

Domestic financial markets and offshore bond financing¹

Firms in emerging market economies markedly increased their issuance of bonds in offshore markets after the Great Financial Crisis. By contrast, increases in offshore bond issuance by firms in advanced economies were more muted. An empirical analysis suggests that the less developed state of financial markets in emerging economies may have encouraged firms there to step up their offshore bond issuance as external financing costs fell. Firms appear to use the proceeds of offshore bonds to boost their holdings of short-term assets. This may raise financial stability concerns.

JEL classification: F23, F36, G15.

Firms from emerging market economies (EMEs) considerably stepped up their issuance of bonds in offshore bond markets after the Great Financial Crisis (GFC) of 2007–09. Taking advantage of easy external financing conditions and investor appetite for higher yields, many EME firms raised funds through bond issues outside their jurisdictions (McCauley et al (2015a)).

We examine whether limits to borrowing in domestic financial markets distorted firms' borrowing decisions, contributing to this surge in EME offshore bond issuance. We conduct the analysis by comparing EM bond issuers to firms located in small advanced economies. This analysis is carried out using a data set that matches bond- and firm-level data (aggregated by industry in part of our analysis), covering companies headquartered in 41 jurisdictions.

We find that limited financing opportunities in their domestic markets played an important role in inducing EME firms to raise funds overseas. We also show that firms use offshore bond proceeds to increase their holdings of short-term assets. This may raise financial stability concerns, for example by increasing the procyclicality of financing in the domestic financial sector.

The rest of the feature is organised as follows. The first section describes the characteristics of firms borrowing in offshore bond markets. The second section presents the empirical analysis. The third section concludes.

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Characteristics of firms borrowing in offshore bond markets

Tracking firm-level financing in offshore bond markets

Our firm-level data set comprises bonds issued or guaranteed by firms headquartered in one of 34 emerging economies or seven small advanced economies and marketed outside their jurisdictions.² The data set covers the period 2000–15. The Annex provides further details.

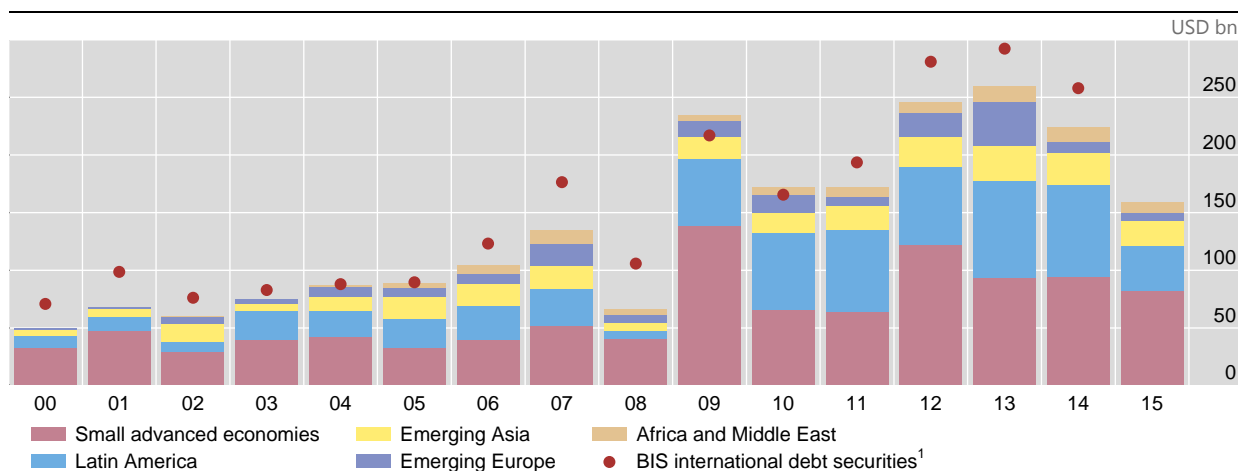
We identify offshore bonds as those issued in a primary market outside the home country of the entity guaranteeing the bond. From the perspective of the economies covered, the major offshore markets are those of the European Union (Eurobonds) and the United States (yankee bonds). These two locations account for the bulk of international bond market activity.³ Transactions are mostly in dollars and euros, which respectively represent 70% and 19% of the total amount in the sample; the proportion raised in local currency is 6%.⁴

By using this criterion we track firms' financing at a consolidated level. Our approach is broadly in line with that used in compiling the BIS international debt securities statistics, by nationality, according to the ultimate borrower sector. Bonds

Geographic distribution of firms active in offshore bond markets

Total bond issuance by region of headquarters

Graph 1



¹ Gross bond issuance by non-financial corporations (ultimate borrower sector), by nationality.

Sources: Bloomberg; BIS debt securities statistics; authors' calculations.

² Similar matched firm-bond-level data have been used to investigate the use of bond proceeds to hoard cash (Bruno and Shin (2015)) or the choice of primary market of issuance (Fuertes and Serena (2016)).

³ Firms also issue global bonds, which are fully fungible securities issued simultaneously in two or more markets (for instance, yankee and Eurobond). Other primary bond markets are less popular, but do attract some firms: samurais, kangaroos and kiwis, for example, refer to bonds issued by foreign firms in the Japanese, Australian and New Zealand markets, respectively.

⁴ The dollar is dominant in both the US and the EU markets, where it accounts for 91% and 51% of the total, respectively. The latter proportion rises to 74% in the case of issuances by emerging economy firms, and falls to 20% for the advanced economy companies in our sample.

issued by affiliates incorporated overseas are consolidated with the liabilities of the parent company, as long as the affiliates are not independent companies. They are thus classified according to the sector and country of the parent company. This overcomes a common limitation of other studies that focus on the immediate borrower, using a residence or balance of payments concept, which misses the relevance of the parent's nationality and sector. However, our measure differs from some previous approaches because we treat as standalone firms those that issue bonds without the explicit guarantee of their parent companies. Other measures group such bonds according to the parent company.

We use the primary market as the main criterion for determining whether a bond was issued offshore or onshore. While this is also the main criterion used to classify the market of issuance in the BIS international debt securities statistics, there are some methodological differences. Thus, we use the term "offshore issuance", consistent with research using similar data (Black and Munro (2010), Mizen et al (2012)).⁵ See the Annex for a more detailed discussion.

Two important features of this data set are worth noting. First, the coverage of firms' offshore bond issuance is comprehensive, which allows us to highlight aggregate trends. In aggregate, the amount issued is similar in size to the totals reported by the BIS international debt securities statistics by nationality (Graph 1).⁶ Second, since the data are compiled at the deal level, it provides the flexibility to carry out a sufficiently disaggregated analysis of industry- or firm-level financing patterns.

Table 1 summarises the offshore borrowing activity of firms in our data set. Some 2,300 companies have been active in offshore bond markets (compared with nearly 6,600 in local bond markets). Overall, these firms have issued a total of 7,200 bonds

Number of borrowing firms in onshore and offshore bond markets

Table 1

	Number of firms ¹			Number of bonds issued		
	International issuers	Domestic issuers	Total	Offshore bonds	Local bonds	Total
Total	2,305	6,589	7,831	7,211	39,826	47,037
Small advanced economies	680	1,331	1,753	3,130	5,446	8,576
Latin America	380	1,103	1,324	1,431	3,802	5,233
Emerging Asia	956	2,941	3,316	2,057	27,372	29,429
Emerging Europe	225	1,097	1,275	440	2,642	3,082
Africa and Middle East	64	117	163	153	564	717

¹ See the Annex for the list of countries included in each region. Firms are classified as offshore (onshore) issuers if they have issued at least one bond outside (in) their local jurisdiction; the latter is defined by the headquarters of the company guaranteeing the bond (ie the local market of a US affiliate of a Brazilian firm is Brazil, except if issues debt without an explicit guarantee from its parent company; in this case it would be the United States). These groups are not mutually exclusive. The third column shows the total number of firms issuing bonds.

Sources: Bloomberg; authors' calculations.

⁵ The term offshore issuance is sometimes used in a different sense: to refer to issuance by overseas affiliates.

⁶ These differences can be explained by distinct coverage of data providers, or methodological differences, such as the treatment of standalone affiliates. For a more detailed discussion, see the Annex and Fuertes and Serena (2016).

outside their jurisdictions. Consistent with global trends, the majority of these placements are in the EU (the Eurobond market) or in the US market (yankee bonds).

Asia has the largest number of firms active in offshore bond markets (nearly 1,000), but the value of the debt issued by Latin American firms (USD 639 billion) overshadows that of debt issued by Asian ones (USD 273 billion). Most companies raise funds in foreign currency: only 14% have issued bonds in local currency.⁷

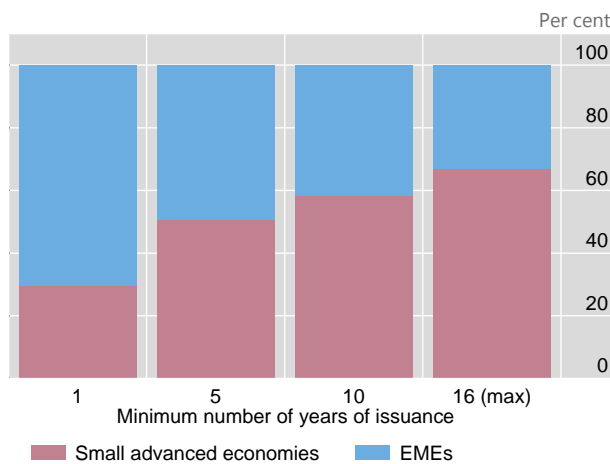
One quarter of the total number of companies are industrial, surpassing energy firms, which, however, account for the highest share of total proceeds (27% of the total, compared with 13% for industrial firms). Technology and health care firms borrow less frequently; these industries typically have high cash flow-to-fixed assets ratios and accordingly lower financing needs.

The increase in offshore bond issuance after the GFC was larger for EME firms, particularly those in Latin America and emerging Europe (Graph 1). In many EMEs, the growth of firms' bond financing in international markets has outpaced that of cross-border bank lending. In several jurisdictions, international bonds already constitute the bulk of foreign lending to the non-bank sector (McCauley et al (2015b)). However, offshore issuance by EME firms slowed from 2015 in the face of rising market uncertainty. In contrast, issuance by firms in small advanced economies has been more stable.

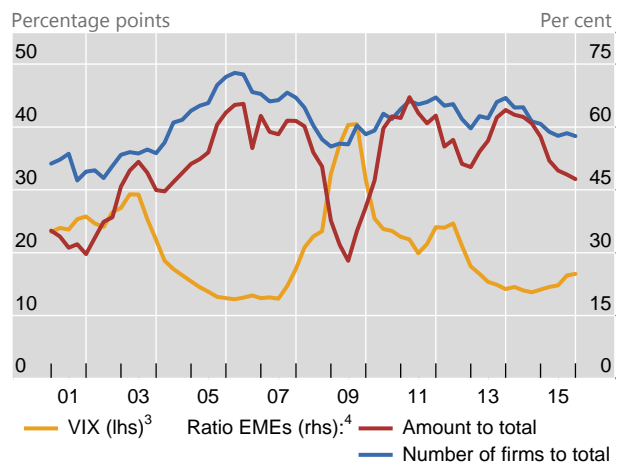
Less frequent and more volatile offshore bond market issuance by EME firms

Graph 2

Distribution of firms by frequency of issuance in offshore bond markets¹



Bond issuance of EME firms and market volatility²



¹ Frequency of issuance in offshore bond markets of emerging market and advanced economy firms. The frequency is bound between 1 (if a firm issues in any one year) and 16 (if it issues in all years). By construction, the proportion of firms issuing in at least one year is the same as the one reported in Table 1, first column. ² The red line shows, at every quarter, the fraction issued by EME firms relative to the total raised by the firms covered in the analysis; the blue line shows the ratio computed for the number of firms. All series are measured as four-quarter moving sums. ³ Chicago Board Options Exchange S&P 500 implied volatility index; standard deviation, in percentage points per annum. ⁴ EMEs as a percentage of all jurisdictions covered in the analysis.

Sources: Bloomberg; authors' calculations.

⁷ The percentage is 36% for small advanced economies and is below 10% in most emerging economies. South Africa is a remarkable exception: 11 out of 33 firms active offshore have issued bonds in the local currency. Also, 46 out of 166 Brazilian companies issuing bonds offshore have issued in Brazilian reals.

Within the universe of issuing firms, 49% of total debt is issued offshore and 51% onshore. Firms issuing only onshore account for 26% of total debt issued. Among such firms, industrial and utilities companies have a more prominent role than energy firms. As described, most bonds issued offshore are in foreign currency; bonds issued onshore are overwhelmingly denominated in domestic currency, with a negligible 3% of amount issued in foreign currency (mostly dollars).

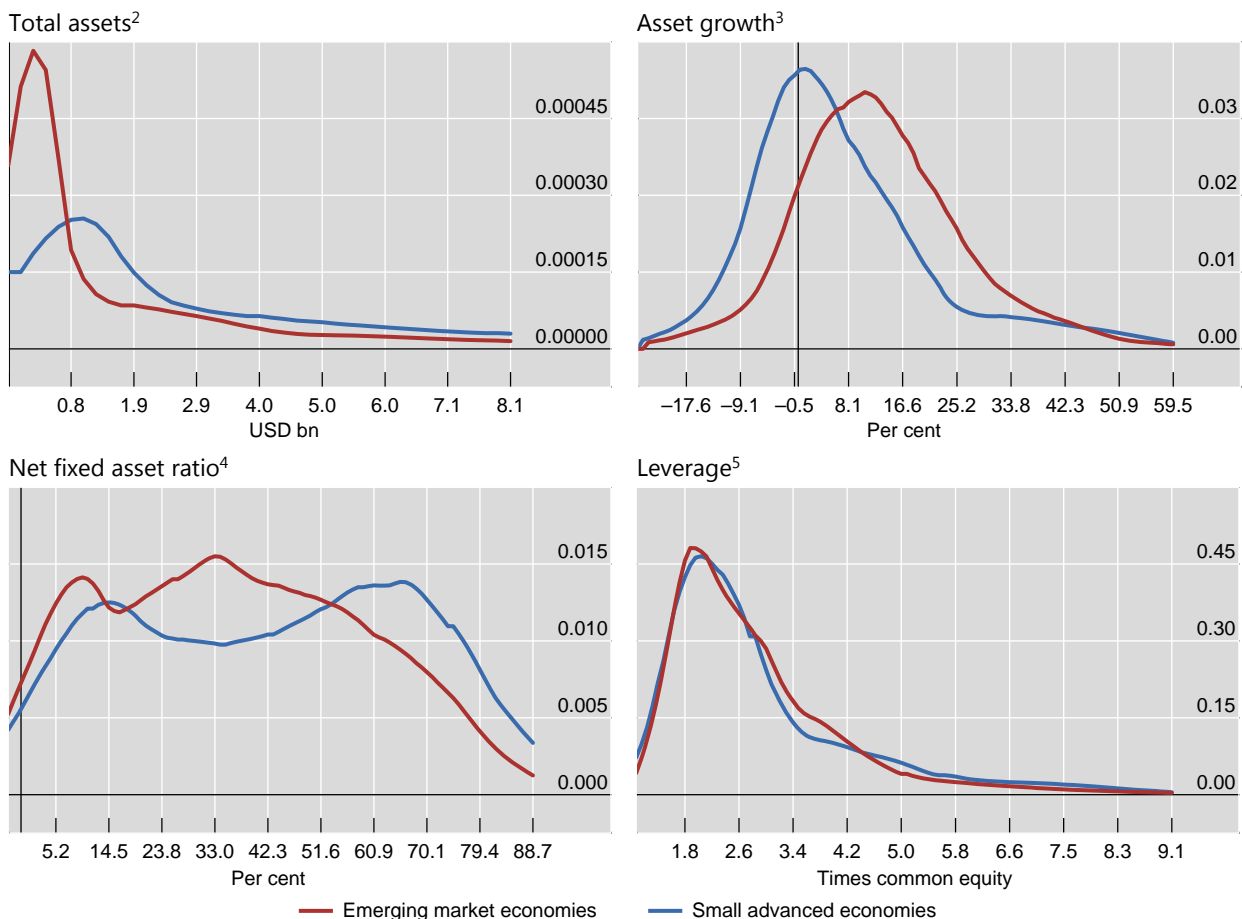
EME firms issue less regularly in offshore bond markets

EME firms issue less frequently in offshore bond markets than do firms from our sample of small advanced economies. For 2000–15, EME firms account for 71% of issuers who issued in at least one year; however, they account for only 40% of issuers who issued in at least 10 of the 16 years (Graph 2, left-hand panel). Thus, there is a large number of infrequent issuers from EMEs, and these, on aggregate, account for

EME borrowers less well suited for arm's length finance¹

Density

Graph 3



¹ Kernel densities estimated for firms issuing offshore bonds. The Annex lists the countries classified as emerging market economies (EMEs) and small advanced economies (AEs). For each firm, the last available value of each variable is used; when firms issue for several years in a row, the information for the most recent year is used. The kernel is estimated using an adaptive kernel density estimation – varying bandwidth – and the Epanechnikov function. In the top left-hand panel, observations are plotted only until the 95th percentile due to the long tail; the largest EME firms shown in Table 2 are thus not shown here. ² Mean values are \$6.9 billion (EMEs) and \$13.8 billion (AEs). ³ Geometric mean of asset growth in the five years before bond issuance; mean values are 17% (EMEs) and 13% (AEs). ⁴ Net fixed assets to total assets; mean values are 36% (EMEs) and 44% (AEs). ⁵ Total assets to common equity; mean values are 3.9 (EMEs) and 5.9 (AEs).

Sources: Bloomberg; authors' calculations.

the bulk of the amount issued. The experienced issuers in our sample tend to come from the small advanced economies.

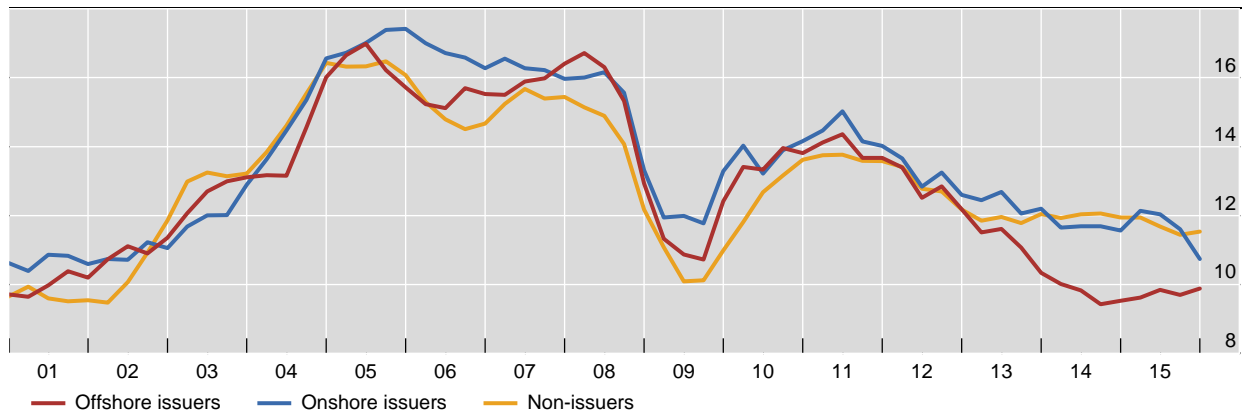
Issuance by EME firms is also more volatile. Graph 2 (right-hand panel) shows that issuance is correlated with shifts in market risk aversion, as measured by the VIX.⁸ In particular, the graph illustrates the negative correlation between the VIX and aggregate offshore bond issuance. This correlation is twice as high for firms in EMEs than for other small open economies. The share of EME firms in the total number of firms issuing offshore bonds thus increases when the VIX is abnormally low and shrinks when the VIX rises. A similar, and even stronger, pattern is found for the amount issued. Investors appear to be less receptive to offshore EME issues when risk aversion is high.

One explanation for these patterns is that EME issuers are less well suited for arm's length finance through bond issuance, only tapping markets when external financing conditions are easy (ie borrowing is procyclical with respect to the financial cycle). In fact, compared with their counterparts in small advanced economies, firms headquartered in EMEs tend to have fewer assets (Graph 3, top left-hand panel),⁹ faster recent growth (top right-hand panel) and a lower proportion of fixed to total assets (bottom left-hand panel). All this points to greater information asymmetries facing the EME issuers: it is harder for them to credibly demonstrate their economic value to investors, since a larger share of this value reflects intangible assets and future growth opportunities. By contrast, their leverage is about the same (bottom right-hand panel).

Return-on-equity¹

In per cent

Graph 4



¹ Four-quarter moving average of the median return-on-equity for the EME firms included in each category. Data are from a panel of 1,100 representative EME firms.

Sources: Bloomberg; S&P Capital IQ; authors' calculations.

⁸ For related findings, see Feyen et al (2015).

⁹ Graph 3 and the left-hand panel of Graph 5 use kernel density estimation. A kernel density provides a smooth visual representation of the frequency of different values of a random variable (eg the value of assets over a sampled population) that is clearer and more accurate than the widely used (discrete) histogram. Technically, a kernel (a weighting function) is used to provide a smooth estimate of the underlying statistical density of a random variable. Scott (1979) shows that the kernel density estimate converges more quickly than a histogram to the underlying density for continuous random variables.

Main issuers in offshore bond markets

Top 10 companies with the largest amount issued in offshore markets, for each jurisdiction

Table 2

Company name	Country	Number of offshore bonds ¹	Value of offshore bonds ¹	Total assets ²
PEMEX	Mexico	136	118,121	148,611
Petrobras	Brazil	47	62,278	299,749
America Movil	Mexico	68	55,854	86,683
Roche	Switzerland	30	55,548	76,105
PDVSA	Venezuela	18	47,096	231,120
Gazprom	Russia	42	42,169	403,955
BHP Billiton	Australia	44	38,045	124,580
Volvo	Sweden	262	35,878	23,785
Statoil	Norway	47	32,419	131,729
Nestlé	Switzerland	101	31,153	134,269

¹ Total number (in units) and value of bonds (in millions of US dollars) issued in the period 2000–15 outside the home country of the firm, by the parent company and its affiliates, provided that the latter are guaranteed. ² Total assets in millions of US dollars in the last year in which the firms tapped offshore bond markets.

Sources: Bloomberg; authors' calculations.

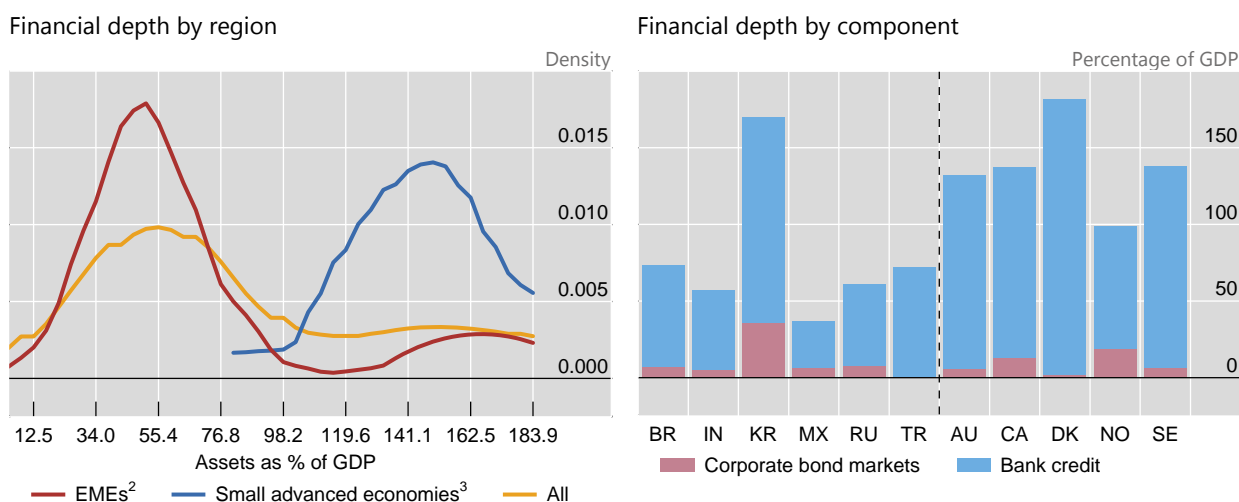
Additional perspective can be gained by examining the evolution of profitability (as measured by the return-on-equity) for three types of emerging market firm: firms that have borrowed in offshore bond markets, firms that have borrowed onshore (but not offshore), and firms that have not borrowed in bond markets (Graph 4). Overall, the profitability of firms that have borrowed in offshore markets has been lower than that of onshore borrowers for extended periods, particularly since the GFC. The gap in the profitability of offshore versus onshore issuers has widened recently. Tests of differences of medians or means indicate that the gap is statistically significant. We obtain similar results looking at other measures of profitability, such as the return-on-assets and net income margin.

While the bulk of EME firms that borrow offshore tend to be small and to issue infrequently, a small group of very large firms issues regularly in the international bond markets (Table 2). These firms are at the 95th percentile of the distribution of EME firms illustrated in Graph 3 (upper, left-hand panel). These larger firms account for 27% of the total amount of EME offshore debt issued, which, while significant, is not the bulk of issuance for these firms.

Domestic borrowing options and offshore bond issuance

Market imperfections that limit domestic borrowing options can influence firms' decisions to issue bonds offshore. Small and opaque firms that incur high costs on account of asymmetric information might be expected to borrow not from markets but from banks, which are more efficient in monitoring borrowers.¹⁰ Over time, they

¹⁰ See Diamond (1984). Small firms may also be unable to access financial markets because of high fixed issuance costs, such as underwriting, registration or legal fees. The evidence for US markets supports this view (Denis and Mihov (2003)).



AU = Australia; BR = Brazil; CA = Canada; DK = Denmark; IN = India; KR = Korea; MX = Mexico; NO = Norway; RU = Russia; SE = Sweden; TR = Turkey.

¹ Onshore financial market depth measured as the sum of corporate bond market debt plus bank credit, in the last year for which data are available. ² See the Annex for the list of EMEs. ³ Australia, Canada, Denmark, New Zealand, Norway, Sweden and Switzerland.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; World Bank, *World Development Indicators*; Bloomberg; national data; authors' calculations.

may rely less on banks and issue debt in financial markets. This could result from improved access to such markets, or from limits on banks' capacity to provide credit (for example, ceilings on large exposures).

Whether firms choose to raise additional debt onshore, either from banks or local capital markets, or offshore (in the Eurobond or yankee markets) depends on the relative benefits and costs. On the one hand, accessing offshore financial markets involves high fixed costs. Companies of uncertain quality are likely to be charged a higher risk premium, since a lack of familiarity exacerbates the problems of informational asymmetries. Access to offshore bond markets might also be more costly for firms based in countries with poor legal systems or weak institutions. Capital controls that restrict offshore bond issuance may also play an important role.

On the other hand, the depth and liquidity of offshore bond markets may imply lower costs of issuance, particularly when external financing costs fall, for example as a result of lower investor risk aversion. In spite of the costs cited above, it may therefore actually be easier and cheaper to issue in offshore financial markets if onshore financial markets are shallow or subject to more restrictions, as is generally the case in EMEs. Unfavourable conditions for local borrowing in EMEs could thus explain increased reliance on offshore financing during periods of lower risk aversion.

The depth of onshore debt markets is likely to be an especially important factor in deciding whether to issue offshore (Black and Munro (2010)). One measure of market depth is the sum of funds obtained locally from banks and capital markets as a ratio to GDP. On this basis, onshore financial depth tends to be much lower for EMEs than for our set of small advanced economies (Graph 5, left-hand panel). Among the largest countries included in emerging market indices, only Korea ranks similarly to the small advanced economies (Graph 5, right-hand panel). The other EME

countries lag well behind: corporate bond markets are thin, and bank credit is lower as a share of GDP, despite rapid growth in recent years.¹¹

Such factors might induce firms to issue bonds overseas when external financing becomes cheaper, even when they have no immediate need for cash. Non-bank lenders might be expected to monitor the use of funds less intensively than would international banks. Thus, arm's length borrowing could be associated with hoarding of cash or short-term assets (Bruno and Shin (2015)). At an aggregate level, bond issuance would be decoupled from capital expenditure.

Empirical model

To explore if limits to borrowing onshore affect firms' offshore debt issuance, we estimate a reduced-form model, using an industry-country-quarter data panel. We restrict our analysis to sectors¹² rather than individual firms because, at the time of writing, a fully balanced panel of data covering the 41 jurisdictions was not available.¹³ In particular, we test the hypothesis that looser external financing conditions increase offshore debt issuance to a greater degree in countries where the domestic financial system is less developed and, accordingly, where firms are more likely to have unmet financing needs. The model is defined by two equations:

$$y_{ijt} = \begin{cases} y_{ijt}^* & \text{if } y_{ijt}^* > 0 \\ 0 & \text{if } y_{ijt}^* \leq 0 \end{cases} \quad (1)$$

$$y_{ijt}^* = \beta' z_{ijt} + \gamma_1 G_t + \gamma_2 FD_{jt} + \gamma_3 G_t FD_{jt} + \varepsilon_{ijt} \quad (2)$$

where y_{ijt}^* is the logarithm of the gross US dollar value of bonds issued offshore (by industry i , based in country j , in quarter t) and z_{ijt} is a vector of country-specific controls comprising country fixed effects, GDP per capita, GDP growth and industry fixed effects to account for each industry's demand for financing.¹⁴ G_t is the standardised measure of the time-varying external financing conditions in offshore markets, as represented by the VIX. We saw earlier that a lower VIX tends to be associated with greater EME offshore bond issuance; an explanation could be that the VIX is an indicator of risk aversion and hence of the tightness of external financing conditions. FD_{jt} refers to domestic financial market attributes, which we measure with three variables: the depth of the onshore financial market (measured as in Graph 4, that is, as the sum of bank credit to the non-financial sector and non-financial corporate bonds outstanding), the presence or absence of capital controls on local bond markets, and the presence or absence of withholding taxes on corporate bond income. The tables in the Annex provide further details of the variables used. As

¹¹ The results are similar when we use a broader measure of onshore depth which includes cross-border bank lending to non-banks. Cross-border lending adds to onshore financial market depth since the borrowing transaction is onshore, although the funds originate from abroad.

¹² Industries are classified according to the Global Industry Classification Standard (GICS), which classifies firms in 10 sectors: Basic Materials, Communications, Consumer Discretionary, Consumer Staples, Energy, Health Care, Industrial, Technology, Utilities and Financials. In this exercise, we remove financial firms.

¹³ That said, some preliminary analysis of firm-level data tends to confirm the results.

¹⁴ As discussed above, industries differ in their dependence on financial markets. For example, due to operational aspects, firms in the technology or health care sector have high internal cash flows and less need for external financing; in contrast, energy and utilities companies have substantial fixed assets and a high dependence on debt to carry out their activities. Reliance on offshore bond borrowing might also be higher for industries with more dollar assets.

negative values of the dependent variable y_{ijt}^* are ruled out, we estimate a censored regression model using maximum likelihood.

To determine whether limits to domestic borrowing encourage more offshore bond issuance when external financing conditions improve, we interact G_t and domestic financial market attributes FD_{jt} . The impact (partial effect) of external financing conditions on the amount issued is then a function of financial market attributes. Formally, x_{ijt}

$$\frac{dE(y_{ijt}|x_{ijt})}{dG_t} = [\gamma_1 + \gamma_3 FD_{jt}] \Phi\left(\frac{\beta'x_{ijt}}{\sigma}\right) \quad (3)$$

where x_{ijt} is a vector of explanatory variables. The empirical results will focus on equation (3). We expect the coefficient γ_3 on FD_{jt} to have a negative impact, so that offshore bond financing declines with financial deepening.¹⁵ To gauge by how much, we measure the derivative on the left-hand side by using the coefficients from equation (2) for low and high values of FD_{jt} .

Less developed onshore markets make borrowers look offshore

Our estimation results confirm that easier external financing conditions increase the amount issued in offshore bond markets, even when other variables are taken into account (Table 3, panel A). This finding is consistent with previous research (McCauley et al (2015a), Feyen et al (2015)). However, we also find that this effect varies with onshore financial market depth (column 1). It is twice as large for firms based in countries with low onshore market depth (we define “low” market depth as percentile 5; “high” market depth as percentile 95; and “medium” as the average).¹⁶

In addition, we also find that capital controls on foreign investments in local bonds matter, as does taxation of income on local corporate bonds (Mizen et al (2012)). The impact of global financial conditions is much larger for firms in countries that restrict foreigners’ investments in local bond markets, or have withholding taxes on bond income (Table 3, panel A, columns 2 and 3).

Advanced economies rank high in our measure of financial depth, never use capital controls and rarely have withholding taxes on bonds. This can explain the more muted reaction of firms to external financing conditions, as described in the previous section.

We conduct several robustness checks. The results hold when we use net flows, other measures of external financing conditions, such as the MOVE index,¹⁷ or when we use a broader measure of onshore market depth that includes cross-border bank lending to domestic non-banks. And to explore whether the results are driven by a few unrepresentative borrowers, we exclude the offshore bond issuance of the top 10

¹⁵ In the case of continuous variables such as financial depth, empirical tests of the hypothesis are different from a standard Wald test of the interaction term. Even if γ_3 is not significant, its impact can be significant for relevant values of financial depth since its standard error includes $\text{cov}(\gamma_1, \gamma_3)$ (Brambor et al (2006)).

¹⁶ Financial depth enters in the econometric model as a continuous variable, and the partial effect is thus a function of this continuous measure. To gauge its shape, we report this effect in Table 3 at three specific points: two values at the tails and, since financial depth is standardised, with respect to the mean and the average.

¹⁷ The MOVE index – the Merrill Lynch Option Volatility Estimate – measures the implicit volatility in the US Treasury markets.

Marginal impact of external financing conditions on offshore bond issuance:
effects of onshore financial market attributes¹

Dependent variable: offshore bond issuance

Table 3

Financial market attributes (FD) as:	All issuers			Excluding top 10 issuers		
	Financial depth	Controls on bond inflows (Yes/No)	Withholding tax (Yes/No)	Financial depth	Controls on bond inflows (Yes/No)	Withholding tax (Yes/No)
Panel A: External financing conditions measured with the VIX						
Low/Yes	-0.411***	-0.250***	-0.170***	-0.439***	-0.251***	-0.175***
Medium	-0.338***			-0.363***		
High/No	-0.212***	-0.128***	-0.029	-0.234***	-0.126***	-0.033
Number of observations	19,379	20,421	26,595	19,379	20,421	26,595
Uncensored	2,094	2,562	2,960	1,976	2,425	2,808
Panel B: External financing conditions measured with the nominal bilateral US dollar exchange rate						
Low/Yes	0.144**	0.036	-0.034	0.217***	0.065*	-0.009
Medium	0.048			0.090**		
High/No	-0.108	-0.022	-0.101***	-0.114	-0.012	-0.089***
Number of observations	16,578	17,640	23,121	16,578	17,640	23,121
Uncensored	2,405	2,562	2,958	2,270	2,426	2,807

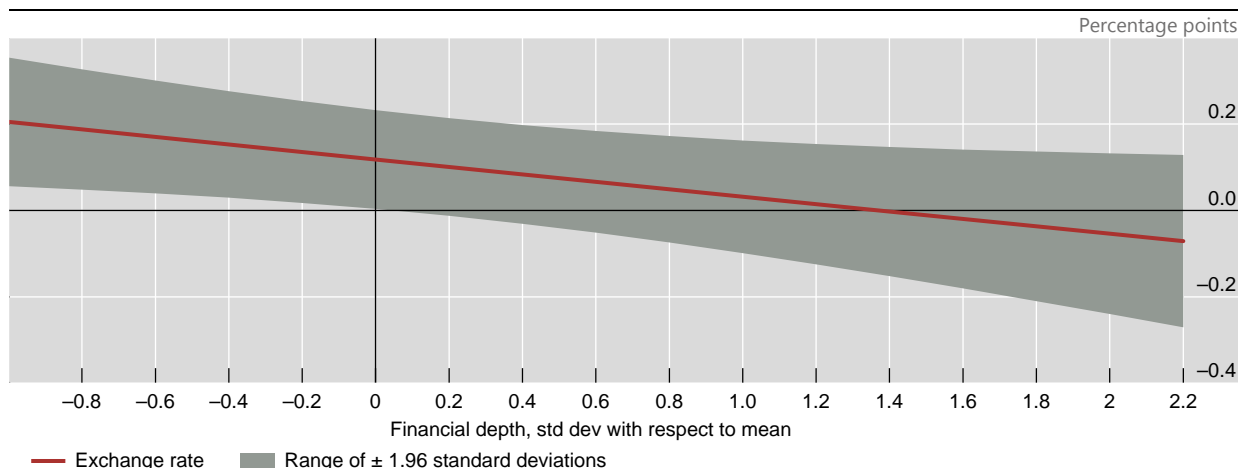
¹ The marginal impact of external financing conditions is a function of onshore financial market attributes. In panel A, external financing conditions are measured with the VIX, standardised and winsorised at 1%: the lower the VIX, the easier external financing conditions. In panel B, with the nominal bilateral US dollar exchange rate: the higher the value, the greater is the appreciation of the domestic currency. This table summarises these effects, measuring them at different values of onshore financial markets attributes. Columns 1–3 report the results when the dependent variable is total amount issued. In columns 4–6, issuance by the top 10 issuers – which account for 23% of the total – is removed. We use alternative proxies for financial markets attributes (FD): in columns 1 and 4 we use financial depth, measured as the cross-country standard deviation with respect to the quarterly mean; in columns 2 and 5, we use a dummy on capital controls on foreign investment in local bond markets; and in columns 3 and 6 we use a dummy on withholding taxes on bond income. All models are estimated correcting for left-censoring (number of uncensored observations at the bottom of the table). ***/** denotes significance at 10/5/1% level. In columns 1 and 4, we report semi-elasticities at low, medium and high financial depth, which correspond to percentile 25, the average, and percentile 75; in the other columns, we report marginal effects when the corresponding dummy (capital controls or withholding taxes) takes value 1 and 0.

Sources: Bloomberg; authors' calculations.

issuers in the sample; these account for 23% of the total amount and 795 bonds. The results are virtually unchanged, and of similar size (columns 4–6).

To provide additional perspective on the role of external financing conditions, we replace the VIX as the measure of such conditions with the nominal bilateral US dollar exchange rate (Table 3, panel B). From the perspective of international investors, dollar weakness strengthens firms' balance sheets if they have borrowed in foreign currency. Thus, it improves companies' ability to raise funds (Avdjiev et al (2015)).

Domestic currency appreciation does indeed encourage offshore bond borrowing, which is mostly in foreign currency. The effect is stronger if firms are incorporated in countries with low market depth; its impact fades, and eventually becomes statistically insignificant, if onshore financial markets are deep (Table 3, panel B, column 1). The results are particularly strong when we exclude the top 10



¹ Marginal impact of the exchange rate on offshore bond issuance excluding the top 10 issuers. The exchange rate is measured as the standard deviation with respect to the historical average of the nominal exchange rate vis-à-vis the US dollar: positive (negative) values indicate strength (weakness) of the domestic currency. The graph shows how this impact is a function of onshore financial market depth – plotted for values ranging from one standard deviation below to 2.2 standard deviations above the mean, which correspond to the fifth and 99th percentiles, respectively, of the distribution of market depth.

Sources: Bloomberg; authors' calculations.

issuers (columns 4–6).¹⁸ To further gauge this impact, we evaluate the results at the range of values of financial depth between our low and high thresholds. We find that the impact is positive and statistically significant from zero for levels of onshore development up to 0.2 standard deviations above the mean (Graph 6). In the last quarter with available data, this cutoff corresponds roughly to financial markets that are slightly deeper than those of Croatia.

Finally, we examine the impact of external financing conditions on onshore bond issuance (Table 4). This is qualitatively similar, underscoring that external financing conditions are also transmitted to local bond markets (Sobrun and Turner (2015)). However, the impact is half the size of that on offshore bond issuance, suggesting that integration remains incomplete and that there are still incentives for firms to borrow offshore. Low financial depth and withholding taxes on corporate bond income strengthen the impact of external financing conditions on onshore bond issuance, but surprisingly capital controls do not have an effect.

Overall, the results confirm that the impact of global financial conditions on firms' offshore bond financing is stronger when onshore financial markets have shortcomings. The findings can help explain why many EME firms hasten to issue offshore bonds when external financing is cheap.

¹⁸ The reason may be that these large companies are more likely to invest abroad. As a result, the value of their assets might be less affected by the domestic exchange rate.

Marginal impact of external financing conditions on onshore bond issuance: effects of onshore financial market attributes¹

Dependent variable: onshore bond issuance; external financing conditions measured with the VIX

Table 4

Financial market attributes (FD) as:	All issuers			Excluding top 10 issuers		
	Financial depth	Controls on bond inflows (Yes/No)	Withholding tax (Yes/No)	Financial depth	Controls on bond inflows (Yes/No)	Withholding tax (Yes/No)
Low/Yes	-0.226***	-0.095***	-0.125***	-0.233***	-0.091***	-0.128***
Medium	-0.192***			-0.196***		
High/No	-0.130***	-0.075***	-0.033***	-0.129***	-0.079***	-0.033**
Number of observations	16,578	18,144	23,976	16,578	18,144	23,976
Uncensored	4,411	4,788	5,514	4,373	4,751	5,474

¹ The marginal impact of external financing conditions on onshore bond issuance is a function of onshore financial markets attributes. See footnote in Table 3.

Sources: Bloomberg; authors' calculations.

How offshore bond proceeds are used

How offshore bond proceeds are invested can have implications for financial stability. In particular, firms might act as surrogate financial intermediaries, raising funds offshore to invest them in short-term financial assets. This could accentuate the procyclicality of the domestic financial system and pose the risk of sudden reversals.

To shed light on this issue, we first test whether in our sample offshore bond issuance is allocated to short-term financial assets, as measured by current assets, and whether it differs from the allocation of onshore bond proceeds. Bonds issued in offshore markets by firms in the sample are overwhelmingly denominated in dollars and, conversely, issuances in onshore markets are mostly in local currency. A recent study by Bruno and Shin (2015) performs a related analysis.¹⁹

For the period 1998–2014, we adapt the bond use equation introduced by Bruno and Shin (2015, Tables 9 and 10), and apply it to a panel of 1,100 representative EME firms.²⁰ The dependent variable is the change in current assets, which is the sum of cash and cash equivalents, marketable securities and other short-term investments, accounts and notes receivable, inventories and other current income. The right-hand side variables are offshore bond proceeds, onshore bond proceeds, other revenues and total assets. We perform the estimation at one- to three-year horizons.

As shown in Table 5, offshore bond proceeds have a positive and statistically significant impact on firms' holdings of current assets, which increases at two- and three-year horizons (columns 1–3). In contrast, onshore bond proceeds have no impact on such holdings (other sources of revenue do have an impact, but it is smaller). The impact of offshore bond proceeds on current assets is even stronger in the post-crisis period (columns 4–6).

¹⁹ While we analyse offshore versus onshore bond issuance, Bruno and Shin (2015) examine US dollar versus non-US dollar bond issuance. Their findings support the view that US dollar bond issuance by EME firms may reflect carry trades. Accordingly, our results are consistent with theirs.

²⁰ This sample is also used in Graph 4.

Bond proceeds and current assets¹

Dependent variable: change in current assets

Table 5

	(1)	(2)	(3)	(4)	(5)	(6)
	t=1	t=2	t=3	t=1	t=2	t=3
Offshore proceeds	0.226** (3.37)	0.288** (2.94)	0.305* (2.40)	0.336*** (5.65)	0.399*** (5.73)	0.367** (2.89)
Onshore proceeds	0.093 (1.67)	0.135 (1.92)	0.184* (2.27)	0.035 (0.52)	0.036 (0.52)	-0.031 (-0.37)
Other revenues	0.333** (3.22)	0.316** (3.26)	0.360*** (4.01)	0.295* (2.71)	0.285*** (3.83)	0.254* (2.58)
Ln(assets)	-0.021*** (-5.73)	-0.021** (-3.51)	-0.018* (-2.48)	-0.021** (-3.57)	-0.027* (-2.69)	-0.026 (-1.95)
Number of observations	10248	9178	8158	3296	2497	1782
R-squared	0.144	0.194	0.242	0.141	0.228	0.272
Number of countries	35	35	35	35	35	33

¹ The dependent variable is the natural log of the change in the ratio of cash and short-term liabilities divided by total assets, plus one. Offshore proceeds, onshore proceeds and other revenues are expressed as ratios to total assets. The series and the regressions are estimated over one- to three-year horizons. Standard errors (clustered by country) are reported in parenthesis. */**/** denotes significance at the 10/5/1% level. Columns (1) to (3) are estimated over the full sample period 1999–2014, while columns (4) to (6) are estimated over the post-crisis period 2010–14.

Sources: Bloomberg; authors' calculations.

As noted earlier, since about 2009, firms issuing bonds offshore have consistently been less profitable than firms issuing bonds (only) onshore or firms that issue no bonds. Firms that have relied on offshore bond financing thus appear to be less able to generate profits even if they are exposed to higher risks. The lower profitability of firms that rely on offshore bond financing may reflect macroeconomic conditions or may indicate that they are using the proceeds from offshore financing in a less productive way.

Conclusions

Two results of our analysis may be highlighted. First, firms' demand for offshore bond financing depends on their ability to raise funds locally. If borrowing in domestic markets is relatively constrained, as is the case in less developed domestic financial markets, an easing of external financing conditions increases the incentive to issue debt offshore.

Second, our empirical analysis indicates that offshore bond proceeds tend to be associated with increased investment in short-term assets. This could raise financial stability concerns. In particular, an increased volume of such investments could pose the risk of sudden reversals and might amplify financial cycles. In contrast, onshore bond proceeds are not linked to higher holdings of short-term assets.

Our results imply that policies that deepen domestic markets by reducing the cost of onshore borrowing could slow the growth of offshore bond issuance by EME firms. This could help alleviate some of the concerns about financial stability noted above.

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Annex: Data description

In this article, we use a data set that matches all the bonds issued in the period 2000 to 2015 with firm-level data for the company backing the bond. Its features are described in detail in Fuertes and Serena (2016). The data series are described in more detail in Tables A1 and A2.

The data set covers non-financial firms headquartered in 41 jurisdictions, comprising 34 emerging economies and seven small advanced economies. The countries and regions covered are: Latin America: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela; emerging Europe: Bulgaria, Bosnia, Croatia, Estonia, Hungary, Lithuania, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey and Ukraine; Africa and Middle East: Egypt, Morocco, Nigeria, Saudi Arabia, South Africa and the United Arab Emirates; emerging Asia: India, Indonesia, Malaysia, the Philippines, Thailand and South Korea; small advanced economies: Australia, Canada, Denmark, New Zealand, Norway, Sweden and Switzerland.

It does not include firms based in the euro area countries, Japan, the United Kingdom or the United States during the full period under analysis. Domestic bond markets in these larger advanced economies are deeper and more receptive to new issues. As a consequence, firms based in these countries would find it less costly to issue onshore than do firms in small open economies.²¹

Firms' financing patterns are monitored at a consolidated level, broadly in line with the BIS international debt securities statistics, by nationality, according to the ultimate borrower sector.

This is underscored by the similarity of these measures, on an aggregate level (see Graph 1). There are three potential explanations for the differences. First, while our measure is broadly consistent with the criteria used in the BIS nationality measure, we make a distinction between affiliates which are financially dependent on their parent companies, and those which are standalone companies. Unlike the BIS nationality measure, we classify standalone affiliates according to the country of

Use of proceeds estimation variables

Table A1

Variable	Definition
Current assets change	Change in the ratio of current assets to total assets. Change in current assets measured alternatively at three horizons: one, two and three years ahead. Scaled by total assets at date zero. Current assets includes cash and cash equivalents, marketable securities and other short-term investments, accounts and notes receivables, inventories, and other current income.
Other revenues change	Cumulative change in other revenues. Changed in other revenues measured alternatively at three horizons: one, two and three years ahead. Scaled by total assets at date zero. Other revenues is defined as net income plus depreciation and amortisation plus other non-cash adjustments plus changes in non-cash working capital.
Offshore bond proceeds	Sum of proceeds of bonds issued offshore accumulated at three horizons: one, two and three years. Scaled by total assets at date zero.
Onshore bond proceeds	Sum of proceeds of bonds issued onshore accumulated at three horizons: one, two and three years. Scaled by total assets at date zero.

²¹ The data set also does not cover China, which is experiencing a process of external financial liberalisation that distorts domestic firms' access to local and international bond markets.

Description of variables

Table A2

Variable	Definition	Sources
Dependent variable		
Total offshore bonds	Logarithm of the amount issued by industry <i>i</i> , country <i>j</i> , at quarter <i>t</i> , constructed using firm-level data	Bloomberg; authors' calculations
Excluding top 10 issuers	Same measure excluding the 10 largest offshore bond issuers, listed in Table 1	Bloomberg; authors' calculations
Other variables		
VIX	Standard deviations with respect to average VIX, winsorised at 1%: negative values low external financing costs	Chicago Board Options Exchange; authors' calculations
Nominal bilateral US dollar exchange rate	Negative standard deviations with respect to average: positive values indicate low external financing costs, local currency strength	National data; authors' calculations
Capital controls on foreign investment in local bond markets	Dummy variable taking value of 1 if the bond inflows restriction category is non-zero	Fernández et al (2015)
Withholding tax on bond income	Dummy variable taking value of 1 if residents in Luxembourg are subject to withholding taxes in corporate bond income, 0 if exempted. Time invariant variable, measured as of 2014	KPMG (2015); authors' calculations

incorporation of the affiliate. Thus, a company such as Jaguar Land Rover – which borrows without explicit support from Tata Motors, its Indian parent company – is treated as a UK-based company. Second, offshore bonds are defined as those marketed outside the jurisdiction of the issuer, as given by the registration domain (ISIN/CUSIP). This definition stresses the primary market, consistent with the BIS definition (Gruić and Wooldridge (2012)). However, ours is a narrower measure, since bonds issued domestically under foreign law, or subsequently listed overseas, are not reclassified. For this reason we use the term offshore bonds, instead of international, which should be reserved for the broader concept. Finally, the coverage of data providers might be different.