduce greater bond yield volatility. Such a pattern was observed in a few EMs, which saw a rise in long-term local currency government yields post-Lehman, although the phenomenon was by no means universal (Figure 2). This would, in turn, have two potentially adverse impacts: (i) it could temporarily increase (until inflows returned) the cost of new borrowing; and (ii) it could complicate the conduct of monetary policy if central banks intervene in bond markets in an effort to stabilize bond yields and avoid exchange rate pressures.⁶

⁶ Foreign investor will take a direct capital loss when exiting the bond market (as bond prices fall and yields move up) depreciates.

Figure 2a. Long-term government bond yields in EMs

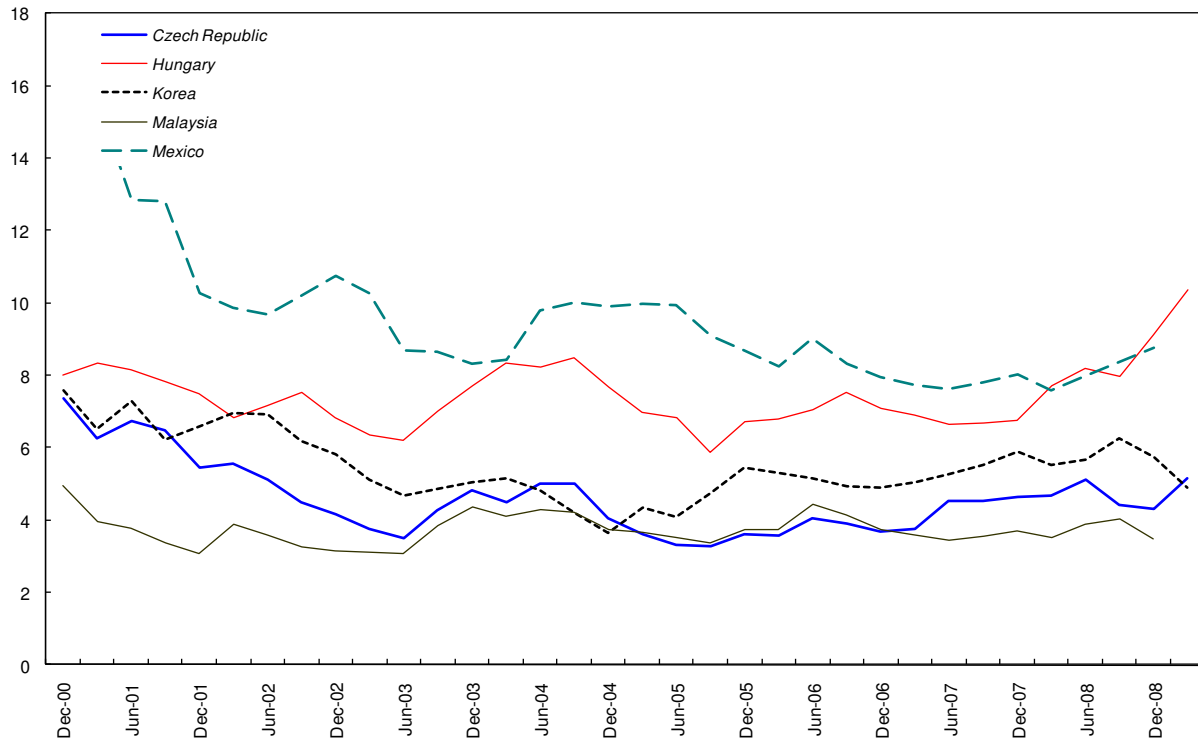
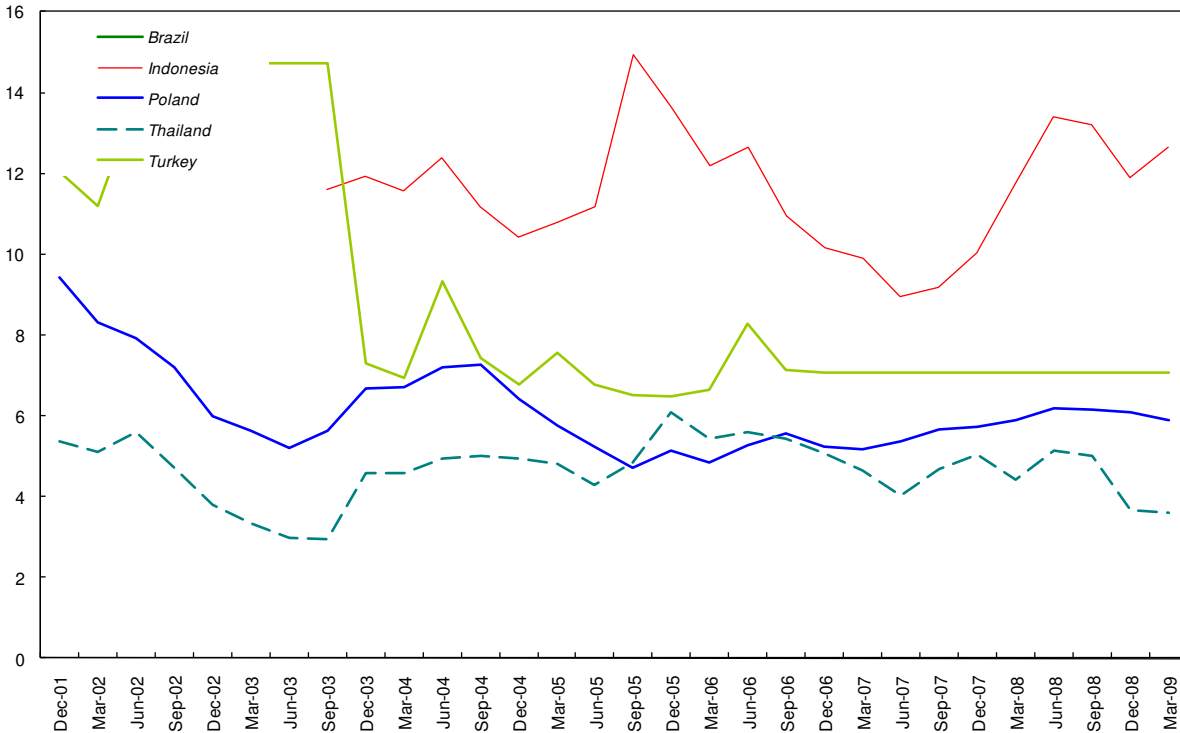


Figure 2b. Long-term government bond yields in EMs



Bond market imbalances could also spill over to other financial markets. Past experiences show that shocks generally spread from equity markets to bond markets, rather than the reverse (Fang, Lim and Lin, 2005; Gebhardt, Hvidkjaer and Swaminathan, 2002). Nevertheless, rapid growth in foreign participation in bond markets—relative to the supply of instruments available for investment—could fuel asset price bubbles, particularly when combined with excessive concentration in a few market participants that may exhibit herding behavior. This is more likely in countries below the necessary threshold of institutional development to support greater foreign participation (IMF, 2005). Unfortunately, there has been very little analysis of the role played by foreign investors in determining bond prices and scope for bond price bubbles, which is a gap in the literature.

Foreign participation, supported by the necessary institutional and regulatory framework, may minimize volatility. Foreign participation, to the extent that it increases market liquidity and exerts pressure for strong corporate governance and institutional reform, can be a stabilizing force in the long run (Prasad and Rajan, 2008).⁷ Measures to prevent excessive concentration among foreign institutional investors, together with prudential limits on individual exposures, could also help mitigate the risk of asset price bubbles noted above (IMF, 2005). Foreign participation may also serve to stabilize markets by reducing currency mismatches and serving as an alternative source of funding when domestic investors divest (Burger, Warnock, and Warnock, 2009).

C. What Does the Empirical Evidence Show?

To our knowledge there has been very little empirical analysis of the determinants of local currency bond market yields in EMs, in general, and even less on the role of foreign investors.⁸ Previous studies on EMs have generally focused on explaining the determinants of sovereign foreign currency (EMBIG) spreads (Baldacci, Gupta, and Amine, 2008; Gonzales-Rosada and Levy-Yeyati, 2006; and IMF, 2006). Even the empirical evidence on the factors affecting long-term interest rates on government debt in mature markets has focused on domestic fundamentals, with little or no attention paid to foreign participation (Caporale and Williams, 2002).⁹ Gale and Orszag (2003) list 29 studies, finding a “predominantly positive significant” effect of fiscal deficits on interest rates, although there were also several studies that found “mixed” or “predominantly insignificant” effects. Generally, estimated impacts range from a minimum of 10 basis points up to 60 basis points for a percentage point of GDP increase in the fiscal deficit. The impact is larger when using expected fiscal deficits (Laubach, 2009).

There is growing evidence, however, that global factors are increasingly having a pronounced effect on government securities markets in mature markets. The availability of

⁷ Foreign investors usually impose positive pressure for developing robust market infrastructure and transparent market practices (Luengnaruemitchai and Ong, 2005).

⁸ The lack of data on foreign participation in EMs has hampered such a study to date.

⁹ There is also a related literature from the finance (Ang and Piazzesi 2003) and macro-finance approaches geared to modeling the term structure (Ruedebusch and Wu 2008), which is not the focus of this study.

global funds has made the demand for government securities more dependent on global investors' preferences, while country-specific risk factors may play a smaller role in G-7 countries (Kumar and Okimoto, 2009). Hauner and Kumar (2006) analyze the determinants of long-term government debt yields for the G-7 economies over 1960–2005 with quarterly data and find that United States' interest rates and current account balances partly explain why global long-term rates have continued to remain at levels that are considered unusually low, given the state of the economic cycle. In the last decade, capital inflows have also been found to increase sovereign bond market liquidity and lower yields (Hauner and Kumar, 2006). To account for insurance-related capital flows, they include the accumulation of international reserves by the rest of the world as a proxy. Hol (2006) also shows that long-term nominal interest rates in Scandinavian countries are determined by both domestic macroeconomic and international economic conditions.

A more recent paper by Baldacci and Kumar (2009) has extended the analysis of the role of global factors in determining local currency government bond yields to emerging markets, although they do not explicitly model the impact of foreign participation. Baldacci and Kumar (2009) estimate a panel of 31 advanced and emerging economies over the period 1980-2007 and show that countries with larger capital inflows (when foreign direct investment is above 10 percent of GDP) benefit from lower increases in government bond yields when fiscal deficits expand. In addition, episodes of elevated global risk aversion (measured by the VIX) lead to a significantly higher impact of deficits on both nominal and real long-term interest rates.

The literature on the determinants of bond yield volatility in EMs is even more sparse.

There have been some early studies on bond yield volatility in advanced economies (e.g., Borio and McCauley, 1996) using time series techniques, but recent research in this area has generally focused on implied volatility based on option pricing (Brooks and Currim, 2002). However, derivative markets in EMs are generally not well-developed enough to extract information on bond price volatility. Previous studies on EMs have generally analyzed whether there has been volatility contagion (e.g., Edwards, 1998; and Andritzky, Bannister and Tamirisa, 2007).

IV. DATA, METHODOLOGY, AND EMPIRICAL RESULTS

A. Data

We compile a new database of foreign participation in domestic government bond markets in EMs. Foreign participation in the domestic government bond market is defined as the share of the outstanding stock of domestic government securities held by non-residents. Data on the currency denomination of domestic government bonds are not available, but almost all the bonds are denominated in local currency according to a survey by CGFS (2007). Therefore, foreign participation in the domestic government bond market should be a good proxy of foreign participation in the local currency domestic bond market. Quarterly data on foreign participation in the domestic bond market have been obtained from the Asiabondonline database of the ADB and from the IMF's country desk data for 10 large EMs from 2000-09.

Macroeconomic and financial data have been obtained from internationally published sources (Appendix Table 1). All macro-financial data have been obtained from the International Financial Statistics (IFS) and Global Data Source (GDS) database published by the IMF. IFS data for long-term nominal local currency bond yields are used because IFS compiles benchmark long-term local currency government bond yields and ensures cross-country comparison. However, IFS data for long-term nominal local currency bond yields for Brazil, Indonesia, and Turkey are incomplete. For Brazil, Indonesia and Turkey, we use the yield on the generic 5-year local currency domestic government bond from Bloomberg.

The sample of countries was determined purely by the availability of data on foreign participation in EM bond markets. As such, it excludes a number of active local currency EM government debt markets, such as Russia, India, South Africa, and frontier markets such as Ghana, Kenya, Nigeria, and Sri Lanka, which may have different dynamics and determinants of local currency government bond yields than in the sample considered.

B. Methodology

We follow the panel data approach of Baldacci and Kumar (2009) in analyzing the macro and external determinants of long-term local currency government bond yields. A panel data approach is used to overcome the short time series of quarterly data that are available on macroeconomic variables (e.g., GDP) and foreign participation by pooling the data across countries to model the determinants of long-term local currency government bond yields for a representative group of 10 EMs from 2000–09.¹⁰ The panel data estimation method is among the most efficient techniques to analyze the impact of a common set of global factors as well as country specific explanatory variables across a diverse group of countries, as shown by Baldacci and Kumar (2009), and IMF (2009).

The determinants of local currency government bond yields identified in the literature are used as control variables to estimate the marginal impact of foreign participation. A comprehensive set of macro-financial variables encompassing Baldacci and Kumar (2009), Caporale and Williams (2002), and Hole (2006) are included, in addition to foreign participation. The econometric analysis is based on a standard reduced-form specification for a panel of 10 EMs using the following equation (1):

$$Lr_{it} = \alpha_i + \beta_1 Sr_{it} + \beta_2 \pi_{it} + \beta_3 b_{it} + \beta_4 D_{it-1} + \beta_5 M_{it} + \beta_6 GDP_{it} + \beta_7 USr_{it} + \beta_8 CA_{it} + \beta_9 FP_{it} + \varepsilon_{it}$$

where Lr denotes nominal yields on the benchmark long-term government bonds for country i , period t (2000 q1–2009 q1); Sr is the short-term nominal policy interest rate (to control for the effects of monetary policy on the bond yield term structure), π is inflation (to control for inflationary expectations through the “Fischer theory”), b is the fiscal deficit in percent of GDP,

¹⁰ While foreign participation data were available for a few countries from 1995 onwards (e.g., Korea and Mexico), the analysis was restricted to 2000–09 to obtain a fairly balanced panel and estimates representative of the entire sample of 10 EMs.

D is the level of gross general government debt in percent of GDP, M is broad money growth (to control for the “liquidity effect”), z is real GDP growth (to control for the country’s cyclical position), USr the U.S. long-term nominal treasury bond yield (uncovered interest-parity), CA the current account balance (to control for currency risk) and FP the share of foreign participation in the government bond market.¹¹ Results are based on fixed effects least squares estimates.¹²

C. Empirical Results

The panel data estimates indicate that both domestic macro and global factors, particularly foreign participation, have a significant influence on long-term local currency government bond yields in EMs.¹³ Following a general-to-specific modeling strategy, we find five statistically significant determinants of long-term government bond yields in the representative group of 10 EMs (Table 2). The statistically insignificant variables in equation (1) are excluded to obtain the most parsimonious model. All of the statistically significant coefficients are of the expected sign and plausible magnitudes.

- The annualized impact of a 1 percent rise in the fiscal balance to GDP on EMs’ long-term yields is about 20bps, a similar magnitude to the value reported in Baldacci and Kumar (2009) for a group of advanced economies and EMs;
- Importantly, the results also show that foreign participation has a statistically significant impact on yields, controlling for other determinants. A 1 percentage point increase in the share of foreign investors in the government bond market will tend to lower yields by about 6bps on average;
- Long-term yields respond to changes in policy interest rates and inflationary expectations, as reported in studies for advanced economies, while the current account balance plays more of a role in EMs;
- U.S. long-term interest rates are an important global factor in determining local currency bond yields in EMs;
- Domestic monetary aggregates and real economic activity do not have a significant effect on long-term local currency government bond yields in EMs.

A time series approach is used to estimate the impact of foreign participation in government bond markets on the volatility of long-term bond yields in EMs. We use a

¹¹ The model is robust to adding to the baseline specification an index of global risk aversion (as measured by the VIX index) as in Baldacci and Kumar (2009) and alternative measures of global interest rates (e.g., federal funds rates). Panel correlations do not suggest that multicollinearity is a serious problem.

¹² All variables are found to be stationary on the basis of Pesaran’s ADF test for panel data, except public debt which is found to be I(1) not a statistically significant determinant and thus excluded from the baseline model. Standard Hausman test results rejected a random effect assumption.

¹³ Endogeneity of foreign participation and bond yields is not driving the result as the impact of foreign participation on long-term yields is significant even when instrumenting foreign participation using a General Method of Moments (GMM) estimator.

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) framework which has become the standard tool for modeling volatility in financial economics. The question at hand is whether the volatility of long-term local currency government bond yields is affected by foreign participation. For simplicity, long-term rates are modeled as an autoregressive process in the mean equation and foreign participation is introduced in the form of multiplicative heteroscedasticity in the equation for the (conditional) variance in a GARCH (1, 1) model as is standard in GARCH models.¹⁴ The equation is of the following form:

$$\begin{aligned} Lr_t &= \theta + \sum \theta_j Lr_{t-j} + \varepsilon_t \\ \varepsilon_t &\sim N(0, \sigma_t^2) \\ \sigma_t^2 &= \exp(\varphi + \gamma FP_t) + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 \end{aligned} \quad (2)$$

Where Lr_t is the nominal long-term local currency government bond yield for each EM, and σ_t^2 a measure of its volatility. Therefore, the sign on γ provides an estimate of the impact of foreign participation in the domestic government bond market on yield volatility, although the magnitude of γ is not comparable across countries given the conditional volatility measure used.¹⁵ The time series results for monthly data from 2000 show that greater foreign participation significantly increases yield volatility in one country (Korea) and decreases it in a few others (Malaysia, Mexico, Turkey), while being an insignificant explanatory variable in most other cases (Table 3).

Table 3. Fixed effects estimates of long-term yields (2000Q1–2009Q1)

Policy interest rates	0.12** (4.63)
Inflation	0.16** (5.26)
Fiscal deficit	0.05* (1.74)
Foreign participation	-0.06** (4.71)
Current account deficit	0.13** (5.08)
U.S. Interest Rate	0.45** (3.54)
Constant	5.38** (15.82)
R-Square (within)	0.40
F-statistic	129.3

The t-statistics are in parentheses
 ** significance at the 5 percent level
 * significance at the 10 percent level

¹⁴ The lag length of the autoregressive mean equation is determined by the Akaike information criteria while a GARCH(1,1) specification is a standard parsimonious way of expressing the conditional variance equation.

¹⁵ A similar methodology was used by Edwards (1998) to estimate the impact of global factors on interest rate volatility in Latin America during the “Tequila” crisis.

Table 4. Impact of Foreign Investors' Participation on Government Bond Yield Volatility	
Country	Sign of impact and statistical significance
Brazil	Not Significant
Czech Republic	Not Significant
Hungary	Not Significant
Indonesia	Not Significant
Korea	(+)**
Malaysia	(-)*
Mexico	(-)**
Poland	Not Significant
Thailand	Not Significant
Turkey	(-)**
** significance at the 5 percent level * significance at the 10 percent level	

The results presented above should be interpreted with caution. While the empirical model of long-term local currency bond yields in EMs encompasses the determinants identified in the literature, there could always be other “omitted” variables that matter.¹⁶ The panel data estimates for a representative group of 10 EMs may also not apply to all EMs. The analysis of the impact of foreign participation on government bond yield volatility relies on a simple statistical approach, although it provides some insight into the dynamics of bond yield volatility in EMs, an area of sparse research. While a more theoretical approach would be needed to explain the findings, one would expect the relatively low level of interest rate volatility observed in EMs (figure 2) to explain why the impact of foreign participation was insignificant in most countries. In addition, as discussed in section II, the role and participation of different domestic institutional investors differ across countries, which may explain why foreign participation has a differential impact on bond yield volatility in Korea on the one hand, and Hungary, Malaysia, Mexico, and Turkey on the other.

¹⁶ Given the importance of foreign participation, the behavior of domestic institutional investors is an obvious variable. Data limitations on the share of domestic institutional investors in EM domestic bond markets through time preclude such an analysis.

V. CONCLUSIONS

Based on a new data base for 10 EMs, this study shows that foreign participation is associated with lower bond yields, while there is no evidence that volatility necessarily increases. There has been a sharp rise in foreign participation in local currency EM bond markets associated with their growing size and importance as a source of financing. This has raised questions as to whether foreign participation has helped deepen those markets or is a potential source of vulnerability as a transmission channel for global shocks. In practice, the significance of foreign participation in deepening markets (and thus ultimately reducing yields) has been untested due to a lack of data on foreign participation in EMs. The experience with surges in capital flows to emerging markets and economic crises has also raised concerns about the risk that greater foreign participation may lead to higher bond yield volatility. The results of a panel data analysis of 10 EM economies from 2000–09 that have significant foreign participation in the government bond markets suggest that greater foreign inflows tend to significantly reduce long-term government yields. Moreover, greater foreign participation does not necessarily result in increased volatility in bond yields in EMs and, in fact, could even dampen volatility in some instances. These results should not be interpreted as conclusive evidence that it is always beneficial to open up domestic local currency bond markets to foreign investors, as we do not attempt to undertake a comprehensive study of the costs and benefits of foreign participation such as their developmental role or potential for fueling asset bubbles. Instead, the study provides quantitative evidence that at least in the case of local currency bond yields in EMs, foreign participation has been beneficial.

APPENDIX. I. DATA SOURCES

Data Description	Data Source
Foreign participation	Asiabondonline database of the ADB for all Asian economies and IMF Country Desk data for the others
Local currency government bond yield	International Financial Statistics, IMF for all countries except Brazil, Turkey and Indonesia where generic government rates from Bloomberg are used.
Short-term nominal policy interest rate	IMF Global Data Source
CPI Inflation	International Financial Statistics, IMF
Fiscal balance to GDP	International Financial Statistics, IMF
Gross government debt to GDP	IMF Global Data Source
Broad money growth	International Financial Statistics, IMF
Real GDP growth	International Financial Statistics, IMF
U.S. 10-year treasury bond interest rate	International Financial Statistics, IMF
Current account balance	International Financial Statistics, IMF

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