

Global Liquidity and External Bond Issuance in Emerging Markets and Developing Economies

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Abstract

Using the universe of all externally issued bonds by corporates and sovereigns in emerging and developing economies during 2000-14, this paper analyzes various issuance trends, including the unprecedented post-crisis surge. The paper focuses on external issuance at the country-industry and individual bond levels and finds that global factors matter greatly for emerging and developing economies issuance. A decrease in U.S. expected equity market (or interest rate) volatility, U.S. corporate credit spreads, and U.S. interbank funding costs and an increase in the Federal Reserve's balance sheet (i) raise the odds that the monthly issuance volume of a country-industry is above its historical average; (ii) decrease individual bond yields and spreads; and (iii) raise bond maturities, after controlling for country pull factors and bond characteristics (for example, type of issuer, industry, and riskiness). Additionally, we document support that the risk-taking channel of exchange rate appreciation also operates for external bond issuance. Moreover, while the paper finds that country pull factors affect the impact of global factors, it does not find consistent evidence for this across the board. This result suggests that, during loose global funding conditions, flows are mostly driven by push factors and do not systematically discriminate between emerging and developing economies. Taken together, the findings suggest that although issuers might be able to benefit from benign international funding conditions, the large issuance volumes, currency risks, and high exposure to global factors could pose external and domestic challenges for policy makers, particularly when global cycles reverse.

Key words: Global Liquidity, Bonds, Primary Market, Capital Flows, International Finance.

JEL Classification: F21, F32, F36, G12, G15.

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I. Introduction

The global financial crisis has given new impetus to the debate on the global financial liquidity cycle, which is primarily brought forth by monetary policy, risk appetite, and leverage in “financial center countries” and transmitted through loose funding conditions to the rest of the world (e.g. Rey (2013)). Emerging and developing economies (EMDEs) benefited from the pre-crisis upturn in this global cycle mainly through internationally active banks (e.g. Bruno and Shin (2015a, 2015b)). However, the process had also led to a build-up in global imbalances and financial fragilities which came to the fore when global banks deleveraged to strengthen their balance sheets and to comply with the new global regulatory architecture.

In the wake of the crisis, various developed economies embarked on unprecedented, extraordinary monetary policies (EMPs) to rekindle domestic economic growth and battle disinflationary pressures mainly via (promises of future) ultra-low policy rates and large-scale asset purchasing programs (LSAP) that aimed to bring down long-term interest rates. Since 2009-10, EMPs in the United States in particular have produced a prolonged episode of ultra-low global interest rates as well as extremely low volatility in financial markets. This in turn has contributed to a revival of ample global funding conditions and widespread financial risk taking as developed market investors searched for yield to meet targeted returns.

The spillover effects of these EMPs on EMDEs have been profound—EMDEs have experienced an unparalleled surge in total gross capital inflows from an annual average of \$0.5 trillion during 2000-2007 to \$1.1 trillion during 2010-2013. As a result, portfolio investors in developed markets currently allocate over \$4 trillion or 13 percent of their investments to EMDEs. Moreover, bonds funds allocations from developed markets to EMDEs have grown by 375% to \$385 billion since 2009 (Figure 1), equities funds allocations have expanded by 70% to \$985 billion (Figure 2), and foreign participation in some local bond markets has increased up to 26 percent of volume outstanding (Figure 3).

These massive capital inflows can set a in motion a feedback loop in EMDEs that consists of: i) ample domestic liquidity and loosening lending conditions, ii) increasing leverage, iii) rising asset prices and stronger domestic balance sheets through local currency appreciation, and iv) an improving growth and fiscal outlook. And as long as the cycle is virtuous, it attracts even more inflows which reinforces the cycle. Yet, while producing short-term growth, boosting investor optimism, and potentially extending debt maturities, these flows also provide challenges for EMDE policy makers, as they can put pressure on currencies and foreign reserves management, interfere with the local credit cycle and monetary policy, produce shadow banking risks, distort asset prices, and reduce incentives for structural reform.

In this context, the inevitable exit from EMPs and the normalization of global interest rates could prove disruptive for EMDEs (e.g. Rajan (2013), Turner (2014), IOSCO (2014)). The “Taper Tantrum”¹ episode is instructive in this respect and shows that market expectations regarding EMPs matter greatly (e.g. Eichengreen and Gupta (2014)). Now, more than 6.5 years later since their launch, EMPs appear to have contributed to the nascent economic recovery in the United States, and the Federal Reserve has finally discontinued its LSAP series of mortgage-backed securities and Treasury bonds purchases and is preparing to raise the policy rate for the first time

¹ In May 2013, the Federal Reserve hinted it might start scaling down its LSAP triggering virulent bouts of volatility in EMDE currencies, equities, and capital inflows.

in a decade. In contrast, the European Central Bank has recently launched its own LSAP in addition to other EMPs. These measures have helped drive down yield curves in Europe to record lows, suggesting the impacts of EMPs on global financial markets and its contribution to global liquidity will endure.

This paper focuses on the impact of global liquidity factors on a subset of capital inflows to EMDEs which has grown dramatically: the external issuance of bonds by corporates and sovereigns. Bond markets have become a major transmission channel of global liquidity (e.g. Shin (2013), Avdjiev et al (2014)). During 2009-14, corporates and sovereigns in EMDEs cumulatively issued \$1.5 trillion in external bonds—overwhelmingly in foreign currencies—representing almost a tripling from \$520 billion in 2002-07. This surge is not driven by a single region or country, but reflects a broad-based trend since the cumulative issuance to GDP ratio is 6.7% for the median EMDE, up from 4.3% in the pre-crisis period. For example, various countries issued externally for the first time during the period, including Angola, Armenia, Botswana, Ghana, Kenya, Laos, Namibia, and Mozambique.

Against this backdrop, this paper seeks to answer five main research questions:

- Question 1: What are the main trends in external issuance by EMDE entities during the 2000-14 period (e.g. volumes, stocks, currencies, maturities, yields)?
- Question 2: What is the impact of global factors—proxied by financial conditions in the United States—on the *propensity* to issue external bonds by an EMDE country-industry compared to its historical issuance average?
- Question 3: What is the impact of these global factors on two important bond characteristics at the time of issuance: its *yield* (and spread) and *maturity*?
- Question 4: Do country characteristics interact and amplify or dampen the impact of global factors?
- Question 5: Does the risk-taking channel through exchange rate appreciation as described and tested in Bruno and Shin (2015a, 2015b) also operate in a similar fashion for external bond issuance by increasing the propensity for country-industries to issue externally? In our setting, this channel hypothesizes that local currency appreciation strengthens local borrowers' balance sheets and their external bond issuance capacity which triggers higher cross-border flows by international investors who are willing to take on more risk.

Our paper makes four contributions. First, we compile external bond issuance data sets, which cover the universe of external bond issuances by EMDEs during 2000-14. We use these data sets to document recent trends in bond flows, stocks, pricing, and maturities across EMDEs. Second, to our knowledge, this paper is the first to study the impact of global factors on primary activity of EMDE entities in international bond markets since the start of new millennium. Third, we find support for the risk-taking channel of exchange rate appreciation for external bond issuance. Fourth, we undertake the analysis on the country-industry or bond tranche level which allows us to account for industry-specific and deal-specific factors (e.g. currency, bond riskiness, bond size). This ameliorates bias due to compositional and selection effects which are present in aggregated capital flows data which are typically the focus of inquiry in the literature.

The remainder of this paper is structured as follows. Section II provides a brief overview of the literature. Section III documents external issuance trends to answer Question 1. Section IV

discusses the data. Section V lays out the methodology to address the other research questions and section VI discusses the empirical results. Section VII concludes.

II. Literature Overview

Global liquidity

The pronounced simultaneous resurgence in capital flows to EMDEs seen since 2009-10 is not a new phenomenon. An extensive literature dating to the 1990s (e.g. Calvo et al (1993)) has emphasized the importance of global push factors, notably real interest rates and growth in advanced economies. Indeed, capital flows to EMDEs have long tended to exhibit strong co-movements suggesting that common drivers in the global environment are at play—both across types of flows (with the exception of FDI flows) and across geographical regions. This observation is corroborated by Koepke (2015), who, while summarizing relevant empirical literature, concludes that global push factors matter relatively more than country pull factors for portfolio flows. He finds that country pull factors matter more for banking flows.

Bekaert, Hoerova and Lo Duca (2013) show that a lower Federal Funds rate triggers a subsequent reduction in measures of uncertainty and risk aversion, proxied, for example, by the VIX index, which measures the 30-day ahead expected volatility derived from S&P 500 index options (Figure 16). And Forbes and Warnock (2012) show that a lower VIX is associated with a surge in capital flows. Rey (2013) finds that capital inflows are negatively correlated with the VIX even at a geographically disaggregated level, and that this pattern holds even when conditioned by other global factors such as the real interest rate and world growth rate.

Bruno and Shin (2015a, 2015b) highlight banks as a channel of transmission. Bruno and Shin (2015a) provide and empirically test a model of risk-taking through currency appreciation. They show that the leverage cycle of international banks is associated with higher cross-border bank flows. This triggers currency appreciation in the recipient countries which strengthens local balance sheets allowing banks to lend more. In a VAR framework, Bruno and Shin (2015b) find that a lower VIX entices globally active banks to take on additional leverage, arguably because they target a certain value-at-risk (VaR) measure which mechanically allows for higher leverage when uncertainty measures fall (e.g. Adrian and Shin (2010)). They also find that the U.S. Dollar depreciates as VIX decreases, which results in a loosening of Dollar lending conditions in international funding markets. Rey (2013) and Bruno and Shin (2015b) also provide evidence that higher leverage leads to a subsequent fall in risk aversion measures, giving rise to a positive feedback loop. The mechanism is as follows: when balance sheets expand in response to lower uncertainty (VIX) through increased collateralized lending and borrowing by financial intermediaries, the newly released funding resources chase available assets for purchase. If this leads to a generalized increases in asset prices in the financial system, it then affects future risk appetite (leads to a fall in risk aversion).

However, recently, bond markets have taken over as a transmission channel. For example, Shin (2013) documents the impact of the VIX on portfolio bond flows. He argues that since 2010, “reaching for yield” by investors in developed economies has contributed to the decline in risk premiums for debt securities and a surge in issuance of international debt securities. In particular,

Shin (2013) discusses the increase in offshore issuance of international debt securities by non-financial firms that operate across borders.

Co-movement of capital flows also translates to co-movement of asset prices. For example, Miranda-Agrippino and Rey (2012) look at equity markets and show that about 25% of the variance of a large cross section of prices of risky assets is explained by a single global factor (the VIX). That is, they find that irrespective of the geographical location of the market in which the assets are traded or the specific asset class they belong to, risky returns load to a large extent on this global factor.

Of course, domestic factors still matter for capital inflows as well. For instance, Ghosh et al (2010) look at aggregate capital inflows and find that, conditional on a surge of capital inflows occurring (which is determined by global factors), whether or not a particular country receives any flows depends on its domestic macroeconomic and institutional factors. Similarly, Fratzscher (2011) documents that common shocks exert a large effect on portfolio flows, but also finds the effects are highly heterogeneous across countries, with a large part of this heterogeneity explained by differences in the quality of institutions, country risk and the strength of domestic fundamentals. Cerutti et al. (2014) who analyze cross-border banking flows in particular, find that, while U.S. financial conditions (VIX and term premia) are important, recipient country characteristics affect both the level of country specific flows as well as the cyclical impact of global liquidity on the domestic economies.

EMPs

EMPs mainly operate through various channels to affect investor portfolio decisions and contribute to the global liquidity cycle, with the attendant domestic and international consequences, including:

- *The portfolio balance channel:* To the extent that assets are not perfectly substitutable, the central bank's purchase of a security such as a U.S. Treasury, affects the available supply of this asset to investors and reduces its yield, pushing investors into holding other assets.
- *The expectations channel:* If the markets interpret the central bank's announcements or operations as signaling lower future policy rates than they had previously expected, bond yields may decline via a lower risk neutral component of interest rates.
- *The confidence channel:* The central bank's actions may also provide new information about the current state of the economy –which in turn could affect the portfolio decisions and asset prices by changing investors' risk appetites.
- *The liquidity channel:* Assets purchased through LSAP operations boost the reserves of commercial banks held at the central bank which can more easily be traded on secondary markets than can long term securities. As a result, the liquidity premium declines, which helps unclog funding markets, lower borrowing costs, and boost bank lending (Joyce et al. 2012).

Recent research has also looked specifically into the effects of EMPs in the United States on both capital flows and asset prices in EMDEs. Fratzscher, Lo Duca and Straub (2013) find that the first LSAP or quantitative easing (QE1) in the United States (which focused on providing liquidity to financial institutions to repair markets) triggered a reversal of flows back to the United States as investor anxiety over U.S. conditions subsided. In contrast, subsequent LSAPs (QE2 and QE3,

which focused on asset purchases) had the opposite effect and induced a portfolio rebalancing out of U.S. equities and bonds and partly into EMDEs. These effects occurred both at the time of announcement of the program as well as during actual asset purchases.

Burns et al (2014) find that 13% of the total variation in capital flows from developed economies to EMDEs can be specifically attributed to a QE effect in the United States. Jointly, financial conditions in the United States and domestic pull factors in EMDEs account for 60% and 40% of the variation, respectively.

Expectations regarding EMPs in the United States particularly matter for flows to EMDEs. Koepke (2014) finds that a one percentage point increase in market expectations for the Federal Funds rate three years forward was associated with a short-term decrease of \$6-7 billion on bond flows to EMDEs and \$1.2-6.5 billion on equity flows. The cumulative, long-term effect might be twice as large. The effect also appears to be asymmetric as a shift towards expectations of monetary tightening is much larger than a shift towards expectations of easing.

III. The Evolution of EMDE Activity in International Primary Bond Markets

This section addresses the first research question. Since 2000, external issuance of corporate and sovereign entities in EMDEs has shown various trends. We discuss i) issuance volume, ii) outstanding stocks, iii) currencies, iv) issuing industries and use of proceeds, v) maturities and yields at issuance, vi) maturing profile, and vii) quality of issuance. Panel A in Appendix 2 provides summary statistics on bond issuance by year.

Issuance volume trends

1. **External bond issuance increased steadily before the global financial crisis and accelerated rapidly after the crisis reaching unprecedented levels (Figure 4).** Total annual issuance rose from around \$64 billion in 2000 to \$400 billion in 2014. For the pre-crisis years (2000-07), annual average issuance was about \$80 billion and grew at an average annual rate of 6%. The global financial crisis negatively affected external issuance across all the regions. Subsequently, total external issuance dropped to \$48 billion in 2008 compared to \$100 billion a year before. However, issuance resumed quickly and during the post-crisis period (2009-14) average annual issuance was about \$250 billion and grew by an average 24% annually. South Asia (SAR), Africa (AFR) and the Middle East (MNA) regions have been the smallest external issuers, and, although in recent years absolute volumes have increased, they are still among the lowest. Of particular interest is China's issuance, which grew rapidly since 2009 in the wake of the major credit stimulus driven by banks and real estate developers, and surpassed Latin America (LAC) in 2014.
2. **Pre-crisis external issuance was mostly driven by sovereigns whereas post-crisis issuance was dominated by corporates (Figure 5).** Issuance by sovereigns and corporates has been increasing on average since 2000 at 5% and 23% annually, respectively. However, the pace of issuance accelerated in the post crisis period, especially for corporates which posted a total issuance of around \$300 billion in 2014, compared to \$14 billion in 2000. EMDE sovereigns experienced a much more moderate increase in their external issuance, issuing \$99 billion in 2014 compared to \$50 billion in 2000.
3. **Cumulative post-crisis issuance is large relative to country GDP and grew much faster for the poorest countries (Figure 20).** For all EMDEs combined, the median

cumulative external issuance to GDP ratio was 6.7% in 2009-14, a significant increase from 4.3% in 2002-07. Richer EMDEs are the main issuers, accounting for 85% of total issuance during this period. Yet, the median ratio for the poorest country group (LMIC)² is 6.2% of GDP, up from 1.9% in 2002-07. This dramatic increase has important implications for sovereign and corporate liability structures in these countries.

4. **External issuance of oil exporting EMDEs has also increased and might pose additional risks given recent oil price and U.S. Dollar developments (Figure 20).** Total volumes by this group has increased from \$68 billion in 2002-07 to more than \$100 billion by 2009-14. Cumulatively, external bond issuance in 2009-14 was 3.8% of GDP for the median oil exporter, up from 1.2% in 2002-07. A strong Dollar, current oil price trends, and tightening of international funding conditions all raise financial risks for this group.

Outstanding stock trends

5. **External debt stocks in absolute terms and relative to the size of the economy have risen to unprecedented levels post-crisis. This is a widespread phenomenon and is not driven by a single country or region (Figure 6).** For March 2015, we estimate poorer EMDEs (LMICs) have about \$280 billion outstanding while the corresponding figure for richer EMDEs (non-LMICs) is \$1.4 trillion. We find that the median ratio of outstanding external bonds issued since 2000 to GDP has risen across all regions. Most of the increase across regions has taken place since 2009 and 2011 when LSAPs in the United States were fully operational and the long-term refinancing operations (LTROs) of the European Central Bank were launched, respectively. In February 2015, the median ratio was largest in LAC with 12.6%, up from 7.5% in 2007. It is also high in Eastern Europe (ECA) and East Asia (EAP, excluding China) standing at 9.2 and 7.8%, respectively. The ratio almost quadrupled in ECA from a crisis nadir of 2.3% in 2008. Similarly, the ratio tripled for MNA to over 6% currently.

Currency trends

6. **External issuance is still mostly denominated in foreign currencies. As such, the recent trend of a strong U.S. Dollar raises financial vulnerabilities. Local currency issuance has increased, driven by Dim Sum bonds (Figure 7).** External issuance has mostly occurred in foreign currencies though the share of local currencies has been increasing gradually. In 2000, around 1% (\$327 million) of total issuance by EMDEs was in local currencies and this has increased to 15% (\$60 billion) in 2014. A key contributor to the trend are Dim Sum bonds issued offshore by Chinese entities which are denominated in renminbi.

Industry and use of proceeds trends

7. **The largest issuing industries include the Finance and Utilities Sectors (Figure 8).** Finance captured the largest share among sectors by second half of 2014. This might be driven by the fact that large internationally active banks started to deleverage in the face of stricter regulatory requirements and market pressures. Utilities and Other sectors (which

² These are countries with a GNI per capita of \$4,125 or lower, according to World Bank Income group definitions.

includes agribusiness, forestry and paper, healthcare, chemicals, closed end funds, defense, and government) are the other two sectors with relatively larger volumes of total issuances.

8. **Proceeds have mostly been used to finance general corporate activities and public investment. In the wake of the “Taper Tantrum”, refinancing has become a key use (Figure 9).** General corporate activities include capital expenditures, R&D expenditures, and other productive investments. Refinancing of debt surged around the “Taper Tantrum” suggesting EMDE entities issued to make their debt profiles less risky while funding conditions were still benign. Public sector uses which cut across industries are also substantial and primarily used for financing community projects at the sovereign and sub-sovereign levels.

Maturities and yields trends

9. **Average yields of new external issuances have dropped precipitously since the crisis (Figure 10).** In 2007, right before the financial crisis, yields stood at 8.4% and have fallen since to about 5% in 2015. As expected, yields of the poorest countries (LMICs) have been consistently higher than for richer EMDEs (non-LMICs). However, the spread between the two has declined steadily from a peak of 4.4% in 2009 to 1.8% in 2015. Taken together, these findings are consistent with search-for-yield motives.
10. **The average maturity of external issuances dropped sharply during the crisis. While maturities have increased since, they remain well below pre-crisis levels (Figure 11).** Right before the crisis, volume-weighted average maturities were almost 9 years. The crisis triggered a sharp drop to 7.3 years in 2009. While maturities recovered somewhat since, around the time of the Taper Tantrum, they started falling again, reaching 6.7 years by the end of 2013, when search for yield flows resumed. Currently, the average maturity for new issuances is almost 8 years. Maturities in richer EMDEs (non-LMICs) were particularly affected during the crisis, dropping from almost 9 years in 2007 to 7.3 years in 2009. Since then they have been on an upward trend and currently stand at almost 8 years. Post-crisis volatility of maturities have been high for poorer EMDEs (LMICs), reflecting lower deal volume compared to non-LMICs. With that caveat, since 2014, LMIC maturities have been increasing sharply from 6.6 to 8.6 years.

Maturity profile of currently outstanding bonds

11. **The majority of the \$1.7 trillion currently outstanding external bonds of EMDEs will mature before 2024 with a peak in 2019. Richer EMDEs will experience another peak in 2017 (Figure 12).** In March 2015, we estimate the outstanding stock of external bonds for EMDEs to be \$1.7 trillion, of which \$1.5 trillion will mature by 2035. Of this initial \$1.7 trillion stock, the average still outstanding monthly amount of bonds maturing within the next 12 months is highest during 2015-19 when it peaks at \$207 billion. During this period, the average monthly amount of maturing bonds is \$164 billion (\$28 billion and \$136 billion for LMICs and non-LMICs, respectively). This monthly maturing amount declines during 2020-24 in which the average drops to \$109 billion. Non-LMICs experience two peaks of roughly \$150 billion in 2017 and 2019. LMICs will experience a single peak in 2019 when the amount that matures within 12 months reaches \$40bn. According to current market expectations, these peaks will occur after the Federal Reserve has raised interest rates.

12. **By 2020, all regions will have experienced peaks in which more than 10% of their currently outstanding stocks will mature within 12 months (Figures 13 and 14).** China's peak should occur in 2017 in when almost 20% of its currently outstanding bonds will mature (\$333 billion). A significant portion of these bonds however are denominated in renminbi which ameliorates currency risks. South Asia peaks in 2019 with 20% of its current stock (\$81 billion). Eastern Europe peaks at almost 15% in 2018 (current stock: \$239 billion). East Asia (ex-China) peaks at 12% in 2019 (current stock: \$174 billion). Africa, Middle East, and Latin America peak at 15%, 15% and 10% in 2020, respectively (current stocks; \$64 billion, \$42 billion, and \$751 billion).

Credit quality

13. **The credit quality of post-crisis external issuance has improved significantly (Figure 15).** Before the crisis, only 30-40% of issuance was investment grade. Since 2010, this fraction has steadily improved from around 50% to 70%. While this is a positive trend, it is important to keep in mind that ratings can be pro-cyclical.

IV. Data

We now turn to the description of our two data sets that cover the universe of EMDE external bond issuance in the period 2000-14. We consider a country to be an EMDE if it is included in the World Bank 2014 regional country classification. Appendix 1 provides a detailed overview of the countries in our sample. Table 1 describes the variable definitions. Our data sets matches three types of data: i) highly granular bond data (i.e. industry or bond deal level), ii) high frequency financial global push factors, and iii) country pull factors. Data on bonds are derived from Dealogic which provides information on borrowers, bond yields and non-pricing terms at origination on the individual deal level, which typically comprises several tranches. Global push factors are from Bloomberg and country pull factors are sourced from the IMF's World Economic Outlook.

A. Bond Deals

Country-industry panel dataset

First, to analyze the impact of global factors on the propensity to issue external bonds by EMDE entities, we compile a balanced panel data set of monthly total external bond issuance for each industry in 71 emerging and developing countries between 2000 and 2014. There are 7 industrial sectors, which translates to 497 individual country-industries for which we have monthly observations. Note that some of these country-industries have not issued externally at all in our sample. Hence the number of country-industry-month observations in the panel is about 84,000.

Our dependent variable is a dummy which denotes for a particular country-industry whether its total volume issuance in a given month is above its historical average over the period 2000-07. In doing so, we essentially control for general issuance patterns for each country-industry and ameliorate bias due to absolute size effects.

Bond tranche deal dataset

Second, to study the impact of global factors on individual bond yield and maturities, we construct a data set which captures the universe of 6,307 individual bond deals for 71 emerging and developing economies in the 2000-14 period. These bonds are issued by 210 country-industries.

The other 289 country-industries never issued externally during the sample period. Appendix 1 provides details of issuance activity on the country level. Bonds often consist of multiple tranches with different characteristics. Therefore the number of observations in this dataset is 6,925 bond tranches.

Our two bond variables of interest are *yield to maturity* (defined as the rate of return on a bond assuming the bond is held until maturity at the time of issuance) and *maturity* (defined as the number of years for which the bond remains outstanding at the time of issuance). We lose tranche observations due to missing data. As a result, we have yield data for 5,962 bond tranches and maturity data for 6,804 (non-perpetual) bond tranches, respectively.

This bond tranche level data set allows us to control for bond-specific characteristics that could influence the two variables of interest. We can therefore account for changes in issuance composition over time. These bond tranche level variables include:

- *Size of bond tranche issued* refers to the total U.S. Dollar volume of the individual tranche of the deal;
- *Currency* is an indicator variable that captures the currency in which the tranche is issued;
- *Investment grade type* is a set of indicator variables that indicates whether the bond tranches are investment grade or not – i.e. a credit rating of BBB- or higher according to S&P or Baa3 or higher according to Moody's. This variable allows us to control for adverse selection issues;
- *Borrower industry* is a set of indicator variables that captures the industrial sector of the issuing entity (Consumer, Finance, Metals, Professional Services, Transportation, Utilities, and Other);
- *Borrower type* distinguishes between three different types of borrowing entities, public-local (local and state/provincial authorities), public-other (central government) and non-public; and
- *Deal type* is a set of indicator variables which reflects the type of bond tranche such as Asset Backed Securities, Corporate Bond-High Yield, or Sovereign (see Table 2 for more details). The grouping is defined by Dealogic.

B. Global Push Factors

We study the impact on external bond issuance of four global push factors that proxy for global financial conditions:

1. The VIX index (*VIX*) (Figure 16) captures the options-implied 30-day ahead volatility of the S&P 500 equity index and is the most frequently used indicator as a proxy for global risk appetite, risk, and uncertainty. Higher values of *VIX* are associated with higher bond yields and lower maturities. Research suggests EMPs have contributed to extremely low volatility. In robustness checks, we also use the MOVE index which captures expected U.S. Treasury volatility and acts as a proxy for interest rate uncertainty. Higher values indicate greater uncertainty.

2. The Libor-OIS spread (*LIBOR*) (Figure 17) is used as a control for risk perception in credit markets. This spread is a measure of inter-bank risk and liquidity in the money market and captures fear of bank insolvency. Higher spreads indicate low liquidity and an unwillingness of banks to lend to each other, and are typically associated with higher bond yields and a decrease in maturities.
3. The corporate credit spread (*RISK*) (Figure 18) tracks the performance of U.S. Dollar denominated investment grade rated corporate debt that is publically issued in the U.S. domestic market. This options-adjusted spread is the difference between U.S. treasury bonds and corporate bonds with a BBB rating or higher. *RISK* is an indicator of corporate sector health, where wider spreads are associated with deteriorating investor confidence and are expected to increase bond premiums and shorten the duration at which EMs can issue debt. Search-for-yield will exert a downward pressure on this spread. In unreported robustness regressions we use the high-yield corporate debt spread instead with qualitatively similar results.
4. The size of the Federal Reserve Balance Sheet (*FED*) (Figure 19), calculated as the sum of mortgage-backed securities and U.S. treasuries, is used to gauge spillover effects from U.S. LSAPs.

Panel B in Appendix 2 provides average values of these global push factors around time of each individual bond issue by year.

In all our regressions, we also control for the United States 10-year Treasury yield (*UST10Y*), which is generally considered a pricing benchmark and a proxy for global liquidity conditions as well. Falling U.S. long-term treasury yields are associated with an abundance of capital in the international market and an increased willingness to hold relatively riskier assets, such as emerging and developing market debt. Indeed, the empirical literature has found this global factor to be a key determinant of emerging market bond prices. Notably, an increase in U.S. treasury yields tends to increase emerging market bond yields and spreads while decreasing the probability of bond issuance (e.g. Eichengreen and Mody (1998a) and Eichengreen and Mody (1998b)).

Global push factors are all based on daily time series. To best estimate the global financial conditions that impacted bond issuance as well as investor confidence, we incorporate these global factors into our two data sets as follows (See Table 2 for more details on global push factors). For the industry-level dataset, we calculate for each month the average value of each factor for the 6 preceding months. For the bond-level data set, for each individual bond we compute the average value for each factor the 6 months prior to the issuance date.

C. Domestic Pull Factors

As regards country-specific factors, the analysis controls for five macro-financial variables used to evaluate a country's development, creditworthiness, and vulnerability. These variables are available on an annual basis and we match the macro variables with the corresponding year for each month in the industry-level panel dataset and the year of the bond issue date in the bond-level dataset:

- Real GDP per capita in U.S. Dollars (*GDPPC*) is used to control for the level of development of a country given its positive correlation with international bond issuance.

- Real GDP growth rate (*GROWTH*) is used to proxy for investment opportunities as higher economic growth can potentially drive down bond yields and increase their maturities.
- The current account balance expressed as a percent of GDP (*CA*) is used as larger current accounts can make countries more vulnerable to a slowdown in capital inflows or sudden stops and hence can result in higher yields and shorter maturities on debt issued.
- Total external debt as a percentage of GDP (*EXT*) is used as lower levels of external debt are expected to reduce default risk and boost investor confidence in the economy which can positively impact bond issue prices and maturities.
- Total bank credit to the private sector as a percentage of GDP (*PCRED*) is often used as a proxy of financial depth and development which can enhance resilience to economic and financial shocks, and, in turn, positively impacts bond prices and maturities. While private sector credit is considered a financial variable, it is also an indicator of economic activity – improved economic activity is usually reflected in greater credit growth and potentially in reduced prices and maturities for bonds.

D. Descriptive Statistics and Correlations

Table 2 provides descriptive statistics. Panel A shows the average yield and maturity at issuance in our universe of bonds during the 2000-14 period was 5.1% and 6 years, respectively. The average bond size was about \$123 million. The average propensity for a country-industry to issue above its 2000-07 historical average in any month was 3% (Panel B). All global push factors exhibit very high variation as a result of the pre-crisis boom, the global financial crisis, and the effect of subsequent policy measures, including EMPs, which drove down interest rates, volatility, and risk spreads.

Table 3 reports correlations. We document a particularly strong negative unconditional association between individual bond yields in EMDEs and the size of the Fed's balance sheet around the time of issuance ($\rho = -0.58$), suggesting that EMPs have contributed to search-for-yield climate to EMDEs. The correlations between bond features and various country characteristics (e.g. *PCRED*) are also quite high, suggesting pull factors are important as well. Correlations between the global push factors are relatively strong, with the exception of the Fed's balance sheet.

Appendix 2 Panels A, B and C display annual bond issuance characteristics (excluding issuance by Chinese entities) and annual averages of push and pull factors around the time of issuance. Panel D shows the fraction of all country-industries with monthly issuance volume above their historical average by year.

A few points are worth highlighting. Panel C shows that the country profile of issuers has changed significantly, with both positive and negative features. Post-crisis, issuing countries are significantly richer than before the crisis as measured by GDP per capita (2010-14: \$7,800 vs. 2000-07: \$4,300). They also have deeper financial systems as proxied by private credit to GDP (2010-14: 51% vs. 2000-07: 36%). Moreover, they have lower levels of external debt to GDP (2010-14: 39% vs. 2000-07: 48%). However, at the same time the current account and economic

growth of issuing countries has deteriorated significantly, particularly during 2011-14 (3.8% and -3% of GDP, respectively).

Panel D clearly shows the presence of synchronized external issuance waves on the country-industry level, even after correcting for historical average issuance patterns of individual country-industries. In the run up to the crisis, the average monthly fraction of country-industries with higher issuance than their own average during 2000-07 climbed from 1.59% in 2002 to 3.35% in 2006. This fraction fell to 1.14% during the height of the crisis in 2008. However, the fraction has increased again since 2010 to record levels from 3.67% in 2010 to 5.30% in 2013.

V. Methodology

This section describes our econometric approach to analyze research questions 2, 3, and 4 of this paper.

A. Modeling the Propensity to Issue Externally on the Country-Industry Level

To address the first research question, we fit logistic regressions on our industry-level panel data set to test the impact of our global factors on the tendency of country-industries in EMDEs to issue external bonds above their own historical average. By comparing monthly issuance of a country-industry to its own historical average issuance volume, we effectively control for country-industry level issuance trends. In all regressions, we cluster standard errors on the country-industry level to allow for within industry correlation. We estimate the issuance propensity for a particular country-industry as:

$$P(ABOVE_AVG_ISSUANCE_{ist} = 1) = F(\beta_0 + \beta_1 X_{it}^{INT} + \beta_2 X_{it}^{DOM} + \beta_3 \text{Industry fixed effects} + \beta_4 \text{Country fixed effects} + \beta_5 \text{Year fixed effects}) \quad (1)$$

where $ABOVE_AVG_ISSUANCE_{ist}$ is an indicator variable which assumes a value of 1 if total issuance volume in industry s in country i during month t is above the pre-crisis historical monthly average of industry s during 2000-07 and 0 otherwise. $F(\cdot)$ denotes the cumulative logistic distribution. X_{it} denote vectors of time-varying explanatory variables that contain global push factors (INT) and domestic pull factors (DOM). The vector of global factors consists of $X_{it}^{INT} = (GF_t, UST_t)$ where $GF_t \in (VIX_t, RISK_t, FED_t, LIBOR_t)$. In other words, we always control for the United States 10 year Treasury rate. The vector of domestic factors is defined as: $X_{it}^{DOM} = (GDPPC_{it}, GROWTH_{it}, CAD_{it}, EXT_{it}, PCRED_{it})$.

Importantly, we include a battery of fixed effects. We account for *time-invariant country factors* such as the overall institutional environment, the macro-financial framework, and the level of development of the country which influences investment opportunities and investor appetite. We include *year factors* to capture the overall impact of global conditions such as trade and crisis effects. As such, we exploit within-year variation and avoid drawing false inference due to general cyclical or time trends. Finally, we include *industry factors* to capture intrinsic differences between industries in terms of their need for and use of external bond finance.

B. Modeling Yields and Maturities on the Bond Tranche Level

We estimate pooled OLS regressions on the bond tranche-level dataset to evaluate the impact of global factors on the pricing and maturity of bonds. Again, in all regressions, we cluster standard errors on the country-industry level to allow for within industry correlation. The model can be written as:

$$BF_b = \beta_0 + \beta_1 X_b^{INT} + \beta_2 X_b^{DOM} + \beta_3 X_b^{BOND} + \beta_4 \text{Year of issuance fixed effects}_b + \beta_5 \text{Country of issuance fixed effects}_b + \varepsilon_b \quad (2)$$

where BF_b denotes the yield to maturity³ or the maturity of bond tranche b . The first two X_b vectors capture global push factors (INT) and domestic pull factors (DOM) around the time bond b was issued, as described above. X_b^{BOND} is a vector of bond-specific characteristics: *Size of bond issued*, *Currency*, *Investment grade*, *Borrower industry*, and *Deal type*. For yield to maturity regressions, we also include *Maturity* in X_b^{BOND} . Importantly, X_b^{BOND} allows us to isolate the impact of issuance composition and bias effects (e.g. differences in bond risk, bond size or industry) so we can make much stronger inference than is possible at higher levels of aggregation where such information is lost. We also incorporate two sets of indicator variables that capture general global conditions such as global trade and general crisis effects in the year which bond b was issued (*Year of issuance* _{b}) as well as time-invariant factors associated with the country in which bond b was issued (*Country of issuance* _{b}).

Missing data in X_{it}^{DOM} limits the sample size. Therefore, in robustness regressions we substitute X_{it}^{DOM} and the country fixed effects for *country-period* fixed effects. Our model becomes:

$$BF_b = \beta_0 + \beta_1 X_b^{INT} + \beta_2 X_b^{BOND} + \beta_3 \text{Year of issuance fixed effects}_b + \beta_4 \text{Country} - \text{period of issuance fixed effects}_b + \varepsilon_b \quad (3)$$

VI. Empirical results

This section addresses research questions two through five. It summarizes and discusses the main empirical results for the impact of global push factors on external bond issuance in EMDEs. Given that the global factors are relatively highly correlated, we estimate their effects in separate regressions.

A. Impact of Global Factors on the Propensity to Issue Externally on the Country-Industry Level

Table 4 shows the results of the logistic regressions that estimate Equation (1) on the country-industry-month level in EMDEs during the 2000-14 period. All four global push factors (VIX, RISK, FED, and LIBOR) are highly statistically significant on the 1-percent level with the expected sign. This finding supports the notion that external issuance across EMDEs is highly synchronized with the global financial cycle which triggers capital flows out of developed markets in search for yield in EMDEs.

³ Note that because the regression controls for the 10-yr U.S. government yield, the results can also be interpreted as if the dependent variable were a “spread”.

Model 1 shows that industries are less likely to issue above their historical 2000-07 average if VIX increases even after controlling for the UST10Y, and time-varying and time-invariant (e.g. country fixed effects) country pull factors. The result is also economically significant. A 10% increase in the VIX leads to a decline in the odds an industry will issue above its average by almost 6% ($1.1^{(-0.63)} - 1$).

Model 2 shows that a decrease in the BBB U.S. corporate credit spread (RISK) lowers the odds of above-average issuance even more than for the VIX. These odds drop by 10% for a 10% increase in RISK. Model 3 indicates that an increase in the size of the Fed's balance sheet (FED) boosts the odds of above-average issuance. The coefficient suggests that a 10% increase in the Fed balance sheet increases the odds by 8%. Finally, Model 4 shows that lower interbank risk increases the above-average issuance odds. A 10% decline in LIBOR increases the odds by 5.5%.

Table 4 also consistently shows that GDP per capita (GDPPC), GDP growth (GROWTH), and the current account (CA) are the most important country pull factors. Industries in countries with higher GDPPC and GROWTH are more likely to issue above their historical 2000-07 average volume in a given month. This could reflect both demand and supply factors: industries in more developed or faster growing countries could have a higher need for external finance while investors have more appetite to supply it given lower risks. Similarly, industries in countries with current account surpluses are less likely to issue above average, perhaps since countries with surpluses are net exporters of capital. We don't find evidence that other macro pull factors such as external debt (EXT) or financial development (PCRED) of the country contain additional information.

In unreported robustness regressions we use the MOVE index and obtain qualitatively similar results as for the VIX in Model 1. The MOVE Index captures expected U.S. Treasury volatility and acts as a proxy for interest rate uncertainty. Higher values indicate greater uncertainty. More specifically, the Merrill Lynch Option Volatility Estimate Index is a yield curve weighted index of the normalized implied volatility on 1-month Treasury options which are based on the 2, 5, 10, and 30 year contracts. Intuitively, MOVE is similar to VIX for the government bond market.

In another set of unreported robustness regressions, we assess the impact of the U.S. Economic Policy Uncertainty (EPU) Index as developed in Baker et al (2015), but do not find any statistically significant results. The EPU Index is based on three types of underlying components:⁴ *“One component quantifies newspaper coverage of policy-related economic uncertainty. A second component reflects the number of federal tax code provisions set to expire in future years. The third component uses disagreement among economic forecasters as a proxy for uncertainty.”*

B. Impact of Global Factors on Yields of External Bonds at Time of Issuance

Table 5 presents bond tranche-level OLS regressions which document the impact of the global factors on individual bond yields in EMDEs during the 2000-14 period. For each global push factor we present two models to estimate Equations (2) and (3), respectively. We exclude Chinese

⁴ For details, see <http://www.policyuncertainty.com/>.

issuance in the second model to avoid a possible China bias since 2,945 bonds in the sample (consisting of 3,143 tranches) are issued by Chinese entities.

A consistent picture emerges in which favorable global conditions bring down bond yields across EMDEs in a synchronized manner. Since the regressions control for the 10-year U.S. treasury yield (UST10Y), the results also imply that the “spread” (see footnote 3) relative to U.S. treasuries falls when global factors are benign. Except for one model, all results are significant at the 5 percent level at least.

Models 1 and 2 demonstrate that a decrease in the VIX is associated with lower bond “spreads” across EMDEs. A 10% decrease in the VIX decreases the EMDE bond “spread” by 6 to 12 basis points. Model 2 excludes Chinese issuance and adds data for 11 countries by dropping time-varying country factors and produces a result that is significant on the 1 percent level and doubles in magnitude. Models 3 and 4 show that the impact of RISK is strong and highly significant as well. A 10% decrease in RISK decreases EMDE bond “spreads” by 12-13 basis points. Models 5 and 6 are also highly significant and indicate that a 10% increase in the Fed’s balance sheet size brings down EMDE bond “spreads” by 8-9 basis points. Finally, a 10% fall in the LIBOR-OIS spread is significantly associated with a reduction in EMDE bond spreads by 3-6 basis points.

As expected, we find that the UST10Y and bond maturity have a consistent positive impact on the yield. The size of the bond does not contain additional explanatory power. Unreported regressions show the level of economic development (GDPPC) as well as economic growth (GROWTH) are significantly negatively associated with spreads, as expected. However, after inclusion of year fixed effects the GDPPC coefficient switches sign and GROWTH is no longer significant. This suggests global factors play a more significant role.

Again, in unreported robustness regressions we use the MOVE index and obtain qualitatively similar results as for the VIX in Models 1 and 2. In another set of unreported robustness regressions assessing the impact of the U.S. Economic Policy Uncertainty (EPU) Index, we again do not find any statistically significant results.

C. Impact of Global Factors on Maturities of External Bonds at Time of Issuance

Table 6 documents bond tranche-level OLS regression results which show the impact of global factors on maturities of non-perpetual external bonds issued during 2000-14. The standard errors are clustered on the country-industry level. As in Table 5, for each global push factor we present two models to estimate Equations (2) and (3), respectively. Overall, we find that favorable global factors are associated with a maturity extension across EMDEs. This result is consistent with a willingness of investors to extend maturities when global liquidity is ample and search for yield effects are strong. However, the results are somewhat weaker in terms of statistical significance, compared to the impact on yields.

Models 1 and 2 suggest that a 10% fall in VIX extends bond maturities by 16-17 weeks, although Model 2 is only significant at the 10-percent level. The results in Models 3 and 4 are statistically strongest, both at the 1 percent level, and suggest that a 10% fall in RISK boosts maturities by 17-

24 weeks. Only Model 5 is statistically significant and suggests a 10% increase in the Fed’s balance sheet increases maturities by 14 weeks. We do not find strong evidence of a significant impact of a lower LIBOR-OIS spread although the coefficient has the expected sign, suggesting that a lower spread has a positive impact on maturities.

Across regressions we also find evidence that larger bonds typically carry longer maturities. This is in line with expectations since larger issuers are typically able to issue at longer maturities. As regards country characteristics, in unreported regressions we find that economic growth (GROWTH) has a strong significant positive impact on maturities, consistent with expectations as well. However, after inclusion of year fixed effects, GROWTH is no longer significant.

In unreported robustness regressions we use the MOVE index and obtain similar results as for the VIX in Model 1 and 2. The impact of the U.S. Economic Policy Uncertainty (EPU) Index is again statistically insignificant.

D. Interaction of Country Characteristics with Global Factors

Appendix 3 contains 60 additional regressions in which we investigate whether country characteristics amplify or dampen the impact of our four global factors $GF_t \in (VIX_t, RISK_t, FED_t, LIBOR_t)$. In doing so, we modify Equations (1) and (2) by sequentially adding an interaction between a global factor and a country variable from $X_{it}^{DOM} = (GDPPC_{it}, GROWTH_{it}, CAD_{it}, EXT_{it}, PCRED_{it})$. This strategy produces $4 \times 5 = 20$ additional regressions for each independent variable. For all 40 bond tranche level regressions (i.e. Equation (2)), we omit Chinese bonds to avoid a China bias.

While some of these interactions are statistically significant, we do not find consistent evidence across the board that country variables amplify the effect of global factors. This suggests search-for-yield flows during loose global funding conditions do not strongly discriminate between EMDEs but are primarily driven by global factors.

In that context, in our 20 additional augmented Equation (1) regressions we highlight that the interaction with PCRED is significant for VIX and FED at the 1-percent level and RISK at the 10-percent level. This suggests higher financial development could amplify benign global factors and raise the odds that a country-industry will issue above its historical average.

In addition, for our 20 additional Equation (2) regressions to explain individual bond yields (and “spreads”), we document that the interaction with GROWTH is significant for VIX and RISK at the 5-percent level and LIBOR at the 1-percent level. We also find significant interactions for EXT with RISK and LIBOR at the 5-percent level. These findings provide some support for the notion that country growth and external debt can amplify the impact of these global factors on individual bond yields and spreads.

We do not find any strong results in our 20 additional Equation (2) regressions to explain individual bond maturities, indicating that maturities are not significantly differently affected by global factors across EMDEs with different domestic characteristics.

E. The Risk-Taking Channel of Exchange Rate Appreciation

Following Borio and Zhu (2012) and Bruno and Shin (2015a, 2015b), in this section, we briefly explore the risk-taking channel of financial conditions and monetary policy in developed countries via exchange rate appreciation. As described earlier, Bruno and Shin (2015b) argue that looser financial conditions are associated with an increase in cross-border capital flows intermediated through higher leverage in the international banking system whose leverage and lending capacity is determined by risk limits such as Value at Risk. The mechanism operates via lower VaR measures a result of local currency appreciation which strengthens local borrower balance sheets, allowing banks to lend them more and take on more risk.

We test whether a similar risk-taking channel is active for international investors and external bond issuance as well. Although these investors such as asset managers are typically not as leveraged as banks, their lending capacity is also determined by risk limits. Thus, local currency appreciation can be expected to affect their behavior in a manner similar to the mechanism described in Bruno and Shin (2015a, b). Under that hypothesis we would expect U.S. Dollar depreciation/local currency appreciation to be associated with a higher propensity for country-industries to be able to issue higher external bond volumes, all else equal.

We use two exchange rate variables as global push factors, following Bruno and Shin (2015a, 2015b):

- The 6-month log difference of the U.S. real effective exchange rate (USREER), along the lines of the VAR framework in Bruno and Shin (2015b). USREER is a trade-weighted Dollar index. Higher values imply a real depreciation of trade partner currencies (appreciation of the U.S. Dollar).
- The 6-month log difference of the real U.S. Dollar – Local currency exchange rate (XRATE), which is similar to the panel regression setting in Bruno and Shin (2015a). XRATE reflects the real bilateral exchange rate where higher values indicate a real depreciation of the local currency (appreciation of the U.S. Dollar). We use the 6-month log difference of the real exchange rate which is calculated as the log of the nominal exchange rate multiplied by the U.S. CPI and divided by the local CPI.

Table 7 presents the results. Analogous to Table 4, Models 1 and 2 estimate Equation (1) and provide strong support for the risk-taking channel of exchange rate appreciation hypothesis: the coefficients on USREER and XRATE are negative and highly statistically significant⁵. This indicates that the propensity to issue bonds externally above historical average volumes for a particular country-industry is significantly higher when the U.S. Dollar depreciates in real terms in the 6 months prior. In other words, when the local currency appreciates, local borrowers' balance sheets strengthen. This in turn increases their external borrowing capacity which triggers higher cross-border flows by international investors who are willing to take on more risk.

⁵ We are aware that there may be potential endogeneity issues in that the local currency appreciation could also be the *result* of capital inflows. While the use of the 6-month prior exchange rate difference should help to address this issue, we leave it to future work to examine it further.

These results are closely tied to our findings in Table 4 of the impact of the VIX on external bond issuance volume discussed in Section A. Particularly, the results point to a channel through which the VIX operates since Bruno and Shin (2015b) document a link between the VIX and USREER.

VII. Conclusion and Policy Implications

Using the universe of all externally issued bonds during the 2000-14 period, this paper shows the post-crisis period has seen an unprecedented surge in external bond issuance and stocks across emerging and developing economies (EMDEs). Bond yields (and spreads) at the time of issuance have fallen to record lows, in part as a result of loose global funding conditions produced by extraordinary monetary policies (EMPs) in developed economies.

In particular, the volume of bonds issued in the six post-crisis years tripled to \$1.5 trillion compared to the six years before the crisis, overwhelmingly denominated in foreign currencies and driven by corporate issuance. This surge is not driven by a single region or country, but reflects a broad-based trend, since the 2009-14 cumulative external issuance to GDP ratio is 6.7% for the median EMDE, up from 4.3% in the pre-crisis period. The trend is also present at the country-industry level across EMDEs even after we correct for their own historical issuance average. Under such benign conditions, many EMDEs issued externally for the first time, including Armenia, Angola, Ghana, Laos, and Tanzania.

Contrasting the pre- and post-crisis periods, we find that countries of external issuers currently are on average richer, have deeper financial systems, and lower external debt. The fraction of issuance that is rated investment grade has also improved. However, these countries currently also have much slower GDP growth and larger current account deficits which can weaken debt servicing capacity and raise external vulnerabilities.

This paper also finds that global factors have a powerful impact on primary activity in international bond market by corporates and sovereigns EMDEs. Controlling for United States interest rates, a battery of country pull factors, and year fixed effects to account for the overall impacts of major global conditions and time trends, we find that a decrease in i) expected U.S. equity market (or interest rate) volatility, ii) U.S. corporate credit spreads, iii) U.S. interbank funding costs and iv) an increase in the Federal Reserve's balance sheet:

1. Raise the odds that a country-industry's monthly external issuance volume is above *its own* historical average. For example, a doubling (halving) of the Fed's balance sheet increases these odds by about 75% (-43%);
2. Lower the yield-to-maturity spread of external bonds at the time of issuance, *even* after accounting for individual bond characteristics (e.g. volume, currency, riskiness, industry, type of issuer). For example, a doubling (halving) of the Fed's balance sheet lowers (increases) a bond's spread by 63 basis points; and
3. Increase the maturity of non-perpetual external EMDE bonds at the time of issuance, again after accounting for individual bond characteristics. For example, a doubling (halving) of the Fed's balance sheet is associated with a maturity lengthening (shortening) of 48 weeks.

We also find empirical support that the risk-taking channel of exchange rate appreciation (e.g. Bruno and Shin (2015b)) also operates for external bond issuance: real depreciation of the U.S. Dollar is associated with a higher propensity for country-industries to issue externally above their

historical average volume. More specifically, when the local currency appreciates, local borrowers' balance sheets strengthen. This in turn increases their external borrowing capacity which triggers higher cross-border flows by international investors who are willing to take on more risk. This process can be self-sustaining, at least for a while.

In addition, in line with the literature, we find evidence that some country characteristics such as the level of financial development can affect the impact of global factors. However, the results are not consistently statistically significant implying that the global cycle is mostly driven by push factors and does not structurally discriminate between EMDEs.

Taken together, our findings provide strong support for synchronized primary issuance flows across EMDEs driven mostly by global factors. As a result, both sovereigns and corporates in EMDEs have collectively been able to take advantage of ample international liquidity by lowering their borrowing costs and extending maturities which can improve risk profiles, although in the wake of the crisis, maturities in EMDEs remain below pre-crisis levels.

The massive and widespread external issuance in EMDEs raises important questions regarding the impact of procyclical investor behavior once the global cycle winds down, or if global shocks materialize, with potential systemic implications for EMDEs. Moreover, while issuance at lower cost and maturity extension can help lower individual borrower risk profiles, large foreign currency exposures raise risks, particularly for unhedged issuers. The recent trend of a rapidly strengthening U.S. Dollar against most EMDE currencies further heightens currency risks.

In this context, the inevitable exit from EMPs will tighten international funding conditions, which could prove disruptive for currencies, balance sheets, and funding capacity in EMDEs. Additionally, fragility in EMDEs can be further compounded by their shallow local financial markets and a lack of strong institutions, supervisory and surveillance capacity, and technical experience. As such, in terms of financial sector policies, there is a continued need for, *inter alia*: i) creating vibrant local currency (corporate) bond markets and an active, diverse domestic investor base; ii) building macroprudential tools and monitoring capacity to deal with synchronized foreign investor activity to prevent or manage a situation where certain flows create a variety of risks which jeopardize undoing financial and (socio-)economic progress made; iii) strengthening data collection efforts, particularly regarding sufficiently granular and timely foreign currency exposures and natural and financial hedges; and iv) strengthen the banking sector to safeguard against potential spillovers.

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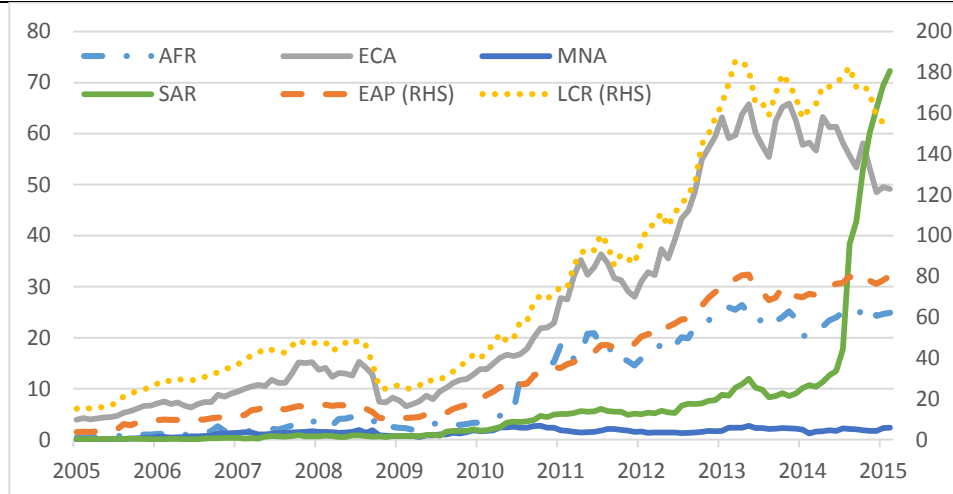
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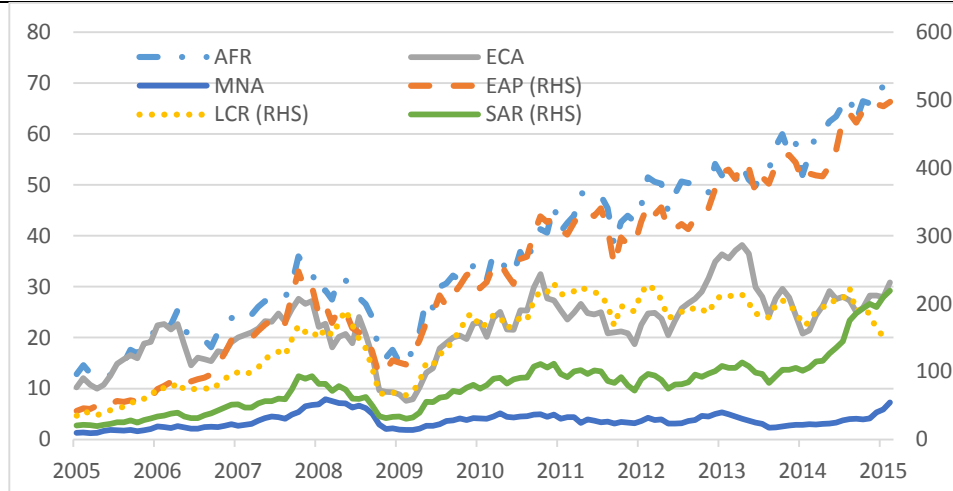
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Figure 1: Bonds Funds Allocations (\$ billions)



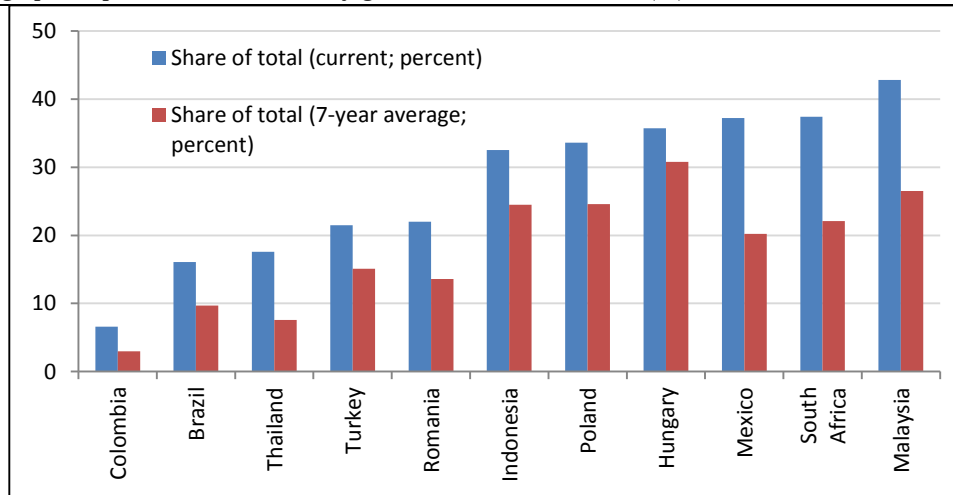
Source: EPFR; Author's calculations

Figure 2: Equities Funds Allocations (\$ billions)



Source: EPFR; Author's calculations

Figure 3: Foreign participation in local currency government bond markets (%)



Source: IMF Global Financial Stability Report (2014)

Figure 4: Total External Volume Issued by EMDEs (billions USD)

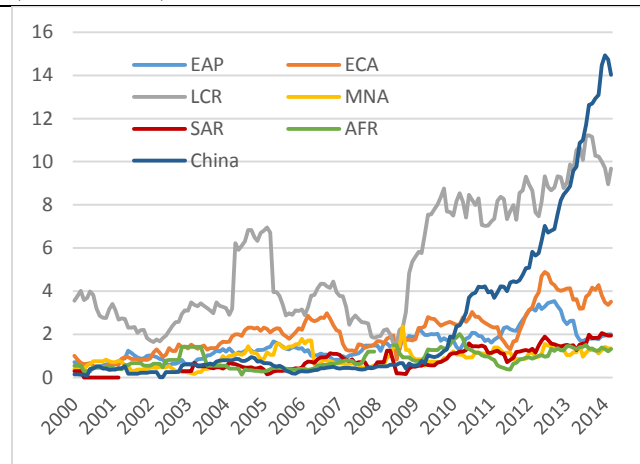


Figure 5: Total External Volume Issued by EMDEs, by borrower type (billions USD)

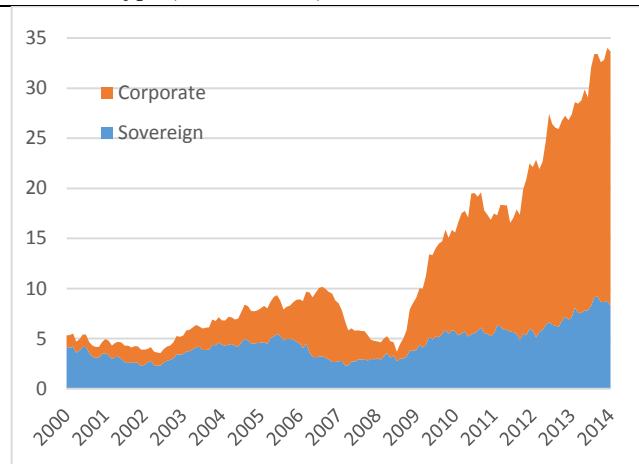


Figure 6: Outstanding External Bonds as % of GDP by EMDEs - Medians

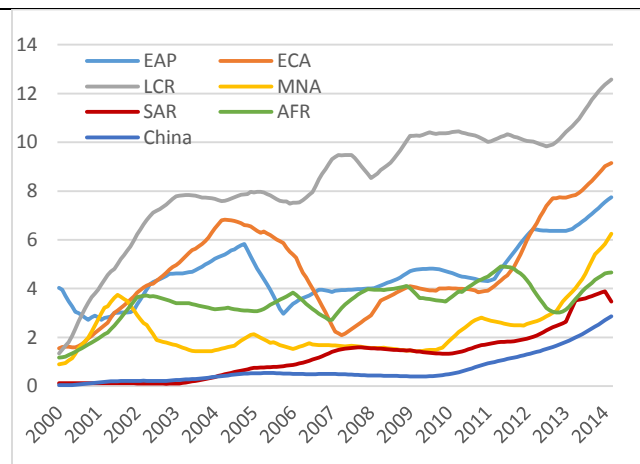


Figure 7: Total External Volume Issued by EMDEs, by currency (billions USD)

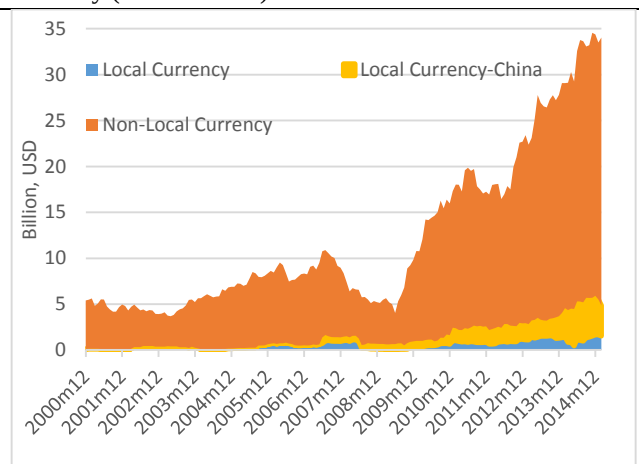


Figure 8: Total External Volume Issued by EMDEs, by industry (billions USD)

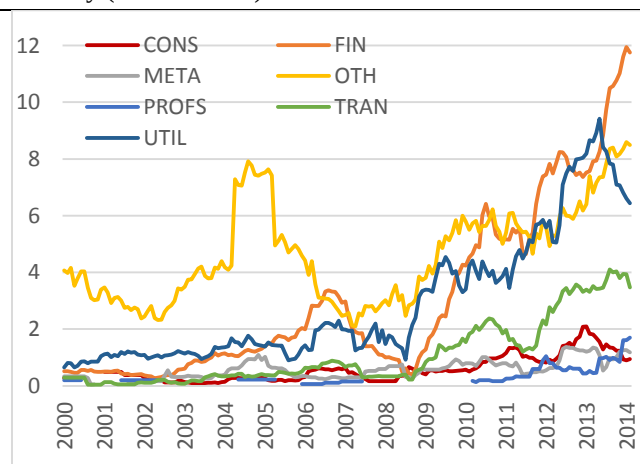


Figure 9: Total External Volume Issued by EMDEs, by use of proceeds (billions USD)

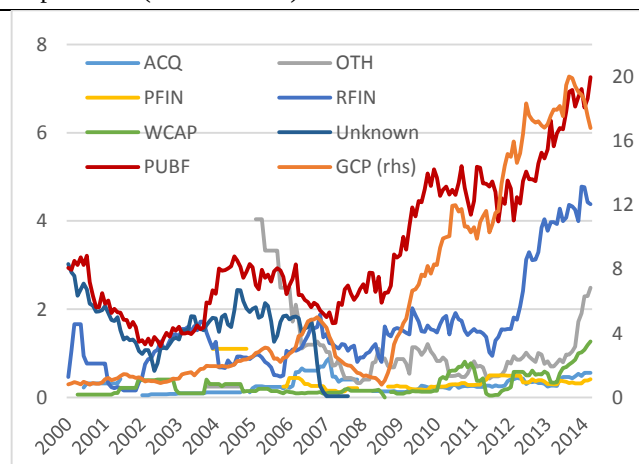


Figure 10: Yields of External Issuance by EMDEs, by income level

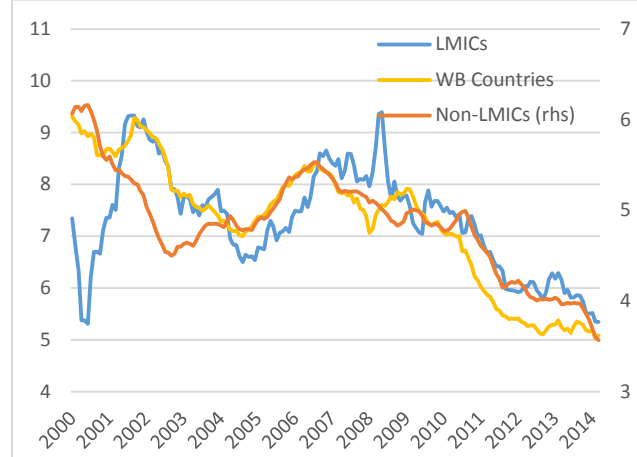


Figure 11: Maturities of New External Issuance by EMDEs, by income level

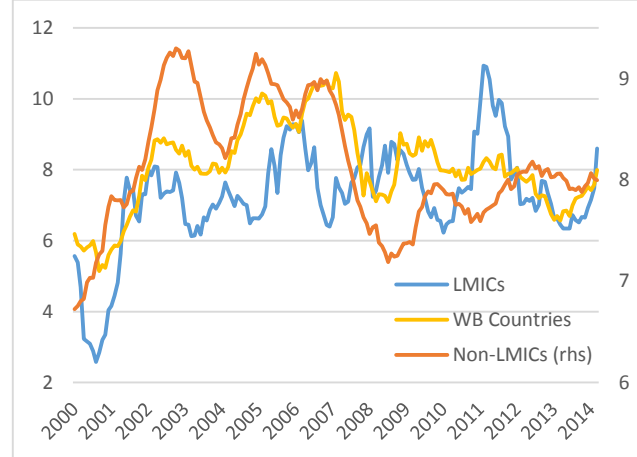


Figure 12: Maturity Profile Outstanding External Bonds, by Income Group (billions USD) per March 2015

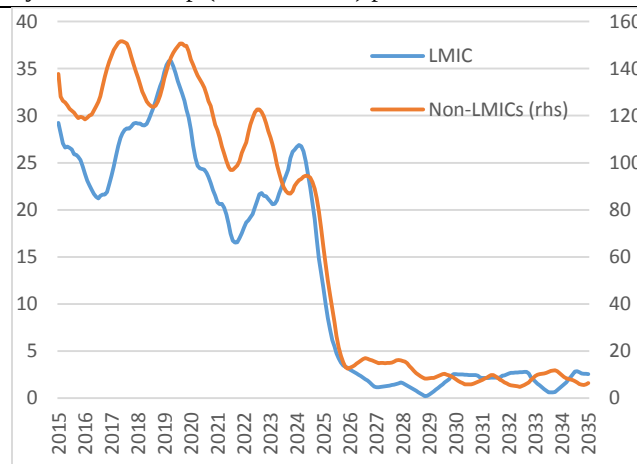


Figure 13: Maturity Profile Outstanding External Bonds, by Regions (billions USD)

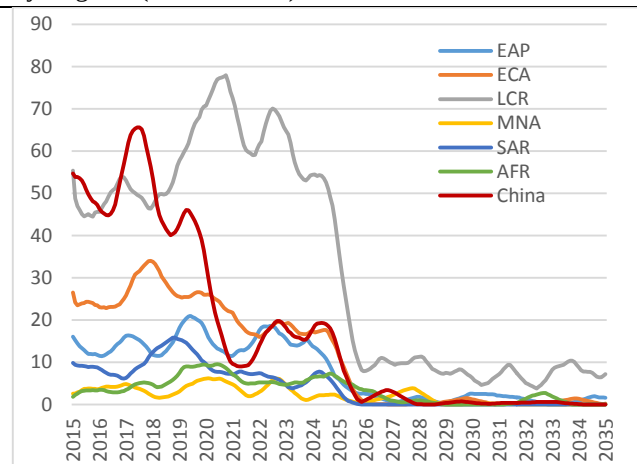


Figure 14: Maturity Profile Outstanding External Bonds, % of stock in March 2015

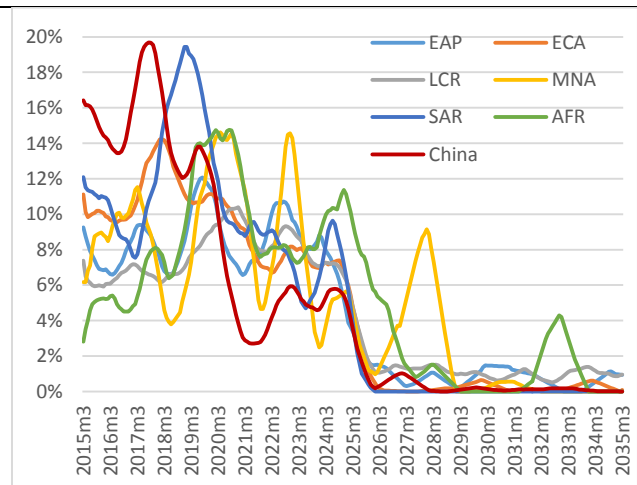


Figure 15: Credit Quality of External Issuance (billions USD)

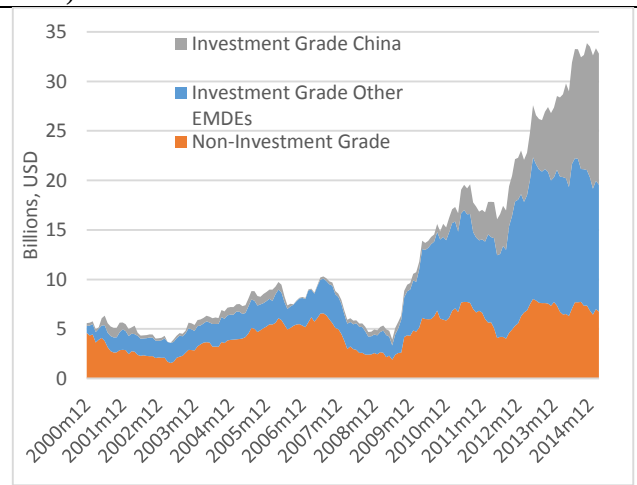


Figure 16: VIX Index (% per annum)

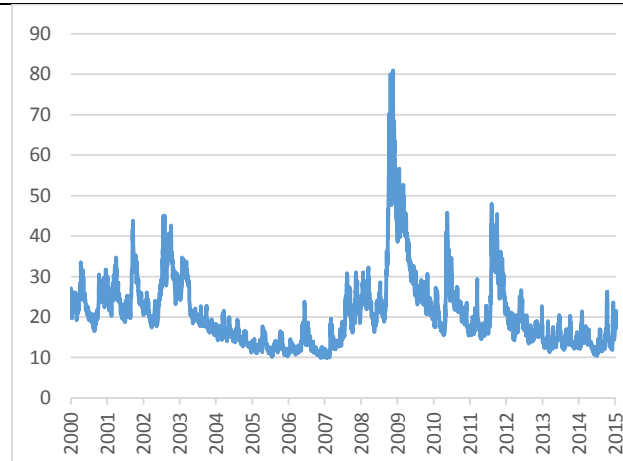


Figure 17: Libor-OIS Spread (bps)

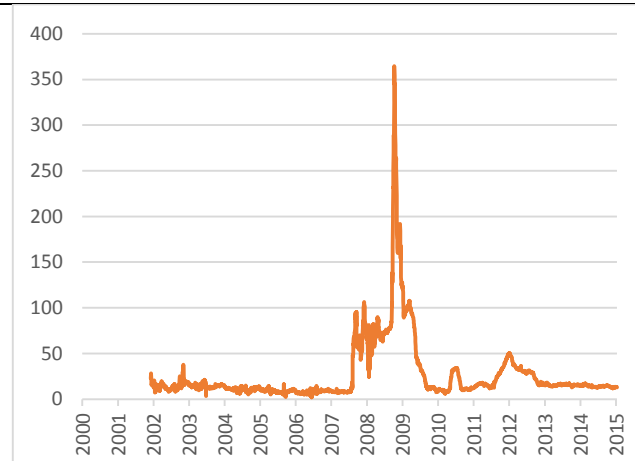


Figure 18: BofA Merrill Lynch U.S. Corporate BBB Index OAS (%)

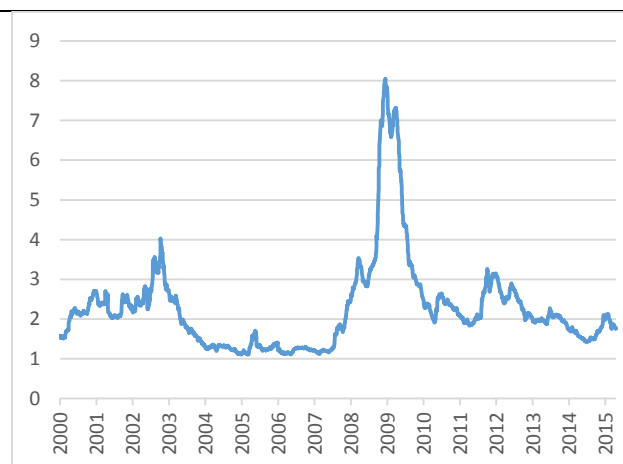


Figure 19: Federal Reserve Balance Sheet Size (billions USD)

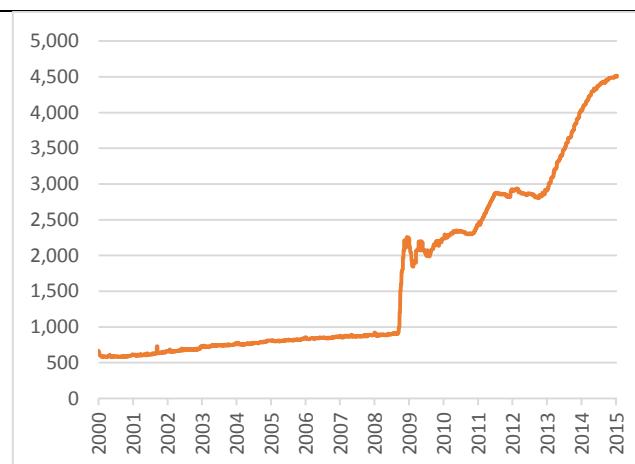


Figure 20: Cumulative total bond issuance by emerging and developing economies

	6 pre-crisis years (2002-2007)			6 post-crisis years (2009-2014)		
	Total Issuance (Bil USD)	Median Issuance/GDP	Issuance in foreign currencies (Bil USD)	Total Issuance (Bil USD)	Median Issuance/GDP	Issuance in foreign currencies (Bil USD)
EMDEs	519	4.3	498	1492	6.7	1323
— Low and Low-Middle Income	87	1.9	82	246	6.2	238
Other	432	6.2	416	1246	9.1	1084
Oil Exporters	68	1.2	64	110	3.8	102

Table 1: Definition of Variables

Variable	Definition	Source
<u>Bond Variables</u>		
Fixed Yield-to-Maturity	Rate of return on security assuming it is held until maturity at time of issuance, weighted by deal volume.	Dealogic
Maturity of Bond issued	Duration (Years) of bonds weighted by deal volume	Dealogic
Log of Size of Bond Issued	Log of total proceeds of bond deal (U.S. Dollars)	Dealogic
Currency	Denotes the currency in which the bond issue is priced, either: U.S. Dollar, Euro, British Pound Sterling, Japanese Yen, Australian Dollar, Canadian Dollar, or Other	Dealogic
Investment Grade	Indicator value with value 1 if a bond tranche is investment grade rated and 0 otherwise (credit rating is BBB- or higher according to S&P or Baa3 or higher according to Moody's)	Dealogic
Borrower Industry	Type of industry: Consumer, Finance, Metals, Professional Services, Transportation, Utilities, and Other	Dealogic
Borrower Type	Type of the borrowing entity, either: Local or State/Provincial Authority, Central Government, Non-Public	Dealogic
Deal Type	Type of security offered, either of the following product types: Asset Backed Securities, Corporate Bond-High Yield, Corporate Bond-Investment-Grade, Covered Bond, Medium-Term Note, Money Market, Mortgage-Backed Security, Non-U.S. Agency, Preferred Share, Short-term Debt, Sovereign, Local Authority	Dealogic
UST10Y	6 month trailing average of 10Y U.S. Treasury Constant Maturity Rate	Bloomberg
<u>Global Push Factors</u>		
VIX	Log of 6 month trailing average of VIX index. VIX captures the implied 30-day ahead market volatility derived from S&P 500 index options.	Bloomberg
RISK	Log of 6 month trailing average of U.S. Corporate BBB Option Adjusted Spread.	Bloomberg
FED	Log of 6 month trailing average of Fed Balance Sheet (Sum of Mortgage Backed Securities and U.S. treasuries)	Bloomberg
LIBOR	Log of 6 month trailing average of 3 Month Libor-OIS Spread (3 Month Libor less 3 Month USD Overnight Indexed Swap)	Bloomberg
MOVE	Log of 6 month trailing average of the MOVE index. The Merrill Lynch Option Volatility Estimate (MOVE) Index is a yield curve weighted index of the normalized implied volatility on 1-month Treasury options which are weighted on the 2, 5, 10, and 30 year contracts.	Bloomberg

Variable	Definition	Source
USREER	6 month log difference of U.S. Real Effective Exchange rate from BIS. Base year is 2010 (Weighted basket of foreign currencies vs USD)	Bloomberg
XRATE	6 month log difference of real exchange rates of each EMDE country in the sample (USD to country local currency)	Bloomberg
<u>Domestic Pull Factors</u>		
GDPPC	Real GDP per capita in U.S. Dollars	IMF World Economic Outlook
GROWTH	Year-on-year percentage changes in real GDP	IMF World Economic Outlook
EXT	Total debt owed to nonresidents repayable in currency, goods, or services as a percent of GDP	IMF World Economic Outlook
CA	Current account balance as a percent of GDP	IMF World Economic Outlook
PCRED	Total domestic private credit to the real sector by deposit money banks as a percent of GDP	IMF International Financial Statistics
<u>Country-Industry Issuance</u>		
ABOVE_AVG_ISSUANCE	Indicators variable which assumes value 1 for a given month in which a country-industry's total external bond issuance is above its monthly 2000-07 average and 0 otherwise	Author's calculations

Table 2. Descriptive Statistics of Variables

Panel A. Bond tranche data

Variable	Obs.	Mean	Std. Dev.	Min	Max
<u>Bond Variables</u>					
Fixed Yield-to-Maturity	5962	5.06	3.25	0.20	12.31
Maturity of Bond issued	6804	6.00	7.31	0.10	100.08
Log of Size of Bond Issued	6925	18.63	1.49	11.51	22.63
<u>Global Push Factors</u>					
VIX	6925	2.86	0.28	2.41	3.95
RISK	6925	0.69	0.29	0.15	1.97
FED	6925	14.44	0.67	13.08	15.23
LIBOR	6573	2.84	0.49	1.92	5.09
MOVE	6925	4.38	0.24	4.03	5.22
USREER	6925	-0.002	0.026	-0.074	0.098
XRATE	6883	-0.015	0.057	-0.319	1.449
UST10Y	6925	3.08	1.14	1.66	6.36
<u>Domestic Pull Factors</u>					
GDPPC	6894	8.62	0.59	6.10	9.63
GROWTH	6897	6.02	3.06	-14.80	34.50
EXT	6918	27.63	29.28	1.30	203.70
CA	6922	-0.15	4.48	-39.50	35.50
PCRED	6905	84.56	48.16	2.23	135.76

Panel B. Country-Industry data

Variable	Obs.	Mean	Std. Dev.	Min	Max
<u>Bond Variables</u>					
ABOVE_AVG_ISSUANCE	89957	0.03	0.17	0	1
<u>Global Push Factors</u>					
VIX	89957	2.99	0.33	2.42	3.95
RISK	89957	0.73	0.41	0.15	1.97
FED	72065	14.00	0.68	13.08	15.24
LIBOR	78029	2.91	0.75	1.92	5.08
MOVE	89957	4.54	0.27	4.04	5.20
USREER	89957	-0.003	0.034	-0.074	0.098
XRATE	84707	-0.007	0.084	-0.570	1.503
UST10Y	89957	3.88	1.17	1.66	6.36
<u>Domestic Pull Factors</u>					
GDPPC	87696	7.79	0.99	4.69	9.64
GROWTH	87780	4.82	4.41	-14.80	59.74
EXT	88452	49.74	35.39	1.30	282.90
CA	88788	-3.82	9.17	-49.80	35.50
PCRED	83328	38.00	26.29	1.97	135.76

Table 3. Correlations between Key Variables

	Fixed Yield- to-Maturity	Maturity of Bond issued	Log of Size of Bond Issued
<u>Global push factors</u>			
VIX	0.1891	0.0251	0.0945
RISK	-0.0677	-0.087	-0.0006
FED	-0.5751	-0.2587	-0.2324
LIBOR	-0.1391	-0.0951	-0.0471
MOVE	0.3311	0.1099	0.1641
USREER	-0.1492	-0.1159	-0.0979
XRATE	-0.0962	-0.0397	-0.0575
UST10Y	0.5469	0.2319	0.2039
<u>Domestic Pull Factors</u>			
GDPPC	-0.2249	-0.0394	-0.0429
GROWTH	-0.358	-0.2328	-0.3234
EXT	0.3692	0.2112	0.2807
CA	-0.2592	-0.1892	-0.2212
PCRED	-0.6565	-0.3912	-0.4685

Global push factors

	VIX	RISK	FED	LIBOR	MOVE	USREER	XRATE
RISK	0.7864						
FED	-0.2948	0.1282					
LIBOR	0.6738	0.8203	0.1469				
MOVE	0.7908	0.5221	-0.5604	0.3982			
USREER	-0.0118	0.0171	0.2012	0.0792	-0.2156		
XRATE	-0.0885	-0.0361	0.1398	0.0065	-0.146	0.3598	
UST10Y	0.0983	-0.3783	-0.836	-0.4811	0.408	0.8279	0.0249

Domestic Pull Factors

	EXT	CA	PCRED
GDPPC	-0.0936	-0.0028	0.2108
GROWTH	-0.3165	0.3445	0.5031
EXT		-0.5258	-0.3839
CA	-0.5258		0.3815
PCRED	-0.3839	0.3815	

Table 4. Bond Issuance Logit Regression Results

Dependent variable: Country-industry monthly issuance above 2000-07 average (1=Yes, 0=No)				
	(1)	(2)	(3)	(4)
VIX	-0.603*** (0.185)			
RISK		-0.789*** (0.199)		
FED			0.728*** (0.193)	
LIBOR				-0.494*** (0.0833)
GDPPC	1.543*** (0.384)	1.544*** (0.384)	1.435*** (0.431)	1.431*** (0.443)
GROWTH	0.0294** (0.0133)	0.0294** (0.0133)	0.0339** (0.0156)	0.0375*** (0.0144)
EXT	0.00520 (0.00358)	0.00520 (0.00358)	0.00630 (0.00433)	0.00709* (0.00411)
CA	-0.0329*** (0.0121)	-0.0329*** (0.0121)	-0.0315** (0.0124)	-0.0289** (0.0127)
PCRED	0.000204 (0.00757)	0.000194 (0.00758)	0.00255 (0.00831)	0.00227 (0.00791)
UST10Y	-0.0143 (0.100)	-0.0400 (0.0960)	-0.0858 (0.0990)	-0.196** (0.0962)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	79,464	79,464	61,824	69,048
No. of Countries	64	64	62	64
No. of Country-Industries	448	448	434	448
Pseudo R-squared	0.359	0.360	0.352	0.356

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5. Bond Pricing OLS Regression Results

Dependent Variable: Fixed yield-to-maturity of Bond Tranche								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VIX	0.550*	1.141***						
	(0.297)	(0.300)						
RISK			1.219***	1.266***				
			(0.299)	(0.376)				
FED					-1.125***	-0.837***		
					(0.295)	(0.308)		
LIBOR							0.335**	0.556***
							(0.146)	(0.145)
GDPPC	0.777**		0.742**		0.740**		1.227***	
	(0.320)		(0.323)		(0.325)		(0.238)	
GROWTH	-0.0187		-0.0206		-0.0200		-0.0284	
	(0.0229)		(0.0231)		(0.0219)		(0.0299)	
EXT	(0.00754)		(0.00761)		(0.00761)		(0.00950)	
	0.0225		0.0217		0.0213		0.0236	
CA	(0.0215)		(0.0215)		(0.0214)		(0.0218)	
	0.00867		0.00857		0.00835		0.0139	
PCRED	-0.000675		-0.000986		-0.000631		0.000119	
	(0.00571)		(0.00576)		(0.00569)		(0.00666)	
Log of Size of Bond Issued	-0.0441	-0.0666	-0.0495	-0.0684	-0.0506	-0.0683	-0.0318	-0.0479
	(0.0479)	(0.0706)	(0.0472)	(0.0706)	(0.0473)	(0.0718)	(0.0471)	(0.0759)
Maturity of Bond issued	0.0537**	0.0344***	0.0542**	0.0347***	0.0536**	0.0341***	0.0548**	0.0326***
	(0.0205)	(0.00766)	(0.0207)	(0.00761)	(0.0203)	(0.00774)	(0.0215)	(0.00764)
UST10Y	0.370*	0.850***	0.378*	0.848***	0.432**	0.822***	0.416*	0.932***
	(0.201)	(0.175)	(0.202)	(0.174)	(0.187)	(0.163)	(0.218)	(0.190)
Bond Tranche fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	Yes	No	Yes	No	Yes	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-period fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Includes China issuance	Yes	No	Yes	No	Yes	No	Yes	No
Observations	5,881	3,153	5,881	3,153	5,881	3,153	5,593	2,863
R-squared	0.805	0.703	0.805	0.702	0.805	0.704	0.795	0.687
No. of Countries	63	70	63	70	63	70	63	70
No. of Industries	187	192	187	192	187	192	187	191
No. of Bonds	5437	2865	5437	2865	5437	2865	5176	2602

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6. Bond Maturity OLS Regression Results

Dependent Variable: Maturity of Bond Tranche								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VIX	-2.951** (1.245)	-3.076* (1.749)						
RISK			-3.301*** (0.983)	-3.201*** (1.157)				
FED					1.186 (1.824)	2.822** (1.385)		
LIBOR							-1.364* (0.738)	-1.176 (0.735)
GDPPC	-2.046** (0.836)		-1.988** (0.847)		-2.031** (0.844)		-2.213* (1.121)	
GROWTH	0.0968 (0.0652)		0.0996 (0.0657)		0.0929 (0.0658)		0.0974 (0.0763)	
EXT	-0.0355* (0.0185)		-0.0351* (0.0187)		-0.0346* (0.0186)		-0.0419* (0.0229)	
CA	-0.0553 (0.0714)		-0.0549 (0.0719)		-0.0563 (0.0721)		-0.0273 (0.0654)	
PCRED	0.0528* (0.0316)		0.0542* (0.0320)		0.0532 (0.0324)		0.0609 (0.0387)	
Log of Size of Bond Issued	0.524** (0.250)	0.717** (0.320)	0.527** (0.246)	0.713** (0.317)	0.525** (0.253)	0.722** (0.311)	0.445* (0.238)	0.573 (0.352)
UST10Y	0.00287 (0.265)	-0.361 (0.533)	0.0999 (0.257)	-0.339 (0.501)	0.160 (0.301)	-0.299 (0.519)	-0.0613 (0.261)	-0.425 (0.537)
Bond Tranche fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	Yes	No	Yes	No	Yes	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-period fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Includes China issuance	Yes	No	Yes	No	Yes	No	Yes	No
Observations	6,749	3,684	6,749	3,684	6,749	3,684	6,406	3,347
R-squared	0.393	0.298	0.393	0.298	0.391	0.297	0.401	0.301
No. of Countries	64	71	64	71	64	71	64	71
No. of Industries	198	203	198	203	198	203	197	202
No. of Bonds	6144	3268	6144	3268	6144	3268	5840	2969

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7. The Risk-Taking Channel and the Exchange Rate

Country-industry logit regressions

Dependent variable: Country-industry monthly issuance above 2000-07 average (1=Yes, 0=No)

	(1)	(2)
USREER	-4.474*** (0.840)	
XRATE		-2.399*** (0.478)
Controls	As in Table 4	As in Table 4
Observations	79,464	76,664
No. of Countries	64	63
No. of Country-Industries	448	441
Pseudo R-squared	0.360	0.361

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 1. Country Sample and Issuance Activity by EMDE Entities

Country	Pre-crisis (2000-2006)		Crisis (2007-2010)		Post-crisis (2011-2014)	
	No. of Bonds	Total Volume (\$ mln)	No. of Bonds	Total Volume (\$ mln)	No. of Bonds	Total Volume (\$ mln)
Albania			1	405		
Angola					1	1,000
Argentina	70	40,105	36	6,807	25	6,414
Armenia					1	690
Azerbaijan	2	5	5	279	6	3,444
Bangladesh					1	297
Belarus	3	3	6	1,350	1	800
Belize	2	223				
Bolivia					2	989
Bosnia and Herzegovina			1	110		
Botswana					1	80
Brazil	331	103,668	190	89,006	260	175,420
Bulgaria	12	3,040	1	291	5	4,583
China	48	16,802	132	29,783	2765	374,001
Colombia	42	15,852	18	12,380	43	33,492
Congo, Democratic Republic of			1	478		
Costa Rica	8	1,600			8	5,496
Cote d'Ivoire (Ivory Coast)			1	2,332	1	736
Dominican Republic	10	2,271	3	1,180	9	5,160
Ecuador	1	596			2	2,981
Egypt	7	3,664	4	3,439	7	5,261
El Salvador	12	3,540	2	1,244	4	2,558
Ethiopia					3	741
Fiji	1	149			1	250
Gabon			1	1,000	2	2,109
Georgia			4	982	5	1,645
Ghana			1	750	2	1,985
Grenada	1	99				
Guatemala	5	1,205	1	85	9	3,770
Honduras					2	1,000
Hungary	44	22,675	25	15,872	22	21,385
India	46	10,277	53	22,235	151	53,640
Indonesia	44	14,380	37	22,487	60	43,058
Iran	2	993				
Iraq	1	2,700				
Jamaica	22	4,604	10	4,482	9	6,060
Jordan	8	407	1	742	2	2,250
Kazakhstan	67	15,634	33	19,558	21	14,681
Kenya					2	2,794

Country	Pre-crisis (2000-2006)		Crisis (2007-2010)		Post-crisis (2011-2014)	
	No. of Bonds	Total Volume (\$ mln)	No. of Bonds	Total Volume (\$ mln)	No. of Bonds	Total Volume (\$ mln)
Laos					4	348
Lebanon	41	19,899	17	9,796	10	9,791
Macedonia	1	176	1	243	1	666
Malaysia	41	17,650	11	8,612	75	21,765
Marshall Islands					1	230
Mexico	117	78,882	103	60,935	163	131,257
Mongolia			3	249	7	3,404
Montenegro			1	253	3	744
Morocco	1	453	2	2,007	6	5,674
Mozambique					2	810
Namibia					1	491
Nigeria			2	522	14	5,971
Pakistan	3	1,900	1	750	2	3,000
Panama	15	6,855	7	2,365	13	5,242
Paraguay					6	2,398
Peru	15	6,168	29	14,393	61	22,056
Philippines	76	28,983	25	13,968	35	14,382
Romania	11	3,502	3	2,569	12	17,082
Rwanda					1	393
Senegal			1	196	2	988
Serbia	1	1,018			7	6,109
Seychelles	1	199	1	30		
South Africa	28	11,632	25	13,204	54	23,902
Sri Lanka	1	100	3	2,000	10	5,775
Tanzania					1	600
Thailand	21	6,218	10	3,531	23	15,954
Togo					1	248
Tunisia	9	2,949	1	253	5	2,017
Turkey	78	45,091	30	24,270	128	58,555
Ukraine	28	8,993	27	10,729	32	21,746
Venezuela	23	16,464	10	31,785	4	12,444
Vietnam	1	737	3	1,173	4	1,532
Zambia					2	1,728

Appendix 2. Annualized External Bond Issuance Statistics

Averages are not weighted. Statistics exclude issuance by Chinese entities.

Panel A. Bond issuance characteristics

Year	Total Volume (\$mln)	Number of bond tranches	Avg. Yield (%)	Avg. Maturity (years)	Investment grade (%)
2000	6.33E+10	189	9.5	7.2	21%
2001	5.73E+10	170	8.8	6.7	33%
2002	4.39E+10	125	9.0	8.5	36%
2003	5.76E+10	167	8.0	7.9	41%
2004	7.71E+10	200	7.4	8.3	36%
2005	1.11E+11	249	7.3	9.7	40%
2006	9.56E+10	294	8.0	9.3	32%
2007	9.94E+10	297	8.1	12.2	45%
2008	4.55E+10	103	7.4	8.3	46%
2009	1.07E+11	159	7.7	9.2	48%
2010	1.60E+11	300	7.1	9.4	53%
2011	1.56E+11	284	6.8	9.4	53%
2012	2.05E+11	400	5.3	8.9	70%
2013	2.24E+11	438	5.3	7.8	64%
2014	2.16E+11	407	5.1	8.7	69%

Panel B. Global push factors around time of issuance

Year	Avg. VIX	Avg. RISK (%)	Avg. LIBOR (bps)	Avg. FED (\$mln)	Avg. UST10Y (%)
2000	23.05	1.85	-	5.90E+05	6.20
2001	25.01	2.35	23.33	6.09E+05	5.24
2002	26.12	2.59	14.68	6.63E+05	4.80
2003	24.69	2.25	14.67	6.52E+05	3.93
2004	16.57	1.35	11.85	6.75E+05	4.31
2005	13.13	1.28	9.56	7.19E+05	4.23
2006	13.10	1.23	7.93	7.54E+05	4.73
2007	13.53	1.27	13.87	7.79E+05	4.71
2008	24.17	2.84	70.84	6.67E+05	3.89
2009	33.88	5.08	66.03	9.77E+05	3.30
2010	23.67	2.48	16.28	1.78E+06	3.35
2011	20.41	2.15	15.23	2.16E+06	3.05
2012	21.27	2.68	33.14	2.51E+06	1.88
2013	14.92	2.05	16.66	2.84E+06	2.04
2014	13.80	1.67	14.57	3.84E+06	2.67

Panel C. Domestic pull factors around time of issuance

Year	Avg. GDPPC (real US\$)	Avg. GROWTH (%)	Avg. CA (%)	Avg. EXT (%)	Avg. PCRED (%)
2000	4706	3.64	-3.14	45.39	31.89
2001	4077	0.88	-3.03	52.08	34.40
2002	2980	3.50	-0.87	54.66	36.99
2003	3282	3.00	0.53	48.83	31.53
2004	3983	6.50	-0.01	51.60	36.24
2005	4662	5.36	-0.71	42.64	35.98
2006	4946	6.43	-0.88	47.95	39.65
2007	5799	6.63	-2.62	42.53	42.72
2008	7848	4.28	-1.85	41.81	46.30
2009	6401	0.00	-1.11	41.28	40.34
2010	7507	6.87	-1.62	33.97	41.86
2011	8293	4.64	-2.45	40.36	50.92
2012	7856	3.51	-3.15	38.16	54.65
2013	7611	3.66	-3.40	39.96	53.76
2014	7669	3.43	-3.22	40.77	53.34

Panel D. Fraction of country-industries with monthly issuance volume above historical average

Year	% of country- industries that issue above their historical average
2000	1.98%
2001	1.83%
2002	1.59%
2003	1.91%
2004	2.53%
2005	3.02%
2006	3.35%
2007	3.10%
2008	1.14%
2009	1.96%
2010	3.67%
2011	3.79%
2012	4.63%
2013	5.30%
2014	5.26%

Appendix 3. Interactions between Country Characteristics and Global Factors

Table 1. Country-Industry Level Logit Regressions (Equation (1))

Dependent Variable: Issuance Country-industry monthly issuance above 2000-07 average (1=Yes, 0=No)															
	Push Factor	<i>GDPPC</i>	Inter- action	Push Factor	<i>GROWTH</i>	Inter- action	Push Factor	<i>EXT</i>	Interaction	Push Factor	<i>CAD</i>	Inter- action	Push Factor	<i>PCRED</i>	Interaction
<i>VIX</i>	-1.710 (1.269)			-0.710*** (0.135)			-0.735*** (0.154)			-0.713*** (0.103)			-0.351* (0.184)		
Pull Factor		0.504 (0.464)			0.0126 (0.0631)			0.00351 (0.00719)			-0.0334 (0.0381)			0.0197** (0.00918)	
Interaction			0.119 (0.150)			-0.000720 (0.0200)			0.000504 (0.00231)			0.000276 (0.0132)			-0.00724*** (0.00270)
	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id
	70,644	61	427	70,644	61	427	70,644	61	427	70,644	61	427	70,644	61	427
<i>RISK</i>	-0.535 (0.873)			-0.642*** (0.120)			-0.575*** (0.128)			-0.628*** (0.0912)			-0.462*** (0.154)		
Pull Factor		1.034*** (0.159)			-0.000531 (0.0201)			0.00636* (0.00329)			-0.0322*** (0.0118)			0.00104 (0.00511)	
Interaction			-0.0111 (0.105)			0.00310 (0.0154)			-0.00126 (0.00173)			-0.000528 (0.00939)			-0.00343* (0.00208)
	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id
	70,644	61	427	70,644	61	427	70,644	61	427	70,644	61	427	70,644	61	427
<i>FED</i>	2.540*** (0.939)			0.353*** (0.101)			0.894*** (0.101)			0.569*** (0.0812)			0.178 (0.142)		
Pull Factor		3.183** (1.376)			-0.704** (0.328)			0.112*** (0.0274)			-0.212 (0.182)			-0.111*** (0.0368)	
Interaction			-0.229** (0.106)			0.0540** (0.0236)			-0.00789*** (0.00194)			0.0135 (0.0129)			0.00774*** (0.00255)
	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id
	53,928	59	413	53,928	59	413	53,928	59	413	53,928	59	413	53,928	59	413
<i>LIBOR</i>	-1.018** (0.442)			-0.473*** (0.0631)			-0.452*** (0.0684)			-0.462*** (0.0495)			-0.408*** (0.0871)		
Pull Factor		0.921*** (0.190)			-0.000968 (0.0294)			0.00742* (0.00392)			-0.0288 (0.0178)			0.00225 (0.00584)	
Interaction			0.0654 (0.0510)			0.00266 (0.00923)			-0.000242 (0.00115)			8.13e-05 (0.00579)			-0.00105 (0.00117)
	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id	Obs.	#C	#Id
	60,732	61	427	60,732	61	427	60,732	61	427	60,732	61	427	60,732	61	427

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Note: Obs. = Observations, #C = Number of Countries, #Id = Number of Industries

Table 2. Bond-Level Pricing OLS Regressions (Equation (2), excluding Chinese issuance)

Dependent Variable: Fixed yield-to-maturity of Bond Tranche																										
	Push Factor	<i>GDPPC</i>			Inter- action	Push Factor	<i>GROWTH</i>			Inter- action	Push Factor	<i>EXT</i>			Inter- action	Push Factor	<i>CAD</i>			Inter- action	Push Factor	<i>PCRED</i>			Interaction	
<i>VIX</i>	-0.907 (1.654)					0.654* (0.334)					0.860** (0.340)					0.946*** (0.328)					1.390** (0.523)					
Pull Factor			-0.423 (0.792)					-0.317** (0.137)					-0.00223 (0.00719)					0.103 (0.108)					0.0153 (0.0233)			
Interaction				0.224 (0.188)					0.0945** (0.0412)					0.00371 (0.00232)						-0.0340 (0.0362)					-0.00814 (0.00805)	
	<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		
<i>RISK</i>	-0.179 (2.163)					0.893** (0.381)					0.937** (0.390)					1.076*** (0.375)					1.277*** (0.446)					
Pull Factor			0.155 (0.456)					-0.0874** (0.0387)					0.00516 (0.00751)					0.0264 (0.0266)					-0.00645 (0.00557)			
Interaction				0.154 (0.251)					0.0713** (0.0277)					0.00419** (0.00204)						-0.0355 (0.0264)					-0.00396 (0.00655)	
	<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		
<i>FED</i>	-0.832 (1.844)					-0.640* (0.357)					-0.624* (0.362)					-0.694* (0.382)					-0.655* (0.389)					
Pull Factor			0.0478 (2.794)					0.457 (0.449)					0.0292 (0.0401)					-0.0677 (0.355)					0.00858 (0.0408)			
Interaction				0.0141 (0.207)					-0.0354 (0.0327)					-0.00152 (0.00284)						0.00531 (0.0258)					-0.00125 (0.00300)	
	<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		<i>Obs.</i> 2,738	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,502		
<i>LIBOR</i>	0.311 (1.380)					0.294* (0.170)					0.286 (0.174)					0.438*** (0.149)					0.496** (0.236)					
Pull Factor			0.753 (0.628)					-0.165** (0.0711)					0.00290 (0.00972)					0.0571 (0.0568)					-0.0110 (0.0133)			
Interaction				0.0188 (0.163)					0.0423* (0.0218)					0.00396** (0.00167)						-0.0188 (0.0194)					-0.000521 (0.00460)	
	<i>Obs.</i> 2,454	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,245		<i>Obs.</i> 2,454	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,245		<i>Obs.</i> 2,454	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,245		<i>Obs.</i> 2,454	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,245		<i>Obs.</i> 2,454	<i>#C</i> 58	<i>#Id</i> 173	<i>#Bd</i> 2,245		

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Note: Obs. = Observations, #C = Number of Countries, #Id = Number of Industries, #Bd = Number of Bonds. R-squared for regressions with the *VIX*, *RISK*, and *FED* = 0.65; R-squared for regressions with *LIBOR* = 0.63.

Table 3. Bond Maturity OLS Regressions (Equation (2), excluding Chinese issuance)

Dependent Variable: Maturity of Bond Tranche																		
	Push Factor	<i>GDPPC</i>	Interaction	Push Factor	<i>GROWTH</i>	Interaction	Push Factor	<i>EXT</i>	Interaction	Push Factor	<i>CAD</i>	Interaction	Push Factor	<i>PCRED</i>	Interaction			
<i>VIX</i>	2.399 (6.849)			-4.766** (2.198)			-4.108 (2.560)			-3.735* (1.869)			-2.003* (1.008)					
Pull Factor		-0.0849 (2.825)			-0.416 (0.412)			-0.0407 (0.0434)			-0.404 (0.404)			0.184 (0.187)				
Interaction			-0.747 (0.780)			0.175 (0.132)			0.00160 (0.0111)			0.122 (0.122)					-0.0457 (0.0541)	
	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887		
<i>RISK</i>	-0.122 (3.943)			-5.049*** (1.873)			-4.708** (1.928)			-4.486*** (1.630)			-3.325*** (1.089)					
Pull Factor		-2.005 (1.254)			0.0198 (0.117)			-0.0366 (0.0229)			-0.112 (0.123)			0.0761 (0.0569)				
Interaction			-0.531 (0.496)			0.120 (0.115)			0.00145 (0.00741)			0.0990 (0.103)					-0.0352 (0.0389)	
	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887		
<i>FED</i>	5.666 (3.871)			3.432** (1.406)			3.399** (1.471)			3.649*** (1.365)			4.318*** (1.530)					
Pull Factor		0.912 (5.961)			-0.656 (1.510)			-0.0704 (0.118)			-0.648 (0.995)			0.312 (0.228)				
Interaction			-0.241 (0.454)			0.0552 (0.109)			0.00255 (0.00797)			0.0431 (0.0693)					-0.0190 (0.0151)	
	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887	<i>Obs.</i> 3,247	<i>#C</i> 60	<i>#Id</i> 184	<i>#Bd</i> 2,887		
<i>LIBOR</i>	0.154 (2.437)			-2.102* (1.107)			-1.496 (1.058)			-1.467 (0.883)			-0.675 (0.561)					
Pull Factor		-2.772 (1.693)			-0.188 (0.183)			-0.0371 (0.0300)			-0.220 (0.196)			0.120 (0.0854)				
Interaction			-0.206 (0.293)			0.105* (0.0616)			-0.00277 (0.00381)			0.0690 (0.0535)					-0.0224 (0.0196)	
	<i>Obs.</i> 2,918	<i>#C</i> 60	<i>#Id</i> 183	<i>#Bd</i> 2,595	<i>Obs.</i> 2,918	<i>#C</i> 60	<i>#Id</i> 183	<i>#Bd</i> 2,595	<i>Obs.</i> 2,918	<i>#C</i> 60	<i>#Id</i> 183	<i>#Bd</i> 2,595	<i>Obs.</i> 2,918	<i>#C</i> 60	<i>#Id</i> 183	<i>#Bd</i> 2,595		

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Note: Obs. = Observations, #C = Number of Countries, #Id = Number of Industries, #Bd = Number of Bonds. R-squared for all regressions = 0.25; R-squared for regressions with *LIBOR* = 0.63