What Slice of the Pie? The Corporate Bond Market Boom in Emerging Economies[1]

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Abstract

This paper studies the determinants of shifts in debt composition among emerging market non-financial corporates. We show that the determinants of bond market access in EMs vary with global cyclical conditions and across local and foreign currency markets. We find that the role for institutions and macro fundamentals in creating an enabling environment for markets increased during the post-crisis period for local currency markets. At the same time, foreign bank linkages help explain why local bond markets increasingly substituted for banks in channeling liquidity to EMs. In the case of foreign currency markets, in turn, global cyclical factors accounted for most of the variation. Furthermore, a country's relative sensitivity to global factors appears to vary with the size of its bond market rather than local fundamentals. Our results highlight the risk of capital flow reversal in EMs that benefited from the upturn in the global financial cycle mostly due to their large and liquid markets rather than strong fundamentals.

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1. INTRODUCTION

Over the past two decades, emerging market economies (EM) have become increasingly integrated into global capital markets. While the development of equity markets picked up pace in the 1990s, the growth of private bond markets was initially slower and limited to a subset of industries in a smaller number of EMs. The period immediately following the global financial crisis (GFC) saw private bond market issuance catching up. The annual value of EM non-financial corporate (NFC) issuance increased more than threefold between 2009 and 2014, grossly outpacing equity and syndicated loan issuance. The boom contributed to growing debt stocks and sizable exposures to both foreign exchange risk and asset managers with portfolios highly concentrated in EM assets (IMF, 2014). On the bright side, it allowed a more diversified set of borrowers to diversify their funding sources. A key question is whether the borrowing spree can be seen, at least in part, as a structural rather than a cyclical shift in bond market development.

Policymakers in EMs have long pursued initiatives to promote capital market development more generally, and bond market development in particular.[2] Intuitively, the diversification of funding sources should lead to more efficient capital allocation and better risk sharing, with a positive impact on long-term economic growth.[3] What is more, evidence from advanced economies (Kashyap et al, 1993, Adrian et al, 2012, Becker and Ivashina, 2014) suggests that local bond issuance does not share the strongly pro-cyclical behavior of bank lending. It is in this spirit that the Asian financial crisis led observers to proclaim bond market development as an effort to develop "spare tires" that borrowers can rely on when bank balance sheets are strained (Greenspan, 1999).[4] [5]

This paper studies the determinants of shifts in debt composition among EM corporates. Our primary aim is to identify both global and domestic factors - other than those related to the demand for borrowing more generally - that explain why financial systems shift away from bank lending and towards bond market finance. Our focus is on the recent bond market boom

[2] The Asian Bond Fund 1 and 2, an initiative of 12 major central banks in Asia-Pacific region, administrated by the BIS, is one example of such policies. Furthermore, the IMF, World Bank and ECB launched in 2007-08 a joint action plan under the G8 umbrella for developing local bond markets in EMs ("Developing Local Bond Markets in Emerging Market Economies and Developing countries").

[3] A central finding in the literature is that both banks and markets have a role to play in providing access to finance and supporting growth (Demirguc-Kunt and Levine, 2001; Levine, 2002; Demirguc-Kunt and Maksimovic, 2002). In particular, while banks tend to be more adept at lending to smaller companies, bond markets hold a comparative advantage in servicing larger, more established companies. At the same time, financial systems become increasingly market based at higher levels of income (Demirguc-Kunt et al, 2012).

[4] However, as discussed in more detail below, the experience has shown that the notion of bond markets as "spare tires" may not hold under sufficiently severe disruptions.

[5] Cross-border syndicated lending and international private bond issuances, on the other hand, historically show cyclical variation in volumes and interest rates spreads (Francis et al, 2014). The present EM corporate bond boom thus can be in part driven by the temporary easing of financial conditions in global markets.

and the question why it was stronger in some countries than in others. In particular, we aim to understand whether there exist significant differences in the behavior of local currency (LC) and foreign currency (FC) markets over this period and whether EMs that experienced the largest booms relative to bank lending were those with strong fundamentals and institutions or whether it was cyclical factors that drove flows into the largest and most liquid markets. In this context, we also explore the role of cross-border bank linkages.

To facilitate the analysis, we propose a measure of corporate debt that can be decomposed both into bank loans and bonds, and into local and foreign currency instruments. To allow for differences in driving forces between LC and FC bond market growth (Eichengreen et al, 2002, Allayannis, et al, 2003), we run separate sets of regressions with the share of LC and FC bond finance in total outstanding corporate debt, respectively, as dependent variables. Defining the dependent variable as a ratio has important advantages, including that it can be directly interpreted in relation to the size of the NFC sector's outstanding debt.[6] What is more, it implicitly controls for potentially endogenous factors that drive the overall demand for borrowing (from both bond markets and banks). The main focus of the empirical analysis is thus on factors that drive bond issuance beyond what can be explained based on shifts in the demand for funding.

We tackle our question of interest in two ways. First, we estimate censored panel regressions with fixed effects (Honore, 1992).[7] While these enable us to identify a wide range of global and local drivers of bond market shares, they are not ideally suited for testing whether a prominent finding of our descriptive analysis continues to hold, namely that market size is an important conditioning variable for the influence of global factors on increasing bond market access during the post-crisis period.[8] In order to test this hypothesis, we cast the model in a panel quantile regression setup and employ the recently proposed censored quantile regression estimator for panel data with fixed effects (Galvao et al, 2013). The quantile regression offers a parsimonious framework to trace the varying importance of determinants at different levels of relative bond market development. In this way, we can analyze whether the search for yield in global markets during the post-crisis period affected countries differently depending on whether their bond markets were more or less developed.

Our main hypothesis is that the recent boom was driven primarily by the global financial cycle (Rey, 2013; Shin, 2013). The analysis indeed confirms that global cyclical factors accounted for most of the variation of bond shares in total corporate debt. That said, the relative importance of local fundamentals and sensitivity to global factors differs

[6] Note also that the correlation between NFC bond market debt divided by GDP and divided by total NFC debt is more than 70 percent.

[7] The need to account for censoring arises because the dependent variable is censored at zero while the need to control for unobserved cross-sectional heterogeneity arises from, inter alia, time-invariant drivers of financial development.

[8] While we could include (lagged) market size among the regressors, the arising simultaneity problem would be difficult to deal with.

substantially between LC and FC bond markets. In the case of FC bonds, macro fundamentals are important determinants of bond market growth before 2010, but their relative role diminished during the post-crisis period as global factors in the form of the search for yield and falling relative cost of bond finance took center stage, paired with a growing investor focus on market size.[9] In contrast, the importance of macro fundamentals for LC bond market growth gained further prominence over the post-crisis period. Finally, we also find evidence for a role for global bank leverage in driving cross-border banking, building on the findings of Bruno and Shin (2015a), among others.[10]

Our paper is related to empirical literature on the determinants of corporate bond issuance at the firm and country level. Earlier studies predominantly for developed countries have shown that both firm-specific characteristics and the macroeconomic environment matter for firms' decisions to issue bonds (Houston and James, 1996, Johnson, 1997; Datta et al, 2000; Dennis and Mihov, 2003; Hale and Santos, 2008; Mizen and Tsoukas, 2013, Didier et al, 2014, Gozzi et al, 2015). Important firm characteristics include firm size, growth and financial conditions while various other factors such as market depth, information asymmetries and market timing also play a key role. In addition, the literature emphasizes the role of reputation as past issuers are more likely to issue again than firms that have never issued before. Relatedly, the probability that a firm will issue a bond in domestic markets (relative to either not issuing at all or issuing in foreign markets) grows with the level of local bond market development.

At the same time, economic fundamentals are important drivers of bond investor interest (Laeven, 2014). Goldstein and Turner (2004) argue that economic policies and institutions are key determinants of bond market development in EMs. Eichengreen and Luengnaruemitchai (2006) indeed find that institutional impediments - and to some extent macro policies - can help explain the smaller size of Asian and Latin American LC bond markets relative to advanced economies. Hale (2007) suggests that country risk is the key macroeconomic fundamental that explains a large share of the variation in corporate financing choices between FC bonds and syndicated loans in EMs.

The choice between bond and bank financing can also be time-varying and related to cyclical drivers or the incidence of financial crises. Becker and Ivashina (2014) find evidence of a cyclical substitution between bank credit and bond financing at the firm level in the US, confirming earlier findings by Ramey (1992) and Kashyap et al (1993) at the macro level. Adrian et al (2012) provide additional empirical evidence on loan-bond substitutability in the

[9] The search for yield would normally drive cross-border bank loans as well (Goldberg, 2009), conditional on global banks' capital structures (Dell'Ariccia et al, 2014, Buch et al, 2014). The post-crisis period, however, was characterized by weak bank balance sheets and global bank deleveraging amid tighter home regulations. Consequently, bond markets became the main conduit of capital flows to emerging markets as investors searched for higher yielding assets.

[10] Foreign bank exposures to EM financial systems mostly held up well following the GFC although cross-border exposures declined as foreign banks shifted increasingly from centralized to multinational funding models. While cross-border exposures of global banks to European EMs declined strongly following the crisis, overall exposures did not, and the bond market boom was limited.

US during the GFC and relate this pattern to the cyclicality of bank leverage. However, empirical evidence on the substitution channel is weaker in the case of developing economies. Indeed, Eichengreen (2007) notes that there is no guarantee that bond markets will continue to function as banking sectors collapse. Arteta and Hale (2008) find that both bank loan and bond financing to NFCs decrease following sovereign crises. Allen et al (2012), similarly, show that banking sector and bond markets behave as complements rather than substitutes in the aftermath of banking crises.

Finally, our paper is related to the literature on capital flow surges during the post-crisis period. The importance of global conditions for fixed income flows to EMs has long been recognized in the literature. Early studies (Calvo et al, 1993, Chuhan et al, 1998) find that factors related to global liquidity and interest rates are more important than local fundamentals in explaining bond and equity issuance in Asian and Latin American economies in the 1990s. Rey (2013) establishes the existence of a global financial cycle—driving capital flows, asset prices and credit - which is not aligned with country-specific macroeconomic conditions and co-moves with uncertainty and risk aversion in global markets. Similarly, Forbes and Warnock (2012) show that global risk proxies such as the VIX consistently predict waves of capital flows. Bruno and Shin (2015a) highlight the key role of the global bank leverage cycle in explaining cross-border banking flows and its close relationship with the role of the VIX. On the other hand, Fratzscher (2012) emphasizes the growing role of macro fundamentals during the post-crisis period, showing that countries with stronger macro fundamentals suffered lower capital outflows during the crisis and were able to attract more flows after the initial shock. Ghosh et al (2014) confirm the role of fundamentals in other episodes of capital flows surges. The cross-country variation and the relative role of local and global conditions in the recent EM NFC bond market boom, however, are still largely unexplored in the literature. Existing studies primarily focused on FC bond issuance. Turner (2014) discusses the rise of bond financing in EMs. Bruno and Shin (2015b) relate increase in the US dollar-denominated bonds issuance to financial risk-taking behavior of EM NFCs, motivated by the dollar carry trade attractiveness in the periods of abundant global liquidity. Caballero et al (2015) highlight that the effect is stronger in countries with tighter capital controls on capital inflows. Lo Duca et al (2015) show a positive effect of US quantitative easing policies on NFC bond issuance in a sample of advanced and emerging economies.[11] McCauley et al (2015) discuss the importance US unconventional monetary policies for changes in dollar credit transmission from global banks to global bond investors.

This paper contributes to the existing literature in three ways: first, we propose a measure of NFC debt stocks in EMs that allows for a breakdown both by currency and by instrument. This allows studying the time and cross-country variation in the relative importance of bond versus bank financing for a large set of EMs. Second, we analyze the drivers of bond market

[11] Analogously, Bremus and Fratzscher (2014) find a positive effect of expansionary monetary policies in advanced economies on cross-border banking flows over the post GFC period. Cerutti et al (2015) show that macroeconomic fundamentals and the nature of the investor base help explain cross-country variation in the impact of global push factors on public and private bond flows to EMs (less so in case of bank flows).

shares in NFC debt at the macro level, allowing their impact to vary across different levels of bond market development, while controlling for the impact of demand side factors and time-invariant drivers of financial development. Finally, we show that the determinants of bond market access in EM vary importantly with global cyclical conditions and with the bond's currency of denomination. In particular, we confirm earlier findings in the literature on the importance of local fundamentals and global bank leverage for the EM corporate debt structure. However, we show that the relative role of local fundamentals in the case of FC bonds declined substantially during the post-crisis period as global factors took center stage, paired with a growing investor focus on market size. In contrast, the relative importance of local fundamentals increased for LC bonds during the same period, explaining, in part, the heterogeneity in the transmission of global funding shocks.

These findings are important from a policy perspective. In the case of local currency bond markets, investors appear to have focused on local fundamentals in deciding how to allocate their funds across markets, perhaps in part due to an awareness of exchange rate risk. In foreign currency bond markets, in turn, domestic fundamentals have played little role in driving the post-crisis boom. To the extent that access to foreign currency denominated bond finance boomed in EMs largely because large and liquid markets attracted investor flows during a cyclical upswing in the global financial cycle, these markets may be hit severely by capital outflows when the cycle turns. While incentivizing corporate deleveraging may be part of an appropriate policy response in sectors where leverage has risen to high levels, continued access to bond market finance will remain an important ingredient to a vibrant corporate sector. Strong institutions and policies that contribute to macroeconomic stability will add to EMs' ability to attract long-term investment flows in an environment of tighter global financial conditions. At the same time, monitoring vulnerable firms, especially those with open foreign exchange positions, will be crucial.

The remainder of this paper is organized as follows: Section 2 discusses a measure of non-financial corporate debt stocks for emerging markets, its composition and trends. Section 3 presents the empirical specification used in the regression analysis covered in Sections 4 (panel model) and 5 (quantile regression setup). Section 6 concludes.

2. TRENDS IN NON-FINANCIAL CORPORATE DEBT STOCKS AND COMPOSITION

This section discusses our measure of non-financial corporate debt stocks as well as recent trends in EM corporate indebtedness.[12]

In the context of unconventional monetary policies in advanced economies, and the search for yield in global financial markets, EM corporate bond markets have boomed (Figure 1, left panel). Both foreign and local currency issuance contributed as the role for bonds in total financing increased notably in recent years. Equity issuance by NFCs dropped from 1.7 percent of EM GDP in 2008 to about 1.1 percent in 2010 and 0.5 percent in 2014. At the

[12] Note that our measure includes debt by both privately and state-owned non-financial corporations.

same time, bond issuance increased from about 0.8 percent of EM GDP in 2008 to 3.3 percent in 2014. The right panel in Figure 1 illustrates that, since about 2010, bond markets have increasingly replaced syndicated loans as conduits of channeling liquidity to EMs.

The data source for the stock of outstanding bond market debt is the Dealogic Debt Capital Markets database (DCM).[13] Dealogic DCM incorporates global primary market bond data since 1980, with details on almost half a million international and domestic deals. We calculate the stock of bonds outstanding in country *c* at time *t* as the sum of bonds issued since 1980 in country *c* minus the sum of all those bonds that have matured by time *t*.[14] In particular, we determine the dollar value of the outstanding stock of bonds at each point in time.[15] We distinguish local and foreign currency bond stocks based on the currency at time of issuance. In countries in which the NFC sector never issued a bond, the stock of bonds outstanding is zero. Our country classification is based on the nationality of the parent company unless the issuer does not have a parent. This allows associating offshore issuance by foreign incorporated subsidiaries of parent companies located in country *c* with country *c*. In other words, debt stocks are calculated based on an ultimate risk basis (Avdjiev et al, 2014).[16] While calculating the stock of outstanding bonds on an ultimate risk basis is inconsistent with the remaining components of our measure which are calculated on a residence basis, we do so in order to avoid excluding an important part of the post-crisis bond market boom. We do, however, check the robustness of our results to using a measure that is computed on a residence basis throughout, including for bonds (and thus excludes offshore issuance by foreign incorporated subsidiaries).

[Insert Figure 1]

The second component of our measure is domestic loans, broken down into local and foreign currency loans. For the majority of countries in our sample, this information is taken from the IMF's International Financial Statistics (IFS). For those countries for which the data is not available in IFS, it is directly sourced from the relevant country authorities (Table A1). The

[13] More information is available under**:** http://www.dealogic.com/the-platform/unique-content/#debt. Coverage includes Investment Grade Bonds, High Yield Bonds, Supranational Bonds, Sovereign Bonds, Local Authority Bonds, Agency Bonds, Securitization, Covered Bonds, Medium-Term Notes, Preferred Stock, EMTN programmes and trades, and ECP programmes and trades.

[14] Note that this may imply a flawed stock estimate to the extent issuances were not captured by Dealogic or because the borrower defaulted.

[15] The stock of outstanding bonds is calculated as the sum of the stocks of outstanding bonds in all relevant currencies, converted into US dollars using the prevailing bilateral exchange rate at any given point in time. Both stock and flow data may be incomplete to the extent that Dealogic DCM does not fully cover issuances of debt or equity securities in a given sector or country. Coverage is likely to be better in more developed economies and more recent years. There is only very limited coverage of short term debt securities (less than one year).

[16] Note that domestic and cross-border loans cannot be calculated on an ultimate risk basis due to data unavailability.

third component of our measure is cross-border loans from BIS reporting banks to country *c*'s non-bank sector, where we assume that all cross-border loans are in foreign currency.[17]

Our complete measure is available for 47 EMs, spanning the period of 2000–13 (Table A1). Appendix 1 discusses some of its caveats, compares it to data from existing sources and describes how we adjust the measure for valuation effects.

Our measure can provide some important insights into the dynamics underlying NFC debt and its composition. The right panel in Figure 2 illustrates that bond finance to EM NFCs is still small relatively to loans from domestic and foreign banks: the mean outstanding stock of NFC bonds in our sample amounted to 5.3 percent of GDP in 2013 while domestic and foreign bank loans together amounted to an average of 40.5 percent. At the same time, however, the importance of bonds as a share of total corporate debt has grown substantially since the global crisis. The stock of outstanding bonds more or less doubled since 2009 in GDP terms while the outstanding stock of bank loans remained broadly constant. In other words, on average, the bond market boom has driven most of the increase in overall debt stocks over this period. The left panel in Figure 2 shows that the increase in debt ratios has indeed been dramatic with FX debt contributing notably. The handful of European EMs in which NFC debt stocks dropped are the exception.

[Insert Figure 2]

The key question this paper asks is what determined the extent to which the global bond market boom boosted access to bond finance – relative to bank loans—in some EMs more so than in others. We aim to disentangle underlying factors in the econometric analysis presented in subsequent sections. It is useful, however, to illustrate some interesting descriptive findings beforehand. Figure 3 illustrates that the importance of foreign bank loans in total EM corporate debt has declined since the global financial crisis, in line with weaker balance sheets and tighter regulatory regimes in global banks. With regards to bond finance, we see that it is largely access to international bond markets that increased in recent years relative to total NFC debt. We observe that the FX bonds share increased from 5.6 percent in 2008 to 8.0 percent since 2008, while in previous years it remained almost unchanged. The share of domestic bond finance, in turn, on average grew rapidly from 2003 to 2007, but has been gradually increasing since 2009.

[Insert Figure 3]

If we look at the same chart by region, we see that Asia is the exception that stands out (Figure 4). Here, it is local bond markets that have grown while access to foreign markets at best stagnated. A possible explanation might be the strong policy push towards local bond market development since the launch of the Asian Bond Market Initiative (ABMI) in 2003

[17] Since the BIS data comprise loans to non-banks more generally, we also implicitly assume that cross-border loans to non-bank financial institutions are zero. For the majority of emerging markets in our sample, this should not be a very strong assumption. What is more, across our sample, cross-border loans only play a relatively minor role in total loans to non-financial corporations.

and the Asian Bond Fund 2 ABF2 in 2005 (Chan, 2011). What is more, while foreign bank loans declined across other regions in recent years, it was the share of domestic bank loans in Asia whose share in total debt has fallen.

[Insert Figure 4]

With view to the econometric analysis, it is interesting to establish whether it was EMs with larger access to domestic and international bond markets that grew strongest in recent years or rather those that were initially still more constrained in terms of bond finance.

The top right panel of Figure 5 illustrates that it is indeed EMs with the largest access to international bond markets in which access grew most since 2009. The larger a country's access in 2009, the more its access grew over the subsequent years. The top left panel however shows that this is not business as usual: between 2003 and 2009, this relationship did not exist. If anything, countries with the largest initial access grew the least while countries with the smallest initial access grew the most. Moving to the lower panel, we see that a declining pattern also holds for local currency bond markets. In other words, over the entire sample period, it is the countries with the largest local bond market access that grew the most.

[Insert Figure 5]

Overall, this finding suggests that market size and easy entry and exit for investors are important in explaining why FC bond market access grew more in some EMs than in others during the post-crisis period while the same change in pattern is not present in the case of LC bond market. In subsequent sections, our aim is to assess whether this finding continues to hold in a regression setup. In particular, we aim to understand the relative roles of domestic structural factors—such as institutions and macro fundamentals—versus global cyclical factors in explaining bond market development across EMs.

3. EMPIRICAL SPECIFICATION

In this section, we move to the econometric analysis. In particular, we estimate different variants of the general model:

$$y_{it} = \alpha_i + EE'_{it}\delta + MF'_{it}\delta + BC'_{it}\gamma + G'_t\beta + Z'_{it}\Phi + \varepsilon_{it} \quad (1)$$

Throughout our analysis, the dependent variable y_{it} is the share of bond finance (local or foreign currency) in total outstanding corporate debt. The advantage of our dependent variable of choice - compared to more commonly used measures of bond market development such as bond market debt over GDP - is that it implicitly controls for factors driving the overall (both bond and bank) demand for borrowing. In other words, it alleviates the need to control for variables such as economic activity on the right-hand side and thus does not require dealing with the related reverse causality issues.

In order to ensure parsimony, we group potential determinants into subsets and include only a limited number of variables from each subset in the regressions. The first group of regressors, *EE*, includes factors that create an enabling environment for bond market development such as the quality of domestic institutions or the relative cost of funding. The second group of covariates, *MF*, comprises macro fundamentals. The third group of regressors, *BC*, includes proxies for local banking system characteristics. The fourth group of explanatory variables, included in *G*, comprises global factors driving bond and bank capital flows to EMs. Finally, our particular interest in the recent bond market boom episode leads us to interact all regressors in our model with a dummy that takes the value one for all observations during the period 2010 to 2013 and zero otherwise. The interaction terms are included in the vector *Z*. The definition of the dummy variable follows the literature (Cetorelli and Goldberg, 2011; Shin, 2013; Bremus and Fratzscher, 2014) who classify 2010-13 as the post-crises episode. In the robustness section, we also add year effects and regional time trends to the vector *Z* to control for additional global shocks, potential non-stationarity and heterogeneous trends in bond market development.

We make use of the time series dimension in *y* by using a panel regression setup for the entire sample period to explain developments in bond market shares. We tackle our question of interest in two ways. We begin with censored panel fixed effects regressions (Honore, 1992) of *y* on our control variables. The need to account for censoring arises because the dependent variable, *y*, is censored at zero (a modest share of the observations in our sample do take the value $y=0$); the need to control for unobserved cross-sectional heterogeneity arises from, inter alia, time-invariant drivers of financial development. While these regressions enable us to identify a wide range of global and local drivers of bond market development, they do not allow us to test reliably whether market size is an important conditioning variable for the effect of global factors on bond market access during the post-crisis period. While we could include (lagged) market size among the regressors, the arising simultaneity problem would be difficult to deal with.

In order to allow testing the proposition that market size matters for bond market development, we therefore, in the second step, cast the model in a panel quantile regression setup. This framework offers two main advantages for our analysis. First, the quantile regression estimator is robust to outliers in the dependent variable and imposes fewer restrictions on the distribution of the error term relative to conditional mean estimators. It thus provides a useful robustness check of the conditional mean results. Second, it provides a parsimonious way of tracing the varying importance of determinants at different levels of bond market development.[18] In other words, it allows assessing how global factors and domestic conditions affect countries based on their position in the conditional distribution of bond market shares in total debt. Throughout the analysis we will be using the term “market development” and “market size” rather synonymously with “bond market shares in total NFC debt”. While a more typical definition would be bond market debt over GDP, the advantage

[18] Specifically, the quantile regression allows characterizing the impact of each determinant across the entire conditional distribution of the dependent variable which provides a more complete pattern of influences compared to conditional mean estimates.

of our measure is that it allows relating changes in the dependent variable directly to the size of the NFC sector's total debt stock. It is further important to note that the correlation between NFC bond market debt over GDP and over total NFC debt is very high, amounting to more than 70 percent.

In order to control for both fixed effects and the censoring character of the dependent variable in a quantile regression setup, we use the recently proposed censored quantile regression estimator for panel data (CPQR) with fixed effects (Galvao et al, 2013). The CPQR estimator is an extension of Chernozhukov and Hong's (2002) three-step censored quantile regression estimator. The general idea behind the CPQR estimator is to estimate a standard panel fixed effects quantile regression on a suitably defined subset of observations. The subset of observations for a particular quantile (τ) is selected by estimating a probability model for the non-zero bond share of NFC financing and selecting the observations for which the estimated propensity score is higher than $1-\tau$. This ensures that only the data for which the conditional quantile line is above the censoring point is used in the estimation of the quantile regression parameters. The estimation procedure is done in three steps which are briefly summarized in Appendix 2.

4. ESTIMATION RESULT USING PANEL MODEL

We begin by discussing the results of the censored panel regressions with fixed effects. The first subsection analyzes the drivers of relative local currency bond market growth. The second subsection presents results from regressions with the share of foreign bond finance as the dependent variable.

4.1. Local currency bond regressions

The dependent variable in this section is the percent share of local currency bond market debt in total NFC debt. All regressors we employ are defined in Table A2 in the Appendix. Country specific regressors are winsorized at the 2% level to minimize the impact of outliers. Tables 1 to 4 each show our benchmark specification in the first column as well as, in the remainder of the columns, robustness checks in which we deviate from the benchmark by adding/replacing one indicator at a time from a given subset of regressors (*G*, *EE*, *MF* and *BC*). All tables report estimated average marginal effects (Honore, 2008, Alan et al, 2014) with bootstrapped standard errors. We use standard clustered bootstrap (with 500 repetitions) and calculate significance levels as bias-corrected percentiles of the bootstrap distribution (Abrevaya and Shen, 2014).[19]

Table 1, column 1 shows the results from our baseline specification. We estimate the model over the period 2002–13. The number of observations is 476, with 43 cross-sectional units and an average of 11 observations per unit.[20] Importantly, the dummy for the period 2010–13

[19] Estimation is done by adapting the pantob.ado file for our framework. We are grateful to Bo Honore for making it available.

[20] Among the list of countries in Table A2, Argentina, Belarus, Jamaica and Venezuela are not included in the baseline regressions due to data availability.

is insignificant, illustrating that the specification does a good job at explaining differences between pre- and post-crisis episodes.

We begin by examining the findings for the regressors included in *EE*, namely domestic factors that create an enabling environment for LC bond market development. The empirical literature has established a strong link between institutions and financial development.[21] Given the disadvantages bond market investors face - compared to banks - in information gathering (Holmstrom and Tirole, 1998), seniority (Welch, 1997) and collateral loan immunization (Rajan and Winton, 1995), we would expect stronger institutions to boost investor interest in bond market financing relative to bank lending. Other factors that may create a stronger enabling environment are those that proxy for an established issuer base and financial infrastructure. Both issuers and investors may benefit through limited information gaps and a lower cost of market entry. While we cannot include initial market size as a regressor for reasons discussed in the previous section, we do include proxies such as a measure of bond market diversification.

Our baseline specification includes two regressors that are designed to proxy for the quality of the local enabling environment; first, an indicator of institutional quality, second, a measure of the concentration of bond issuance. The institutional quality indicator of choice is the number of procedures necessary to enforce contracts from the World Bank's Doing Business indicators, an indicator widely used in the literature. The results shown in column 1 of Table 1 illustrate that the number of enforcement procedures is indeed a significant determinant of bond market development and carries the expected negative sign. The same holds for the concentration indicator (negative sign). Conversely, the interaction terms between both variables and the dummy for the period of 2010–13 are all insignificant at conventional levels. In other words, a strong enabling environment drives LC bond market development. However, the importance of these factors has not changed during the post-crisis period and is thus unlikely to explain the strong boost to bond market development in recent years.

This finding is confirmed in our robustness checks in columns (4-8) of Table 1. Column 2 replaces our measure of institutional quality with an alternative indicator frequently used in the literature, namely creditor rights. This and other indicators not shown here for parsimony (credit information and the rule of law) carry coefficients with the expected sign (stronger institutions are associated with higher bond market shares), but not all of them are significant. The subsequent three columns add proxies for the quality of market infrastructure as regressors, (a) GDP per capita, (b) a dummy variable for membership in the Asian Bond Fund (ABF) initiative, an initiative of 12 major central banks in the Asia-Pacific region to promote local bond market development, and (c) the stage of development of the government bond market (Dittmar and Yuan, 2007), the latter proxied by a dummy for the inclusion in

[21] Djankov et al (2007), for instance, document a positive association between financial development—measured as total banking sector assets—and both contract enforcement and the protection of creditor rights. They also find that the quality of information sharing is especially important in developing countries relative to advanced economies as discussed in Japelli and Pagano (2002). Papaioannou (2009) shows that institutional development is also a significant correlate of international banking inflows.

J.P. Morgan's EMBI Global index. Among the three regressors only the ABF enters significantly .[22] The interaction terms are once again not significant, confirming the result that an enabling environment matters but is unlikely to explain much of the cross-country variation in the recent bond market boom. Moreover, note that alternating the enabling environment proxies generally does not change the signs or the statistical significance of the remaining regressors.

Columns (6-8) take a closer look at local banking system characteristics. The primary variable of interest in this group is the bank capital to assets ratio, an inverse measure of leverage. The theoretical literature provides ambivalent guidance as to the expected sign of the variable's coefficient. Noting that an increase in the capital ratio implies falling bank leverage, a negative sign implies that bond market issuance is a complement rather than a substitute to bank lending (Holstrom and Tirole, 1997). Intuitively, bank lending and LC bond issuance may both increase as local bank risk taking takes off since local banks tend to be major holders of corporate bonds in EMs (Eichengreen and Luengnaruemitchai, 2006). In addition, if the bond market investors face information and monitoring deficits compared to banks, uncertainty for bond investors grows - driving down their supply of funds—as the stock of outstanding bank loans falls (Holstrom and Tirole, 1997). Conversely, a positive sign could arise either if banks and bond markets were substitutes or if they were complements with bond markets less sensitive to cyclical conditions. The evidence from advanced economies (Kashyap et al, 1993, Adrian et al, 2012, Becker and Ivashina, 2014) suggests that local bond issuance does not share the strongly pro-cyclical behavior of bank lending (leverage) and that bonds tend to substitute for cyclical contractions in the supply of bank loans.

When we include the local bank capital to asset ratio in the baseline specification, it turns out to be insignificant with a positive sign, both before and after the crisis (Column 6). We obtain a similar result when we replace it with the share of non-performing loans in Column 7 (Becker and Ivashina, 2014) as a proxy for the strength of the bank's balance sheets. In sum, while LC bond market issuance could substitute for weak local bank lending, the evidence is not statistically significant.

Finally, we also control directly for the degree of dependence on foreign funding in Column 8 of Table 1 using an indicator that captures lagged cross-border exposures of BIS reporting banks to domestic banks as a percentage of GDP. During periods of growing cross-border banking, we may expect the variable to carry a negative coefficient, signaling that EMs highly dependent on cross-border banking would further increase their dependence on foreign funding intermediated through banks. Our results confirm this expectation as the indicator shows a negative coefficient, but is not statistically significant. However, during the post-crisis period, as global banks reduced cross-border lending, one may expect the opposite, namely that a high initial dependence on foreign funding would put downward

[22] Another potential determinant is the size of the local institutional investor base, however consistent data across the countries was not available.

pressure on bank credit and thus increase the dependent variable (positive coefficient on the interaction term). However, we find no evidence for such a link.[23]

[Insert Table 1]

The baseline regression further includes one variable from the *MF* subset, proxying for the quality of macroeconomic fundamentals in relation to the level of country risk (Hale, 2007). In particular, we include the lagged three-year average current account balance as a percent of GDP in line with Fratzscher (2012) and Burger et al (2015), who illustrate the importance of current account as a pull factor of global capital flows. The first column of Table 2 illustrates the evidence for the expected positive association between the lagged current account and the dependent variable, indicating that increasing bond market access more so than credit growth is predicated on strong fundamentals. The coefficient is positive, although only the interaction term is statistically significant. Table 2, columns 2 to 4 show the results when we replace the current account with alternative measures of macro fundamentals. We find equivalent results when employing other commonly used indicators such as reserves as a percentage of short term debt (positive sign), external debt as a percentage of exports of goods and services (negative sign), and the ICRG country financial risk rating.[24] In all cases, the interaction terms are positive and significant. In sum, while there is mixed evidence on the importance of local macro fundamentals over the pre-boom period, we find that strong macro fundamentals increased investor interest in EM local currency bond markets over the post-crisis period. The baseline specification further includes two global variables. The first is the US high yield spread which we include as a measure of global risk aversion towards high yield fixed income investments.[25] Given the EM NFC's risk profile – the median share of investment grade bonds in total debt securities over our sample is 27.5 percent - we would expect a lower high yield spread in the US market to lead to greater demand for NFC bonds across EMs. The second global factor is the growth rate of US broker-dealer (BD) leverage as a proxy for global bank liquidity and risk taking behavior. Bruno and Shin (2015a) highlight the importance of the global bank leverage cycle in explaining cross-border banking flows. Following this reasoning, to the extent that BD leverage falls, bond markets' role as a conduit of channeling liquidity to EMs could be enhanced.[26]

[23] There are at least three possible reasons for this somewhat surprising finding: first, while cross-border exposures of global banks declined in the post-crisis period, domestic subsidiary lending did not, signaling that subsidiaries found alternative sources of financing (IMF, 2015); second, bond market issuance in European EMs—those with comparably high foreign funding dependence—grew only marginally compared to other EMs. In other words, factors that constrained bond market borrowing in European EMs during the post-crisis period – such as initial market size—may explain the overall negative coefficient. Finally, while we lag the variable, it is very persistent, and endogeneity issues are unlikely to be resolved.

[24] We also used the lagged three-year average growth rate and the ICRG composite risk rating as alternative proxies; the coefficients have correct signs but are not statistically significant.

[25] Falling risk aversion towards HY fixed income assets may, in part, be driven by global liquidity conditions.

[26] The sample correlation between the two global variables in the benchmark specification is -0.22.

We find that the coefficient on the high yield spread is positive, and the one on the interaction term is negative, although only the interaction term is statistically significant (Table 2, column 1). This implies that a falling high yield spread is associated with growing investments into LC bonds issued by EM corporates. Before 2010 this effect is not statistically significant, in line with the still limited integration of EM corporate bond markets in global financial markets (Shin, 2013). During the post-crisis period, the effect becomes more significant, indicating that LC bond markets benefited from the turn in the global financial cycle. Conversely, the coefficient on BD leverage growth is negative and the variable is significant while the interaction term is significant with a positive coefficient. This suggests that global bank risk taking behavior reduced LC bond shares in EM corporate debt before 2010, but its impact has been muted during the post-crisis period as the sum of the two terms is not statistically significant.[27] The finding is in line with Bruno and Shin (2015a) who emphasize the role of global banks as transmitters of credit conditions to corporates either directly or through their interactions with local banks. The balance sheet weakness and global bank deleveraging amid tighter home regulations over the post-crisis period explain the observed change in the importance of this channel of financing.

Columns 5-6 use alternative global funding indicators. In Column 5 we replace the high yield spread with the estimate of the 10 year US treasury term premium (Adrian et al, 2013).[28] The term premium measures the difference between the fixed government bond rate and the expected short term rates and as such can be interpreted as a measure of the global (US) relative cost of bond (fixed rate) versus bank borrowing (expected floating rate). The measure also provides an indirect proxy for the search for yield driven by quantitative easing policies in advanced economies which may drive investors to seek yield in riskier securities (Krishnamurthy and Vissing-Jorgensen, 2011). The variable enters with the expected negative sign and is significant while the interaction term is insignificant, indicating that the relative cost of bank versus bond borrowing is an important driver of bond market growth irrespective of the period under investigation. Column 6 includes VIX as a proxy for the overall global risk sentiments which enters with expected sign but is insignificant. This is in line with Bruno and Shin (2015a) who show close relation between the BD leverage and VIX as proxies of global financial cycle. Indeed, when we exclude the BD leverage from regression, the VIX interaction term becomes significant. Finally, column 7 includes all three global regressors which enter with the same signs and significance as before.

[Insert Table 2]

Table 3 includes additional specification checks. In column 2 we add year effects; in column 3 we add regional time trends to control for potential non-stationarity and heterogeneous trends in bond market development; [29] in column 4, we use a version of the dependent

[27] Based on the 90 percent bootstrap confidence interval which ranges between [-0.7 1.4].

[28] We are grateful to referee for suggesting this variable.

[29] We group all countries into four regions according to the IMF's classification: South and East Asia and Pacific; Latin America and the Caribbean; Eastern Europe; Middle East, Central Asia and North Africa. The latter is taken as a numeraire.

variable that is not adjusted for valuation effects; in column 5, we exclude LC issuances by foreign incorporated subsidiaries of parent companies from the LC bond stock which makes the bond data directly comparable to our bank loans data.[30] Our results are generally robust to these specification checks. In particular, the uncovered key empirical relations are not driven by potential trending behavior, global shocks or different valuation measures. In column 6-7, as an additional regressor we include two alternative measures of capital controls - the Chinn-Ito index of financial openness (Column 6) and Fernandez et al (2015) broad measure of capital controls (Column 7). The interaction terms of both indicators show a reverse sign, suggesting that less open countries saw larger increases in bond shares during the post-crisis period (Shin and Zhao, 2013, and Caballero et al, 2015), however the estimates are not statistically significant.

[Insert Table 3]

Finally, we dig a bit deeper into the role of local fundamentals over the crisis period. In particular, we test whether the search for yield may impact countries differently depending on the quality of their institutions or macro fundamentals. For this purpose, in Table 4, we add the interaction of each of the domestic fundamentals with the high yield spread over the boom period to our baseline specification (double interaction). In columns 2-5, we find that these interaction terms are statistically significant with signs which imply that the sensitivity to global push factors was higher in countries with strong macro fundamentals or institutions. To ease the interpretation, the last two rows show the estimated marginal effects with respect to high yield variable at the 20^{th} and 80^{th} empirical quantiles of the fundamentals variable. We see that a unit fall in the high yield variable over the post crisis period is associated with a difference of more than 2 percentage points in the share of LC bond finance between two countries that have markedly higher and lower current account balances. This result strengthens one of the central findings of this paper, namely that local fundamentals explain in part the LC bond market boom and the extent to which LC markets boomed in one country relative to the other.

[Insert Table 4]

To summarize, we find that structural domestic factors such as strong fundamentals and an enabling environment are associated with rising LC bond market development relative to banks. The importance of these factors increased further during the post-crisis period.

4.2. Foreign currency bond regressions

This section analyzes the drivers of relative foreign currency bond market growth. The dependent variable of interest is the percent share of foreign currency bond market debt in total NFC debt. The structure of the exposition follows closely the discussion of LC bond market regressions in the previous section.

[30] This robustness check is more important for FC issuances but is included here for completeness.

Table 5, column 1 shows the results from our baseline specification. We estimate the model over the period 2002–13. The number of observations is 445, with 43 cross-sectional units and an average of 11 observations per unit.

We begin by examining the findings for the regressors included in *EE*, the factors that create an enabling environment for FX bond market growth. Financial theory suggests several factors that may drive a firm's decision to issue a foreign currency bond (see e.g, Allayannis, et al, 2003, Mizen and Tsoukas, 2014). The firms may choose the currency of debt issuance to minimize the expected cost of borrowing, exploiting the deviations from the interest rate parity. The firm's choice may also be driven by risk management motives (hedging large foreign currency proceeds), by the size of the local currency bond market and the foreign exchange derivatives market and by the established foreign exchange listings.

We include the interest rate differential adjusted for the past foreign exchange variation in our baseline specification. Ideally, the interest rate differential is adjusted by a measure of the expected exchange rate change. The data on foreign exchange options and forwards of sufficiently long size was available only for a limited subset of countries, however, thus preventing their use. Nevertheless, to the extent that market participants form their expectations on the basis of past foreign exchange rate change (Moscowitz et al, 2012), our choice of regressor should be a good alternative. In particular, Column 1 in Table 5 reports estimates using the interest rate differential between the local money market rate and the US BAA yield (Caballero et al, 2015). The estimated coefficient is not statistically significant in level, but negative and strongly significant over the post-crisis period. This is in line with Bruno and Shin (2015b) and Caballero et al (2015) who document persistent deviations from interest rate parity over the post crisis period as the main motive for FC bond issuance in their sample of EM firms.

Columns 2-6 report alternative specifications. In columns 2-4 we include proxies for other factors that may drive foreign bond issuance: (a) the concentration of the local currency bond market; (b) the share of commodities exports in GDP as a proxy for the size of foreign currency receipts; (c) the stage of the development of the government bond market (Du and Schreger, 2014), proxied by a dummy for the inclusion in J.P. Morgan's EMBI Global index. All three variables enter with the expected sign, but not all of them are significant. Moreover, the signs and the statistical significance of the baseline regressors do not change. In columns 5-6 we use alternative measures of the interest rate differential: (a) the spread between the local lending rate and the US BAA yield as well as (b) the spread between the local money market rate and the US federal funds rate. With all of these inclusions, the results remain unchanged. In addition, we also included indicators of institutional quality used in the LC bond analysis which turn out to be insignificant in line with the fact that they are primarily issued under the foreign law (not reported).

The baseline specification further includes a measure of local banking characteristics, discussed in the previous section (Table 1, Column 1). The local bank capital to assets ratio is significant with a negative sign while its interaction with the 2010–13 dummy is significant and carries a positive sign. In other words, the lagged growth of local bank leverage is associated with higher share of FC bond finance, suggesting that stronger bank monitoring reduces uncertainty for external bond investors in foreign currency bonds and contributes to

its growth. The different sign of the interaction term would suggest the dominance of substitution effects over the post-crisis period; similar findings result when we replace the capital ratio with the share of non-performing loans in Column 7. Even though we lag the banking characteristics variables and later include time effects to minimize endogeneity concerns, the finding may in part reflect reverse causality in that bond finance growth could drive local deleveraging. Finally and analogous to the LC bond analysis we do not find evidence in favor of a significant role for the degree of dependence on foreign funding (Column 8).

[Insert Table 5]

Table 6 takes a closer look at macro-fundamentals and global variables. The first column of Table 6 illustrates the evidence for the expected positive association between the size of the current account and the dependent variable, analogous to the LC bond regressions. However, contrary to the estimates in Table 2, the interaction term is negative and significant; indicating that the growth of the FC bond market became decoupled from the strength of local fundamentals over the boom period. Table 6, columns 2 to 4 show the results when we replace the current account with alternative measures of macro fundamentals. We find equivalent results when employing other commonly used indicators such as reserves as a percentage of short term debt, the net foreign asset position and the ICRG country financial risk rating (positive sign in level and negative in interaction), the only exception being the insignificance of the interaction term of the reserves variable. In sum, while the growth of FX bond market was strongly associated with the strength of local fundamentals before 2010, it became largely decoupled thereafter.

The baseline specification (Table 6, column 1) includes only one statistically significant global variable, the US high yield spread. The coefficients on the high yield spread and its interaction term are negative, and again only the interaction term is statistically significant. The magnitude of the interaction coefficient is larger relative to LC bond regressions and highly significant, indicating that global bond markets largely replaced cross-border banking—constrained by balance sheet weakness and regulatory reform - as conduits of channeling liquidity to EMs. Using alternative proxies for global factors yields similar results. The BD leverage growth (Column 5) enters with the same signs as in the LC bond regressions, but both coefficients are insignificant. The 10 year US term premium (Column 6) enters with expected negative sign and is significant for the interaction term, in line with the fall in the relative dollar cost of bond finance and the search for yield over the post-crisis period. The results are further confirmed if we replace the high yield spread with the VIX (Column 7) or if we add the TED spread (Column 8) as an alternative to proxy for global bank funding conditions. In sum, while the US high yield spread interaction appears to matter more for foreign currency bond shares, the BD leverage growth matters mostly for LC bond shares. This suggests that the search for yield drives investors mostly into EM assets that do not entail currency risk while local currency bond market development benefits more strongly than foreign currency bond markets from reduced global bank risk taking. The latter result would suggest that domestic bank loans funded by global banks tend to be substitutes for local rather than foreign currency bond market issuance; this may reflect two issues: first, global bank funding supports local currency lending in many EMs; second, EMs where this

is not the case are mostly those (e.g. European) where bond markets have played less of a role, both pre- and post-crisis.

[Insert Table 6]

Table 7 reports additional specification checks. In Column 2 we add year effects; in column 3 we add regional time trends to our benchmark specification to control for potential non-stationarity and heterogeneous trends in bond market development; in column 4, we run a regression with a version of the dependent variable that is not adjusted for valuation effects; in column 5, we exclude issuances by foreign incorporated subsidiaries of parent companies from the FC bond stock which makes the bond data directly comparable to our bank loans data. Our results are again generally robust to these specification checks. In column 6-7, as an additional regressor we include two alternative measures of capital controls - the Chinn-Ito index of financial openness (Column 6) and Fernandez et al (2015) broad measure of capital controls (Column 7). The interaction terms of both indicators show a reverse sign, suggesting that less open countries saw larger increases in FC bond shares during the post-crisis period (Shin and Zhao, 2013, and Caballero et al, 2015), but the estimates are not statistically significant.

[Insert Table 7]

Finally, we test whether the search for yield may impact FC bond shares differently depending on the quality of their institutions or macro fundamentals. As in Table 4, we add the interaction of each of the domestic fundamentals with the high yield spread over the boom period to our baseline specification (double interaction). In contrast to LC bond results, none of the interaction terms are statistically significant in columns 2-5 of Table 8. In other words, there is no evidence that the sensitivity to global push factors was higher in countries with strong macro fundamentals.

[Insert Table 8]

5. ESTIMATION RESULTS USING PANEL QUANTILE MODEL

In contrast to LC bond regressions, the previous section showed that global push factors are crucial in explaining the recent FC bond market boom. We would now like to understand better which factors (if not domestic macro fundamentals or institutions) determine whether global liquidity flowed into some countries rather than others. In order to investigate this question, we move to the quantile regression setup discussed in the previous section. In particular, we run our baseline specification one more time, now allowing for varying coefficients along different quantiles of the dependent variable.[31] The key question is whether global factors proxying for the search for yield have larger impacts on bond market

[31] A relatively sizeable degree of censoring of the LC bond share variable prevents efficient estimation the quantile regressions for a sufficiently informative number of quantiles.

development in countries with already large FC bond size. The main focus is therefore on global push factors and the question whether their coefficients become larger in absolute terms for higher quantiles of the dependent variable.

Figure 6 illustrates the estimation results based on our benchmark specification. Due to modest account of censoring in our sample we report the results starting from the 45^{th} quantile. The solid line in each chart shows the average marginal effect estimates from the 45^{th} to the 90^{th} quantile of the dependent variable. The shaded area indicates the bootstrapped 10 percent confidence interval around the point estimates.

The average marginal effects across quantiles are broadly in line with those found in our baseline specification in Tables 5 and 6 . Similarly, the variables that are insignificant in the panel regressions are also insignificant throughout in the quantile regressions. Figure 6a confirms the findings from the panel regressions with regard to the current account ratio (Row 1) and the local bank capital ratio (Row 2). The former is significant in a range of quantiles with a positive coefficient while its interaction term is negative and similarly significant. Note that the size of the coefficients decreases and they become insignificant at higher quantiles. Similarly, the level and the interaction term for the bank capital ratio are significant only for lower and middle quantiles, while they turn small and insignificant in countries with already high share of FC bonds.

The first row of Figure 6b shows the coefficient estimates for the interest rate differential variable. As in the panel regression, only the interaction term is significant and the estimated slope of the coefficients is positive, indicating that the interest rate differential effects were stronger in EMs with a more established FC bonds base where the average firm has more room to strategically choose the currency of debt issuance. The second row shows coefficient estimates for the high yield spread variable and its interaction. Once again, the panel regression results are confirmed in that the high yield spread and its interaction show (on average) a negative coefficient. While the coefficient for the pre-2010 period is significant only for the highest quantiles, the interaction term is significant for a wider range of quantiles. Interestingly, both the high yield spread and its interaction term show a negative slope in the coefficient estimate across quantiles. This suggests that a given drop in risk aversion would increase FC bond market access more strongly the larger FC bond market is relative to the overall size of the financial system. In other words, FC bond market increased significantly more as a ratio to total NFC debt in EMs with FC bond markets that were already relatively large. We interpret this as an indication that flows into FC EM bond financing driven by falling global risk aversion tend to go into markets that are liquid and allow for easy entry and exit.

[Insert Figure 6]

In sum, the quantile regressions analysis confirms our earlier findings on the relative importance of individual regressors. More importantly, we find that market size is an important conditioning variable that explains a large share of the cross-country variation in FC bond market growth during the post-crisis period.

6. CONCLUSION

This paper studies the determinants of shifts in EM corporates' debt composition. Our primary aim is to identify both global and domestic factors that explain why financial systems shift away from bank lending and towards bond market finance. Our focus is on the recent bond market boom and the question why it was stronger in some countries than in others. In particular, we aim to understand whether EMs that experienced the largest booms relative to bank lending were those with strong fundamentals and institutions or whether it was cyclical factors coupled with easy entry and exit that attracted investors. In this context, we also explore the role of cross-border bank linkages.

Our main hypothesis is that the recent boom was driven primarily by the global financial cycle. In particular, we conjecture that the search for yield accounted for most of the variation of bond shares in total corporate debt, with investor interest in specific EMs mostly driven by market size and the associated easy entry and exit. In the case of foreign currency bond markets, the analysis confirms that these markets indeed grew considerably more in EMs with initially more market based financial systems. While macro fundamentals are shown to be important determinants throughout the sample period, their relative role declined substantially during the post-crisis period due to a growing investor focus on market size. Interestingly, the opposite is the case for local currency bond markets where the role for local fundamentals increased during the post-crisis period, suggesting that investors applied greater scrutiny when taking on exchange rate risk.

These findings are important from a policy perspective. In the case of local currency bond markets, investors appear to have focused on local fundamentals in deciding how to allocate their funds across markets, perhaps in part due to an awareness of exchange rate risk. In foreign currency bond markets, in turn, domestic fundamentals have played little role in driving the post-crisis boom. To the extent that access to foreign currency denominated bond finance boomed in EMs largely because large and liquid markets attracted investor flows during a cyclical upswing in the global financial cycle, these markets may be hit severely by capital outflows when the cycle turns. While incentivizing corporate deleveraging may be part of an appropriate policy response in sectors where leverage has risen to high levels, continued access to bond market finance will remain an important ingredient to a vibrant corporate sector. Strong institutions and policies that contribute to macroeconomic stability will add to EMs' ability to attract long-term investment flows in an environment of tighter global financial conditions. At the same time, monitoring vulnerable firms, especially those with open foreign exchange positions, will be crucial.

APPENDIX 1. A MEASURE OF NON-FINANCIAL CORPORATE DEBT

In this Appendix, we provide some additional information regarding our proposed measure of corporate debt.

Caveats

It is important to note that our measure does not include intercompany loans which constitute a large component of NFC debt in some EMs. The reason is that intercompany loans arguably have a different risk profile than other forms of debt. An important caveat is that we do not separately include syndicated loans. In principle, syndicated loans are available from Dealogic and stocks can be calculated in the same way as bond stocks. However, including the stock of syndicated loans separately would lead to double counting to the extent that these are already included in domestic and foreign bank loans. This would be the case for all syndicated loans but a small minority that is tradable in secondary markets (Gadanecz, 2004). Finally, our measure does not comprise non-bank, non-bank lending.

Comparison with Existing Sources

While data on corporate debt is otherwise not available for a similarly broad set of countries, there are at least two available sources that provide a comparable measure for some EMs. These are, first, the BIS measure of total NFC credit and, second, a measure of NFC debt employed in various issues of the IMF's Global Financial Stability Report (GFSR).[32] However, neither measure would suffice for the purpose of this paper, as both cover a significantly smaller set of countries and permit neither a breakdown into foreign and local currency debt—including valuation adjustment— nor a breakdown into bank and bond market debt

Nevertheless, a comparison of our measure to the two alternatives is useful to ensure that the aggregates are of broadly similar magnitudes. In order to compare our measure on equal grounds, we add intercompany loans to our measure and choose countries for which all three measures are available. Figure A1 illustrates how NFC debt stocks in 2013 compared between our measure and the two alternatives. As illustrated in the chart, the overall magnitudes are mostly very similar.

Adjusting for Valuation Effects

The empirical analysis in this paper employs our measure of corporate debt in both valuation adjusted and unadjusted form. The motivation behind adjusting the data for valuation effects is our interest in the determinants of shifts in the composition of outstanding debt. Since

[32] The BIS measure is available here: http://www.bis.org/statistics/credtopriv.htm. The GFSR measure combines data on non-financial corporate domestic debt securities from Bloomberg with data on domestic bank loans (IFS) and external debt (QEDS. The GFSR measure is, moreover available for a significantly shorter horizon.

corporate debt stocks comprise debts in both local and foreign currencies in many EMs, not accounting for valuation effects would omit an important variable driving movements in outstanding stocks and their composition. Our approach is to attempt to calculate all components of the total debt stocks at a constant exchange rate, namely that of December 2013.

In the case of the bonds data, the valuation adjustment is performed in a straightforward fashion as Dealogic data allows calculating outstanding stocks by individual currencies. The challenge is greater in the case of domestic loans. In most EMs, a case can be made that the vast majority of domestic FX loans is denominated in US dollars. European EMs are an exception to this rule. In all European EMs other than Turkey and Russia (in which USD denominated loans constitute the vast majority of domestic bank loans) we therefore distinguish euro denominated loans.

Our strategy is thus as follows: for European EMs with the exception of Russia and Turkey, we break domestic bank loans down into EUR and USD denominated loans where loans denominated in currencies other than EUR and USD are assumed to be denominated in USD as well.[33] For all other EMs, we assume that domestic bank loans in FX are fully denominated in USD. While this assumption may be a strong one in some cases, to our knowledge USD denominated loans constitute the majority of domestic bank loans in FX in all non-European EMs in our sample.[34] Moreover, to the extent that the true currencies of denomination correlate more closely with the USD than with the local currency in each EM, it is still a preferable assumption to not controlling for valuation effects at all.

In the case of cross-border loans, a currency breakdown is not publically available from BIS. Our assumption is therefore that cross-border loans follow the same composition as domestic FX loans. While this may not be exactly true, there is likely to be a strong correlation in most cases. Moreover, cross-border loans constitute the smallest component of total corporate debt across EMs such that possible inaccuracies should have a relatively small impact on the results.

[33] The ECB Statistical Data Warehouse includes a breakdown of loans by currency which confirms our hypothesis that the vast majority of foreign exchange denominated loans in Europe is in Euros. This is also confirmed by data on national central bank webpages. See for example for Albania (http://www.bankofalbania.org/web/Time_series_22_2.php?evn=agregate_detaje&evb=agregate&cregtab_id=653&periudha_id=1) and for Serbia http://www.nbs.rs/internet/english/80/index.html.

[34] The currency composition of bond market issuance available in Dealogic suggests that non-European EMs rely almost entirely on dollar borrowing. While bank borrowing does not necessarily have the same composition as market based borrowing, it is the most relevant published resource available.

APPENDIX 2. GALVAO ET AL'S (2013) THREE-STEP CENSORED QUANTILE PANEL REGRESSION ESTIMATOR.

In the first step, a parametric propensity score model is estimated. We use a panel fixed effect logit model as in Galvao et al (2013). We denote the estimated propensity score from the logit model as $\hat{\pi}_{it}$. The subsample J_0 is selected as

$$J_0(c_N) = \{(i,t): \hat{\pi}_{it} > 1 - \tau + c_N\} \qquad (2)$$

The constant c_N takes a value strictly between 0 and τ and serves to control for the potential inconsistency of the propensity score estimator $\hat{\pi}_{it}$ by providing a more conservative criterion for the selection of observations. Following Chernozhukov and Hong (2002) we choose c_N as the value that minimizes the equivalent of Powel's (1986) criterion function. In the minimization process we discard the values of c_N for which more than 10% observations from J_0 were excluded from J_1 as this could signal possible misspecification of the separation (subset selection) model or the conditional quantile model (Chernozhukov and Hong, 2002). Such events, however, appeared only a few times and only in the estimation of lower quantiles.

We denote the vector including all regressors as X_{it}, with the corresponding coefficients denoted as φ. In the second step, a preliminary estimator $\hat{\varphi}_0$ is obtained by minimizing the quantile criterion function over the subsample J_0 which is equivalent to minimizing the quantile objective function:

$$\min_{\varphi} \sum_{j=1}^{N} \sum_{t=1}^{T} \rho_\tau(y_{it} - \alpha_i - X_{it}'\varphi)\, 1\{\hat{\pi}_{it} > 1 - \tau + c\} \qquad (3)$$

where $\rho_\tau(u) = u(\tau - 1\{u \leq 0\})$.The estimator $\hat{\varphi}_0$ is a consistent estimator of the quantile regression parameters, though not necessarily efficient. To improve the efficiency of the estimator, another round of data selection is performed. Define the subsample J_1 as:

$$J_1(c_N) = \{(i,t): \hat{\alpha}_i + X_{it}'\hat{\varphi}_0 > \omega_{NT}\} \qquad (4)$$

where ω_{NT} is a small positive number that converges to zero when N and T go infinity and $\sqrt{NT}\omega_{NT}$ is bounded. We choose the $\omega_{NT} = (1/3)(NT)^{-1/3}$th quantile of the estimated quantile function in (4) as in Galvao et al (2013). In the final step, the quantile objective function is minimized over the subset J_1 yielding the final estimate $\hat{\varphi}$.[35] The confidence intervals are computed as the corresponding 5th and 95th percentiles of the bootstrapped distribution. We use the bootstrap procedure for censored quantile regression models in Bilias et al (2001) with 250 bootstrap draws to save computing time.

[35] Estimation is done by adapting the authors R file to our setup. We are grateful to the authors for making it available.

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Table 1: LC bond regressions: Enabling Environment (EE) and Domestic Bank Characteristics (BC)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8
Enforcement procedures	-.89* (.49)			-1.11* (.61)	-.92* (.52)	-1.02** (.51)	-1.09* (.54)	-.86* (.47)
Interaction with 2010-13 dummy	.07 (.09)			.08 (.1)	.06 (.1)	.07 (.12)	.11 (.1)	.08 (.1)
Bond market concentration (lagged)	-2.48** (1.12)	-2.7** (1.19)	-1.73** (1.02)	-2.13* (1.02)	-2.56** (1.15)	-2.46** (1.15)	-2.67** (1.21)	-2.46** (1.02)
Interaction with 2010-13 dummy	1.32 (1.57)	.89 (1.35)	.98 (1.15)	1.26 (1.47)	1.63 (1.66)	1.2 (1.51)	2.2** (1.39)	1.09 (1.51)
Current account ratio, 3-year average (lagged)	.1 (.1)	.14 (.12)	.19 (.13)	.11 (.11)	.09 (.1)	.1 (.11)	.11 (.12)	.08 (.09)
Interaction with 2010-13 dummy	.21*** (.08)	.16*** (.08)	.15*** (.07)	.1* (.11)	.22*** (.09)	.22*** (.11)	.21*** (.09)	.21*** (.09)
US high yield spread	.25 (.25)	.24 (.28)	-.01 (.17)	.2 (.22)	.24 (.25)	.22 (.3)	.07 (.23)	.36 (.3)
Interaction with 2010-13 dummy	-1.22* (.63)	-1.34** (.7)	-.88** (.47)	-.97* (.57)	-1.22* (.63)	-1.14* (.71)	-1.01* (.6)	-1.34* (.75)
US BD leverage growth	-.64** (.27)	-.59** (.26)	-1.41*** (.41)	-1.2*** (.44)	-.61* (.28)	-.73** (.31)	-.78 (.4)	-.66** (.27)
Interaction with 2010-13 dummy	1.02* (.59)	.62 (.52)	1.88*** (.71)	1.5* (.72)	1.04* (.6)	1.01* (.66)	1.42** (.64)	1.09* (.65)
Dummy for 2010-13	-.28 (3.92)	2.29 (1.59)	10.04* (7.29)	-1.32 (4.21)	.42 (4.63)	-.52 (6.28)	-2.24 (4.18)	-.64 (4.1)
Creditor rights		.02 (.22)						
Interaction with 2010-13 dummy		.1 (.26)						
PPP GDP per capita, (logged and lagged)			3.73 (2.59)					
Interaction with 2010-13 dummy			-.89 (.79)					
Asian Bond Fund dummy				4.64*** (1.56)				
Interaction with 2010-13 dummy				1.22 (1.36)				
Membership in EMBI index					-.28 (.98)			
Interaction with 2010-13 dummy					-.61 (1.07)			
Local bank capital to assets (lagged)						.21 (.17)		
Interaction with 2010-13 dummy						.03 (.2)		
Local bank NPL ratio (lagged)							-.09 (.12)	
Interaction with 2010-13 dummy							-.05 (.15)	
Cross-border claims (bank-to-bank), % GDP								-.01 (.06)
Interaction with 2010-13 dummy								-.1 (.1)
Number of observations/units	476/11	476/11	445/11	476/11	476/11	450/11	465/11	475/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.48	0.48	0.49	0.48	0.48	0.51	0.49	0.48

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of LC total bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table 2: LC bond regressions: Macro Fundamentals (MF) and Global Variables (G)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Enforcement procedures	-.89* (.49)	-1.12* (.64)	-1.09 (.76)	-.98 (.59)	-.76 (.47)	-.85* (.49)	-.69 (.47)
Interaction with 2010-13 dummy	.07 (.09)	-.05 (.11)	-.03 (.12)	0 (.12)	.07 (.09)	.07 (.09)	.06 (.09)
Bond market concentration (lagged)	-2.48** (1.12)	-2.11* (1.07)	-1.54 (1.02)	-1.86* (.91)	-2.47** (1.02)	-2.6** (1.16)	-2.3** (1)
Interaction with 2010-13 dummy	1.32 (1.57)	.73 (1.42)	1.19 (1.85)	1.84 (1.9)	1.22 (1.55)	1.43 (1.52)	1.23 (1.44)
Current account ratio, 3-year average (lagged)	.1 (.1)				.1 (.09)	.1 (.1)	.12 (.1)
Interaction with 2010-13 dummy	.21*** (.08)				.2*** (.08)	.21*** (.08)	.2*** (.08)
US high yield spread	.25 (.25)	.25 (.28)	.09 (.22)	.77* (.37)			.35 (.28)
Interaction with 2010-13 dummy	-1.22* (.63)	-.89** (.42)	-1.05* (.57)	-1.96*** (.82)			-1.7* (0.92)
US BD leverage growth	-.64** (.27)	-.56* (.34)	-.52 (.33)	-.64** (.33)	-1.72*** (.42)	-.61 (.49)	-1.71*** (.43)
Interaction with 2010-13 dummy	1.02* (.59)	.23 (.46)	1.88** (.92)	1.71** (.97)	1.44** (.77)	1.3*** (.57)	3.49** (1.55)
Dummy for 2010-13	-.28 (3.92)	-1.96 (5.58)	9.53 (6.5)	-7.89** (6.53)	-1.91 (3.78)	2.54 (5.51)	-.02 (4)
Reserves in % of ST external debt (lagged and logged)		.02 (.69)					
Interaction with 2010-13 dummy		1.14** (.55)					
External debt in % of exports of G&S (lagged and logged)			-2.46** (.98)				
Interaction with 2010-13 dummy			-1.36** (.72)				
ICRG financial risk indicator				.26** (.09)			
Interaction with 2010-13 dummy				.26*** (.12)			
US 10Y term premium					.48 (.32)		-.66*** (.26)
Interaction with 2010-13 dummy					-.6*** (.22)		.33 (.41)
VIX (logged)						.13 (.44)	
Interaction with 2010-13 dummy						-1.4 (1.11)	
Number of observations/units	476/11	451/11	476/11	447/11	476/11	476/11	476/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.48	0.49	0.48	0.5	0.48	0.48	0.48

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of LC bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table 3: LC bond regressions: Additional robustness checks

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Enforcement procedures	-.89* (.49)	-1.24** (.58)	-.56 (.6)	-.95* (.51)	-.37 (.64)	-.78 (.5)	-1.1* (.59)
Interaction with 2010-13 dummy	.07 (.09)	.12 (.1)	.06 (.12)	.08 (.09)	.06 (.1)	.07 (.12)	.09 (.12)
Bond market concentration (lagged)	-2.48** (1.12)	-2.64 (1.39)	-2.17** (.84)	-2.51** (1.15)	-1.14 (.88)	-2.47** (1.09)	-3.16** (1.34)
Interaction with 2010-13 dummy	1.32 (1.57)	1.54 (1.6)	1.55* (1.49)	1.38 (1.6)	.52 (1.44)	1.36 (1.43)	2.29** (1.65)
Current account ratio, 3-year average (lagged)	.1 (.1)	.06 (.11)	.05 (.1)	.1 (.1)	.19* (.11)	.1 (.1)	.13 (.12)
Interaction with 2010-13 dummy	.21*** (.08)	.24*** (.09)	.26*** (.1)	.23*** (.09)	.16*** (.08)	.22*** (.12)	.23*** (.11)
US high yield spread	.25 (.25)	.07 (.24)	.19 (.26)	.2 (.26)	-.19** (.11)	.17 (.27)	.29 (.33)
Interaction with 2010-13 dummy	-1.22* (.63)	-1.15* (.66)	-1.1* (.72)	-1.06* (.64)	-1.03* (.62)	-1.22* (.71)	-1.5** (.8)
US BD leverage growth	-.64** (.27)	-.83*** (.31)	-.54* (.31)	-.58** (.28)	-1.53*** (.41)	-.7*** (.25)	-.64* (.34)
Interaction with 2010-13 dummy	1.02* (.59)	1.18* (.74)	1** (.57)	.85 (.6)	2.01*** (.72)	1.14* (.69)	1.24** (.73)
Dummy for 2010-13	-.28 (3.92)	-2.59 (4.1)	-.38 (4.96)	-.76 (3.9)	0 (4.2)	-.23 (4.72)	-2.59 (4.85)
Chinn-Ito Index						.51 (.75)	
Interaction with 2010-13 dummy						-.44 (.4)	
Fernandez et al capital controls index							-1.09 (1.88)
Interaction with 2010-13 dummy							2.55 (1.57)
Year effects	No	Yes	No	No	No	No	No
Regional time trends	No	No	Yes	No	No	No	No
Number of observations/units	476/11	476/11	476/11	476/11	476/11	468/11	391/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.48	0.48	0.48	0.48	0.48	0.49	0.54

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of LC bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table 4: LC bond regressions: Macro fundamentals and the Impact of the High Yield Spread

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5
Enforcement procedures	-.89* (.49)	-0.93* (0.5)	-0.93* (0.49)	-1.11 (.77)	-.99 (.6)
Interaction with 2010-13 dummy	.07 (.09)	-.12 (.13)	.07 (.09)	-.03 (.12)	0 (.12)
Interaction with HY spread interaction		.19* (.1)			
Bond market concentration (lagged)	-2.48** (1.12)	-2.53** (1.12)	-2.5** (1.13)	-1.55 (1.02)	-1.79* (.9)
Interaction with 2010-13 dummy	1.32 (1.57)	1.37 (1.58)	1.33 (1.56)	1.24 (1.85)	1.91 (1.87)
Current account ratio, 3-year average (lagged)	.1 (.1)	.1 (.1)	.1 (.1)		
Interaction with 2010-13 dummy	.21*** (.08)	.21*** (.08)	.45*** (.18)		
Interaction with HY spread interaction			-.23** (.12)		
US high yield spread	.25 (.25)	.25 (.25)	.25 (.25)	.08 (.22)	.77** (.37)
Interaction with 2010-13 dummy	-1.22* (.63)	-8.45** (3.96)	-1.15** (.56)	-10.58** (4.16)	14.64*** (4.16)
US BD leverage growth	-.64** (.27)	-.64** (.27)	-.64** (.27)	-.52 (.33)	-.64** (.33)
Interaction with 2010-13 dummy	1.02* (.59)	1.06* (.59)	1.11* (.6)	1.92** (.94)	1.89** (.99)
Dummy for 2010-13	-.28 (3.92)	6.84 (5.32)	-.57 (3.89)	19.12** (8.66)	-24.91*** (8.56)
External debt in % of exports of G&S (lagged and logged)				-2.49** (.98)	
Interaction with 2010-13 dummy				-3.41** (1.36)	
Interaction with HY spread interaction				2.04** (.84)	
ICRG financial risk indicator					.26** (.09)
Interaction with 2010-13 dummy					.67*** (.19)
Interaction with HY spread interaction					-.41*** (.11)
HY marginal effect 2010-13 at 80th quantile of local		-1.93	-1.11	-1.81	-1.54
HY marginal effect 2010-13 at 20th quantile of local		-0.6	0.85	1.06	0.43
Number of observations/units	476/11	476/11	476/11	476/11	451/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.48	0.48	0.48	0.48	0.49

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of LC bond finance in total outstanding corporate debt. All regressions include country fixed effects. HY marginal effects are calculated at the 80 (20) quantile of variable which is interacted with HY spread 2010-13 interaction. Data sources for all regressors are reported in Appendix 1.

Table 5: FC bond regressions: Enabling Environment (EE) and Domestic Bank Characteristics (BC)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8
Current account ratio, 3-year average (lagged)	.14* (.07)	.13 (.07)	.12* (.08)	.13 (.07)	.16** (.08)	.17*** (.08)	.03 (.08)	.15* (.08)
Interaction with 2010-13 dummy	-.18** (.09)	-.15* (.11)	-.32*** (.11)	-.16** (.08)	-.17** (.09)	-.18*** (.08)	-.19* (.12)	-.19** (.08)
Local bank capital to assets (lagged)	-.32* (.2)	-.32* (.2)	-.25 (.2)	-.29** (.18)	-.36** (.22)	-.31* (.19)		-.3* (.2)
Interaction with 2010-13 dummy	.39** (.19)	.39** (.2)	.35** (.21)	.31** (.17)	.4*** (.2)	.47** (.22)		.39** (.19)
MM-BAA spread (FX adjusted)	-.01 (.02)	-.01 (.02)	-.02(.02)	-.01 (.02)			-.02(.02)	-.02(.02)
Interaction with 2010-13 dummy	.1** (.04)	.1** (.04)	.11*** (.04)	.09** (.04)			.12** (.05)	.1** (.04)
US high yield spread	-.12 (.36)	-.22 (.33)	-.2 (.3)	-.24 (.33)	-.17 (.39)	-.18 (.41)	-.02 (.31)	-.07 (.38)
Interaction with 2010-13 dummy	-4.11*** (1.22)	-4*** (1.18)	-4.1** (1.18)	-3.63*** (1.18)	-3.89*** (1.19)	-3.41*** (.88)	-4.57*** (1.38)	-4.07*** (1.24)
Dummy for 2010-13	1.31 (2.13)	.7 (2.34)	-.12 (2.27)	.89 (2.11)	.74 (2.21)	-2.25 (2.38)	5** (1.77)	1.42 (2.13)
Bond market concentration (lagged)		-1.08 (.87)						
Interaction with 2010-13 dummy		.79 (1.31)						
Share of commodities export in GDP (lagged)			.16 (.23)					
Interaction with 2010-13 dummy			.17** (.07)					
Membership in EMBI index				3.76** (3.15)				
Interaction with 2010-13 dummy				.59 (1.07)				
Lending rate-BAA spread (FX adjusted)					0 (.02)			
Interaction with 2010-13 dummy					.06 (.04)			
MM spread (FX adjusted)						0 (.01)		
Interaction with 2010-13 dummy						.03** (.01)		
Local bank NPL ratio (lagged)							.11* (.06)	
Interaction with 2010-13 dummy							.11* (.09)	
Cross-border claims (bank-to-bank), percent GDP								-.05(.06)
Interaction with 2010-13 dummy								-.02 (.06)
Number of observations/units	445/11	445/11	417/10	445/11	426/10	439/11	459/11	444/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.64	0.64	0.64	0.64	0.68	0.67	0.63	0.64

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of FC bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table 6: FC bond regressions: Macro Fundamentals (MF) and Global Variables (G)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8
Current account ratio, 3-year average (lagged)	.14** (.07)				.17** (.08)	.14* (.07)	.13* (.08)	.14* (.07)
Interaction with 2010-13 dummy	-.18** (.09)				-.18** (.09)	-.17** (.09)	-.17** (.09)	-.18** (.09)
Local bank capital to assets (lagged)	-.32** (.2)	-.19 (.21)	-.31* (.2)	-.09 (.15)	-.3* (.21)	-.33* (.21)	-.32* (.2)	-.32* (.2)
Interaction with 2010-13 dummy	.39** (.19)	.31* (.21)	.36** (.19)	.14 (.13)	.4*** (.19)	.4** (.2)	.39** (.2)	.39** (.19)
MM-BAA spread (FX adjusted)	-.01 (.02)	-.04* (.02)	-.01 (.02)	-.02 (.02)	-.01 (.02)	-.02 (.02)	-.02 (.03)	-.02 (.02)
Interaction with 2010-13 dummy	.1** (.04)	.12*** (.04)	.09** (.04)	.08*** (.03)	.1** (.05)	.05* (.03)	.06* (.04)	.11** (.04)
US high yield spread	-.12 (.35)	-.28 (.34)	-.2 (.37)	-.07 (.39)	-.21 (.34)			-.6 (.54)
Interaction with 2010-13 dummy	-4.11*** (1.14)	-4.17*** (1.1)	-4.21*** (1.18)	-3.59*** (.95)	-4.1*** (1.17)			-3.49** (1.34)
Dummy for 2010-13	1.31 (2.15)	6.96* (3.74)	.85 (2.51)	11.04** (3.84)	1.09 (1.89)	-1.77 (2.16)	6.95 (3.76)	1.58 (2.02)
Reserves in % of ST external debt (lagged and logged)		1.73*** (.5)						
Interaction with 2010-13 dummy		-1.07 (.68)						
Net foreign asset in percent of GDP (lagged)			.01 (.03)					
Interaction with 2010-13 dummy			-.03 *(.02)					
ICRG financial risk indicator				.1 (.09)				
Interaction with 2010-13 dummy				-.2** (.08)				
US BD leverage growth					-.27 (.54)			
Interaction with 2010-13 dummy					.54 (1.04)			
US 10Y term premium						-.19 (.31)		
Interaction with 2010-13 dummy						-.74* (.44)		
VIX (logged)							-.18 (.52)	
Interaction with 2010-13 dummy							-3.32*** (1.1)	
TED spread								.7 (1.02)
Interaction with 2010-13 dummy								-2.79 (2.35)
Number of observations/units	445/11	422/11	445/11	420/11	445/11	445/11	445/11	445/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.64	0.66	0.64	0.67	0.64	0.64	0.64	0.64

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of FC bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table 7: FC bond regressions: Additional robustness checks

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Current account ratio, 3-year average (lagged)	.14** (.07)	.15* (.08)	.1 (.08)	.12 (.07)	.11 (.09)	.15** (.08)	.14 (.12)
Interaction with 2010-13 dummy	-.18** (.09)	-.18** (.09)	-.13** (.09)	-.2*** (.09)	-.22** (.12)	-.18*** (.09)	-.18** (.11)
Local bank capital to assets (lagged)	-.32** (.2)	-.31* (.2)	-.29* (.22)	-.32** (.19)	-.29 (.23)	-.3* (.21)	-.4** (.23)
Interaction with 2010-13 dummy	.39** (.19)	.39*** (.19)	.42*** (.22)	.39*** (.17)	.14 (.24)	.39** (.23)	.48** (.26)
MM-BAA spread (FX adjusted)	-.01 (.02)	-.02 (.02)	-.01 (.02)	-.03 (.02)	-.03 (.03)	-.02 (.02)	-.01 (.03)
Interaction with 2010-13 dummy	.1** (.04)	.11** (.05)	.09** (.04)	.11*** (.04)	.11** (.05)	.11*** (.04)	.10* (.05)
US high yield spread	-.12 (.35)	-.31 (.18)	.18 (.34)	-.01 (.33)	-.43 (.4)	-.17 (.37)	-.09 (.5)
Interaction with 2010-13 dummy	-4.11*** (1.14)	-4.6*** (1.19)	-5.03*** (1.48)	-4.43*** (1.15)	-3.95*** (1.3)	-4.15*** (1.17)	-4.86*** (1.43)
Dummy for 2010-13	1.31 (2.15)	1.4 (2.25)	3.06 (2.76)	1.52 (1.98)	3.35 (2.47)	1.47 (2.58)	2.21 (3.37)
Chinn-Ito Index						.27 (.48)	
Interaction with 2010-13 dummy						-.16 (.45)	
Fernandez et al capital controls index							2.05 (4.05)
Interaction with 2010-13 dummy							-1.5 (1.99)
Year effects	No	Yes	No	No	No	No	No
Regional time trends	No	No	Yes	No	No	No	No
Number of observations/units	445/11	445/11	445/11	445/11	445/11	437/11	370/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.64	0.64	0.64	0.64	0.64	0.65	0.72

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of FC bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table 8: FC bond regressions: Macro fundamentals and the Impact of the High Yield Spread

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5
Current account ratio, 3-year average (lagged)	.14** (.07)	.14* (.07)			.14* (.08)
Interaction with 2010-13 dummy	-.18** (.09)	-.37* (.3)			-.18** (.09)
Interaction with HY spread interaction		.18 (.23)			
Local bank capital to assets (lagged)	-.32** (.2)	-.31* (.19)	-.19 (.22)	-.09 (.14)	-.31 (.24)
Interaction with 2010-13 dummy	.39** (.19)	.38** (.19)	.31* (.2)	.14 (.13)	.39** (.2)
Interaction with HY spread interaction					0 (.08)
MM-BAA spread (FX adjusted)	-.01 (.02)	-.01 (.02)	-0.04* (0.02)	-.02 (.02)	-.01 (.02)
Interaction with 2010-13 dummy	.1** (.04)	.1** (.04)	.12*** (.04)	.08*** (.03)	.1** (.04)
US high yield spread	-.12 (.35)	-.12 (.36)	1.43 (1.71)	1.28 (2.29)	-.09 (.91)
Interaction with 2010-13 dummy	-4.11*** (1.14)	-3.81*** (.96)	-4.11*** (1.21)	-3.51*** (.94)	-4.11*** (1.22)
Dummy for 2010-13	1.31 (2.15)	1.11 (2.17)	7.34** (3.89)	11.28** (4.04)	1.31 (2.14)
Reserves in % of ST external debt (lagged and logged)			2.16*** (.68)		
Interaction with 2010-13 dummy			-1.16* (.69)		
Interaction with HY spread interaction			-.36 (.34)		
ICRG financial risk indicator				.15 (.12)	
Interaction with 2010-13 dummy				-.21** (.08)	
Interaction with HY spread interaction				-.04 (.06)	
Number of observations/units	476/11	476/11	476/11	476/11	451/11
Prob > ChiSq	0.000	0.000	0.000	0.000	0.000
Fraction uncensored	0.48	0.48	0.48	0.48	0.49

Notes: The Table shows marginal effects with boostrapped standard errors in parentheses. Statistical significance is based on boostrapped confidence intervals. *,** and *** denote statistical significance at 10%, 5% and 1% level. The dependent variable in all regressions is the share of FC bond finance in total outstanding corporate debt. All regressions include country fixed effects. Data sources for all regressors are reported in Appendix 1.

Table A1. A Measure of NFC Debt:

Definition	Definition	Source	Availability
Outstanding stock of bonds	NFC bonds outstanding by currency on an ultimate risk basis	Dealogic	Full country sample
Domestic bank loans	Domestic bank loans to non-financial corporation	IFS – Other Depository Corporations (ODC) survey- Loans Other Non-financial Corporations and Loans Public Non-financial Corporations	Algeria, Armenia, Belarus, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Egypt, Georgia, Guatemala, Indonesia, Jamaica, Kazakhstan, Macedonia, Mexico, Morocco, Pakistan, Panama, Philippines, South Africa, Thailand, Turkey and Uruguay
		Country authorities	Albania*, Argentina, Bosnia and Herzegovina*, Bulgaria*, China, Ecuador, El Salvador, India, Jordan, Latvia*, Lebanon, Lithuania, Malaysia, Peru, Poland*, Romania*, Russia, Serbia*, Tunisia, Ukraine* and Venezuela
		ECB data Statistical Data Warehouse – MFIs loans deposits and security holdings by sector	Croatia* and Hungary*
Foreign bank loans	External loans from BIS reporting banks to domestic non-bank sector	BIS -External loans of reporting banks vis-à-vis non-banking sectors (BIS Table 6)	Full country sample

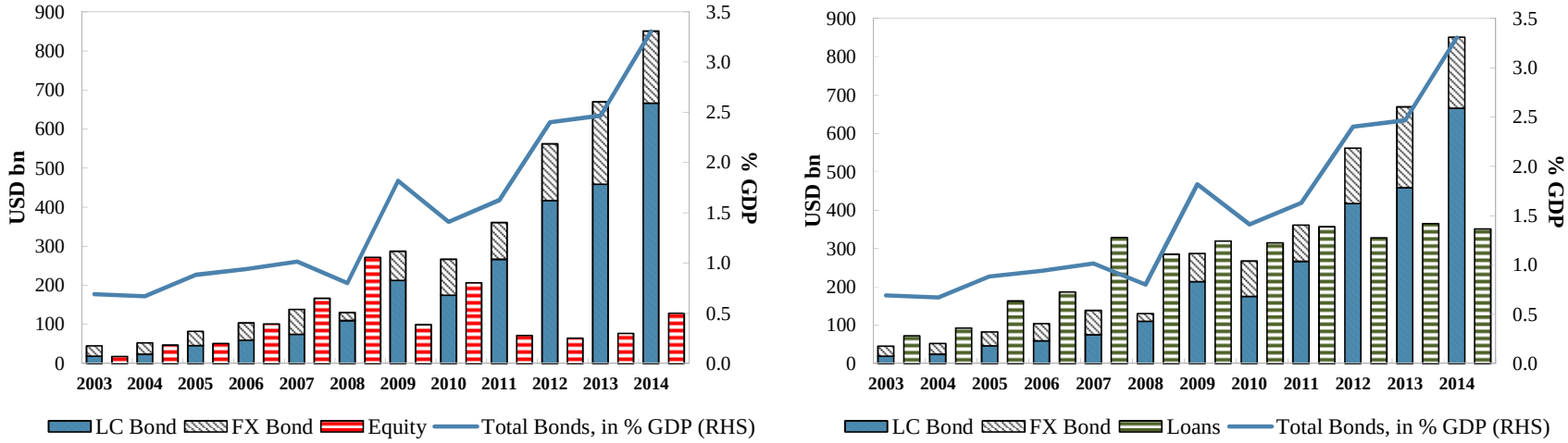
Notes: * Indicates countries whose data allows for a breakdown of bank loans into EUR and other currencies

Table A2: Definitions and Sources of Variables

	Name	Definition	Source
Dependent variables	Adjusted Bond share	Percent share of bonds in total NFC debt, adjusted for valuation effects (see section II)	See Table 1
	Unadjusted Bond Share	Percent share of bonds in total NFC debt (see section II)	See Table 1
	Adjusted LC Bond Share	Percent share of LC bonds in total NFC debt, adjusted for valuation effects (see section II)	See Table 1
	Adjusted FX Bond Share	Percent share of FX bonds in total NFC debt, adjusted for valuation effects (see section II)	See Table 1
Regressors	Enforcement procedures	Measures the average number of procedures to enforce a contract	World Bank Doing Business
	Bond market concentration	Share of largest issuance in total issuances in given year	Dealogic; author's calculations
	Asian Bond Fund dummy	Takes the value 1 during year in which a country was a member of the ABF	Author's calculations
	Current account ratio, 3-year average	Lagged 3-year average of current account ratio to GDP, in percent	World Economic Outlook; authors' calculations
	Local bank capital to assets	The ratio of local bank capital and reserves to total assets, in percent	World Development Indicators and IMF GSFR
	US high yield spread	Moody's Baa-Aaa Corporate Bond Yield, in percent	FED St. Louis
	US BD leverage growth	US Broker-dealer leverage growth	Author's calculations based on Adrian and Shin (2011)
	Dummy for 2010-13	Takes the value 1 during years 2010 to 2013	Author's calculations
	Creditor rights	Measures the degree to which collateral and bankruptcy laws protect borrowers and lenders	World Bank Doing Business
	Creditor information	Measures rules and practices affecting the coverage, scope and accessibility of credit information	World Bank Doing Business
	Rule of law	Measures whether confidence in and adherence to rules of society	Worldwide Governance Indicators
	Number of bond market issuers	Simple count of the number of local currency bond issuers	Dealogic; author's calculations
	Membership in EMBI Index	Takes the value 1 during year in which a sovereign bonds were included in EMBI	J.P.Morgab
	PPP GDP per capita, (logged)	GDP per capita converted to international dollars using purchasing power parity rates	World Development Indicators
	Reserves in % of ST external debt	Gross international reserves, percent of short term external debt	World Economic Outlook; authors' calculations
	External debt in % of exports of G&S	Total external debt, percent of exports of goods and services	World Economic Outlook; authors' calculations
	Growth, 3-year average	Lagged 3-year average of real GDP growth rate, in percent	World Economic Outlook; authors' calculations
	ICRG composite risk indicator	Composite risk indicator	ICRG
	ICRG financial risk indicator	Financial risk indicator	ICRG
	Local bank NPL ratio	The value of nonperforming loans divided by total value of local bank's loan portfolio (in %)	World Development Indicators and IMF GSFR
	Cross-border claims (bank-to-bank)	External position of BIS reporting banks vis-à-vis domestic banks, percent GDP (BIS Table 6)	BIS

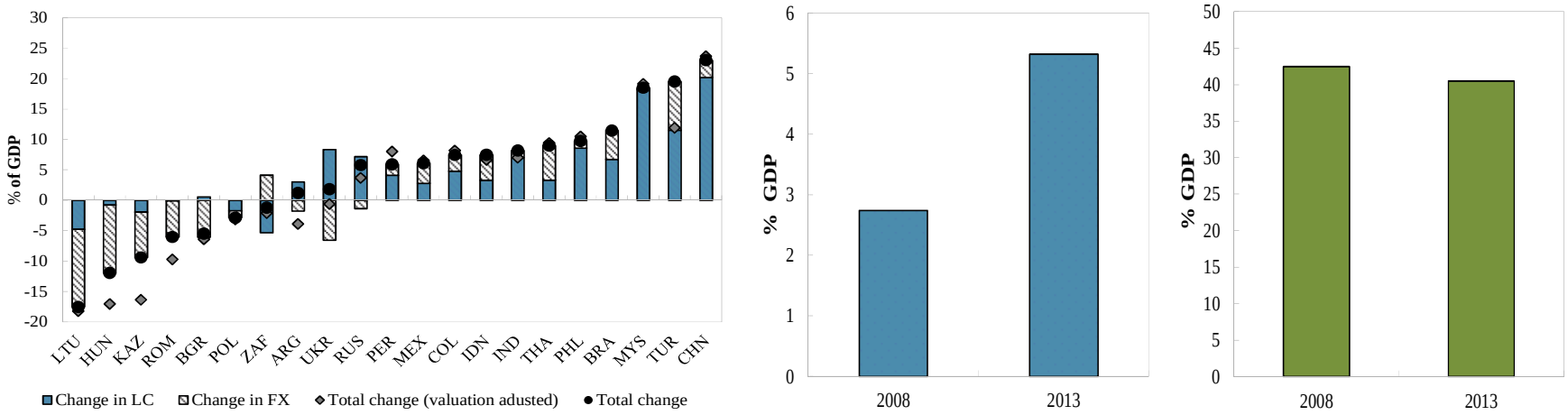
	US term premium	The difference between the 10Y bond yield and estimated expected short term interest rates	https://www.newyorkfed.org/research/data_indicators/term_premia.html
	VIX	Implied volatility of S&P 500 index	FED St. Louis
	TED Spread	The difference between the 3M USD LIBOR and the 3M T-bill	FED St. Louis
	Money market spread	Spread between US federal funds rate and domestic interbank rate, in percent	IFS; central bank websites
	Chinn-Ito Index	Measuring a country's degree of capital account openness	http://web.pdx.edu/~ito/Chinn-Ito_website.htm
	Fernandez et al index	Measuring a country's degree of capital controls	http://www.nber.org/data/international-finance/
	MM-BAA spread (FX adjusted)	ln((1+local money market rate)/(1+US BAA yield)) - the FX change	IFS; central bank websites
	lending-BAA spread (FX adjusted)	ln((1+local lending rate)/(1+US BAA yield)) - the FX change	WDI; IFS; central bank websites

Figure 1: EM NFC Bond vs. Equity and Syndicated Loan Issuance



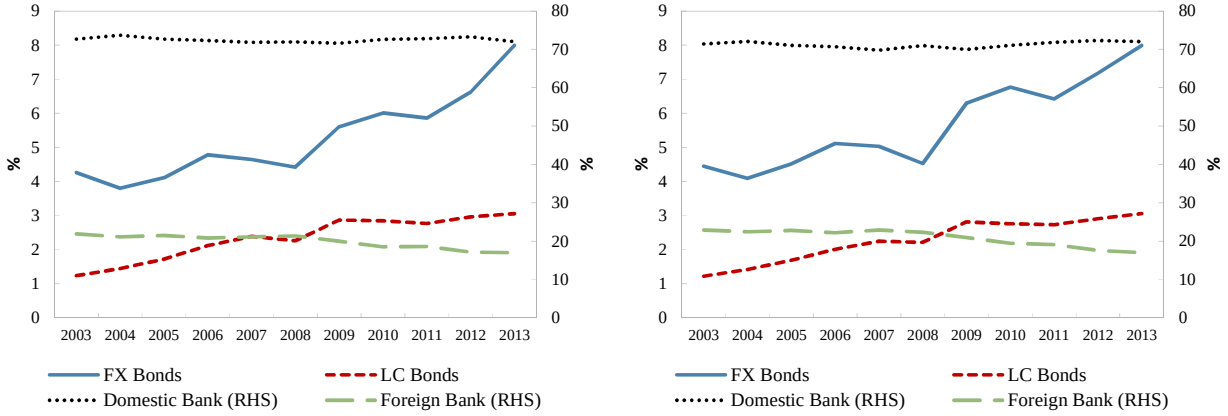
Notes: The left chart shows aggregate emerging market issuance of local (LC) and foreign currency denominated (FX) bonds compared to aggregate emerging market equity issuance. The right chart shows aggregate emerging market issuance of local (LC) and foreign currency denominated bond issuance compared to aggregate emerging market syndicated loan issuance. Source: Dealogic and auhors' calculations.

Figure 2: Change in EM Bond Market Debt 2009–13



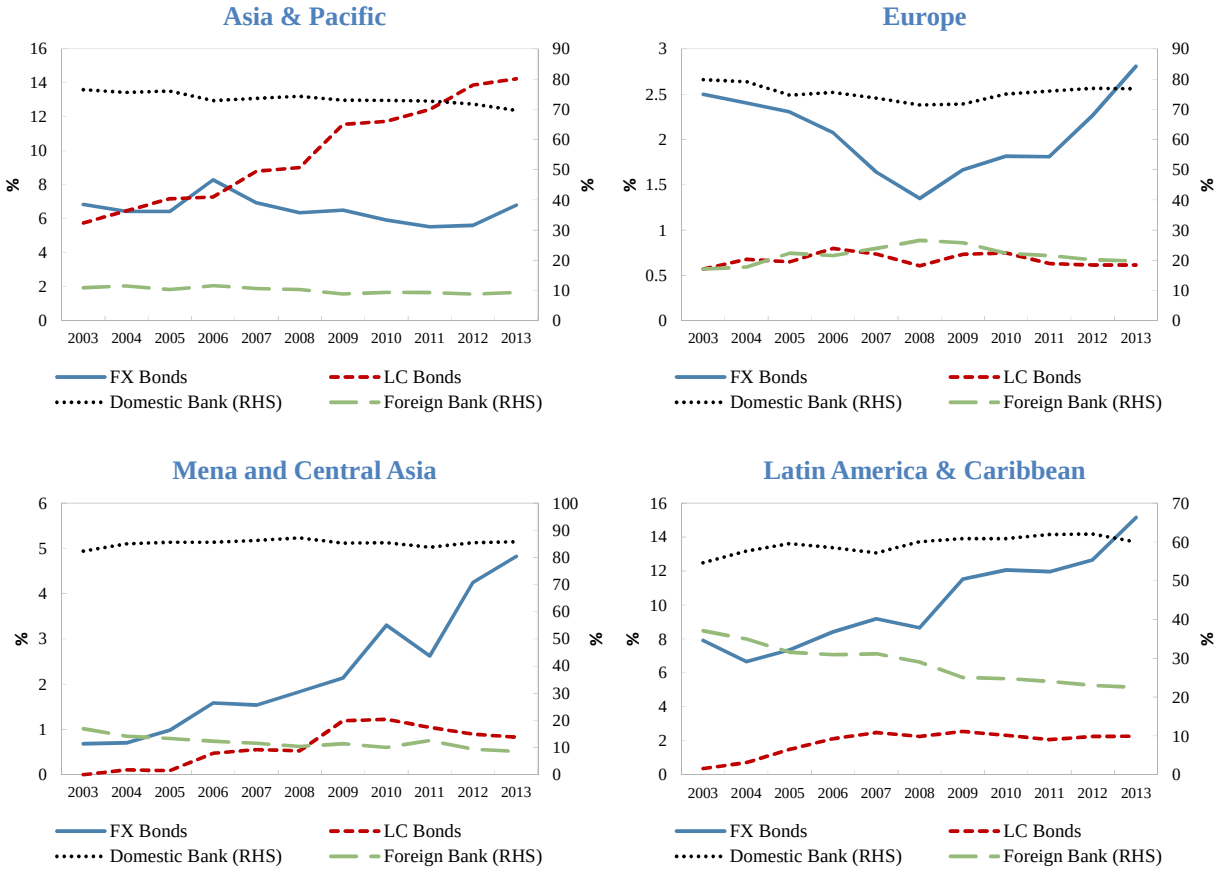
Notes: The left chart shows the change in non-financial corporate debt in percent of GDP between 2008 and 2013: total change adjusted for valuation effects (diamond) and in unadjusted form (circles); total change split into local currency (LC) and foreign currency (FX) component (bars). The middle and and the right chart show average (across EMs) outstanding stock of non-financial corporate bonds and loans, respectively, as a share of GDP. Source: Dealogic, IFS, BIS, country authorities and authors' calculations.

Figure 3: EM NFC Debt Composition Over Time



Notes: The left chart shows the average (across EMs) evolution of the breakdown of total non-financial corporate debt into local (LC) and foreign currency (FC) bonds as well as domestic and cross-border bank loans. The right chart shows the evolution of the four series adjusted for valuation effects. Source: Dealogic, IFS, BIS, country authorities and authors' calculations.

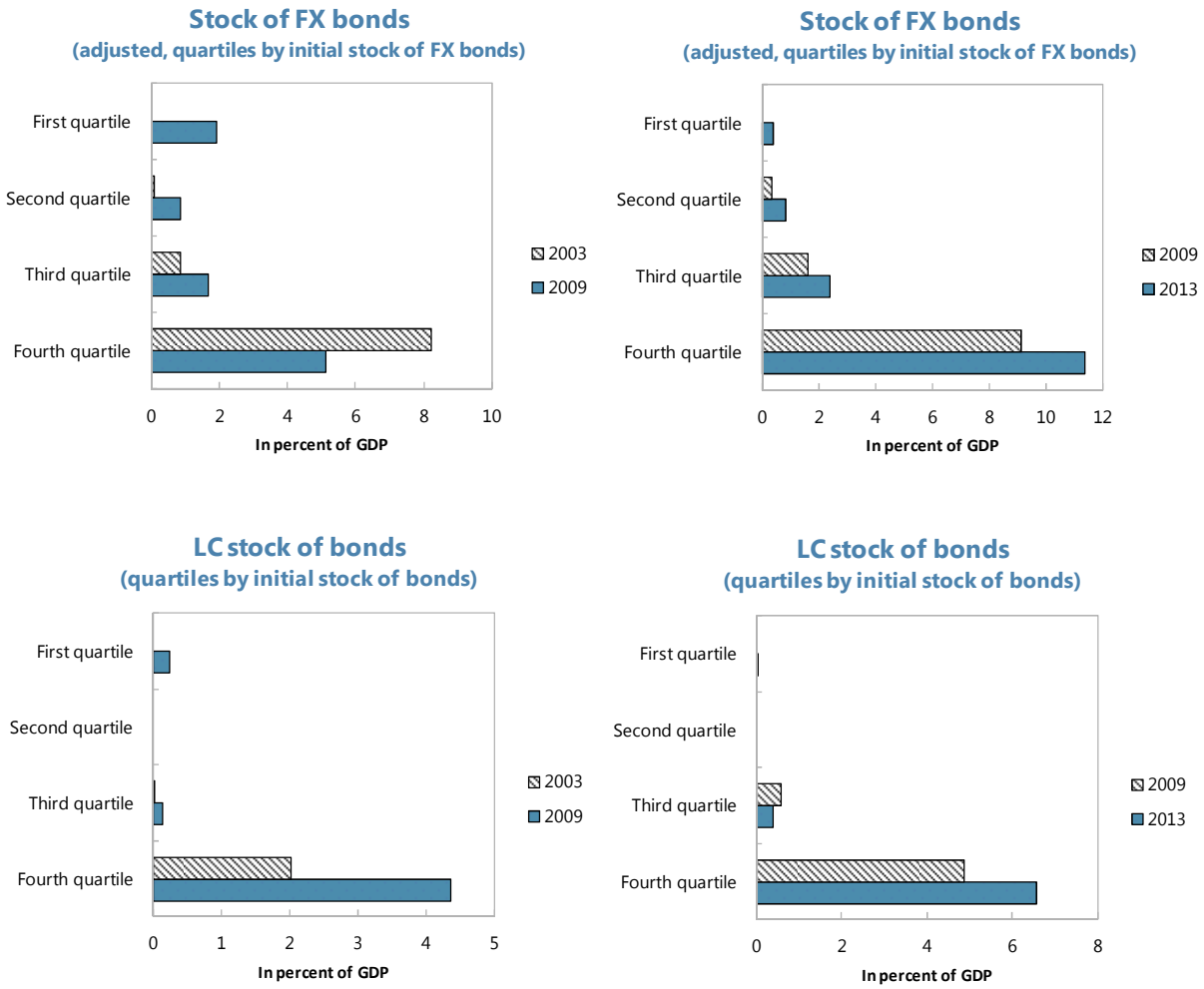
Figure 4: EM NFC debt Composition Over Time by Region



Notes: The charts shows the average (across EMs) evolution of the breakdown of total non-financial corporate debt into local and foreign currency bonds as well as domestic and cross-border bank loans by

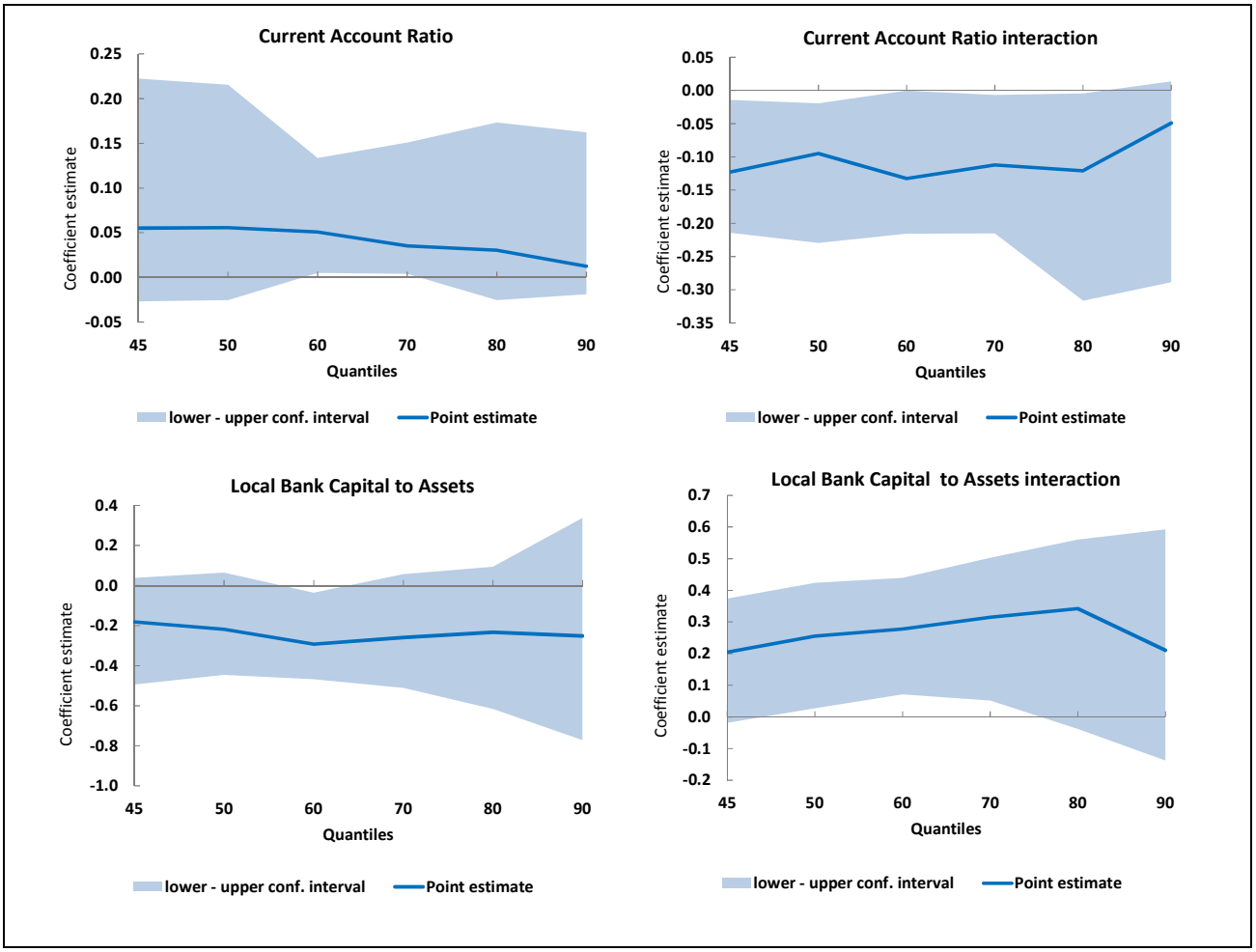
region. Regions follow the standard IMF classification (Asia and Pacific; Eastern Europe; MENA=Middle East and North Africa and Central Asia; Latin America and Caribbean). Source: Dealogic, IFS, BIS, country authorities and authors' calculations.

Figure 5: Change in the Stock of NFC Bonds by Initial Quantile



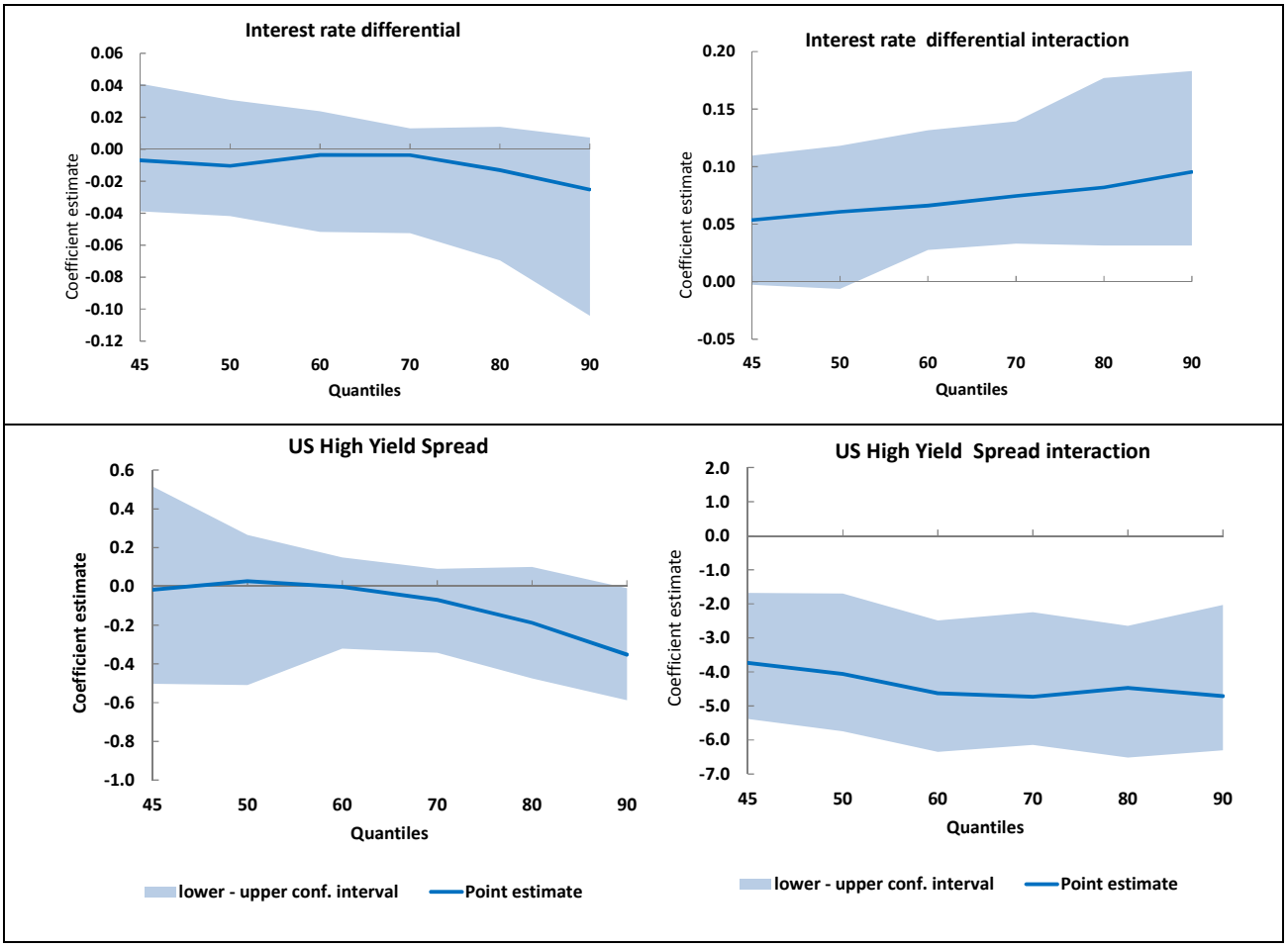
Notes: The top left chart shows the stock of foreign currency bonds (adjusted for valuation effects) in 2003 and 2009, averaged across EMs in a given quartile defined by the relative size of a country's 2003 foreign currency bond stock relative to GDP; the top right chart shows the stock of foreign currency bonds (adjusted for valuation effects) in 2009 and 2013, averaged across EMs in a given quartile defined by the relative size of a country's 2009 foreign currency bond stock relative to GDP. The bottom left chart shows the stock of local currency bonds in 2003 and 2009, averaged across EMs in a given quartile defined by the relative size of a country's 2003 local currency bond stock relative to GDP; the top right chart shows the stock of local currency bonds in 2009 and 2013, averaged across EMs in a given quartile defined by the relative size of a country's 2009 local currency bond stock relative to GDP. Source: Dealogic and authors' calculations.

Figure 6: Quantile Regression Results: Macro Fundamentals and Bank Characteristics:



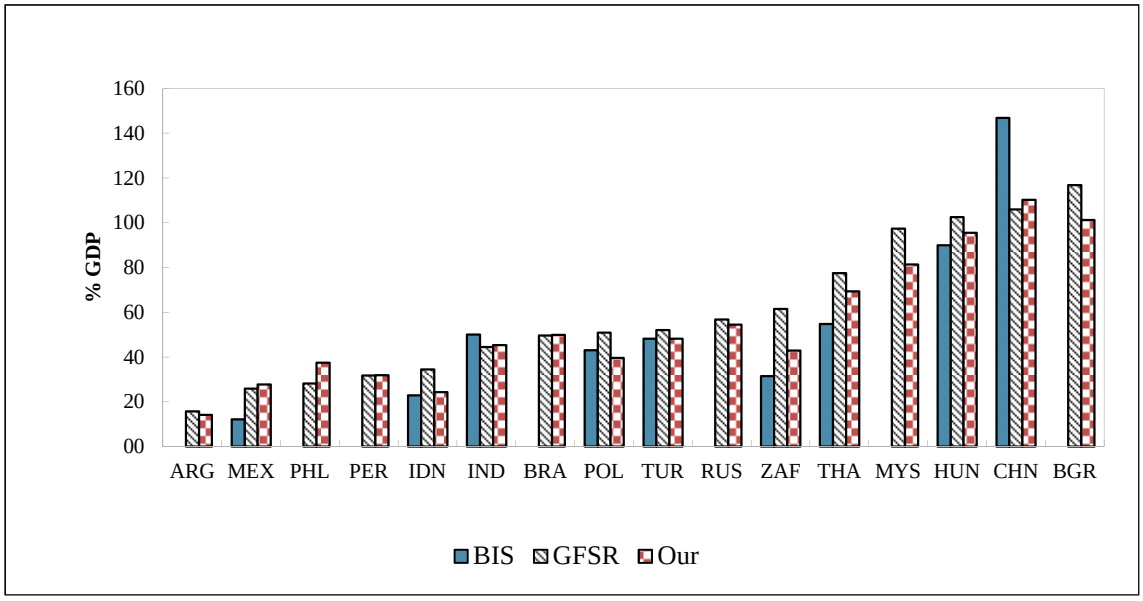
Notes: The solid line in all charts shows marginal effects (y-axes) with respect to regressor in caption for defined conditional quantiles (x-axes) of the dependent variable estimated from multivariate censored panel quantile regression. The shaded areas around the solid line are the boostrapped 90% confidence intervals. The dependent variable in all regressions is the share of FC bond finance in total outstanding corporate debt. All regressions include country fixed effects.

Figure 6b: Quantile Regression Results: Macro Fundamentals and Bank Characteristics:



Notes: The solid line in all charts shows marginal effects (y-axes) with respect to regressor in caption for defined conditional quantiles (x-axes) of the dependent variable estimated from multivariate censored panel quantile regression. The shaded areas around the solid line are the boostrapped 90% confidence intervals. The dependent variable in all regressions is the share of FC bond finance in total outstanding corporate debt. All regressions include country fixed effects.

Figure A1:



Notes: The chart compares different measures of non-financial corporate debt as a percentage of GDP for a selected set of EMs, including the one proposed in this paper (Our) as well as that available from the BIS and that used in previous IMF's Global Financial Stability Reports (GFSR) vintages (see text). Source: Dealogic, IFS, BIS, GFSR, country authorities and authors' calculations.