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Insights from matched firm-bond level data – Market of issuance and credit quality[1]

Alberto Fuertes and Jose Maria Serena, Bank of Spain

[1] This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS or the central banks and other institutions represented at the meeting.

Insights from matched firm-bond level data: Market of issuance and credit quality

Alberto Fuertes (Banco de España) and Jose Maria Serena (Banco de España)[1]

Abstract

Matching firm-level and bond-level information is useful to investigate the real and financial risks of firms' financing patterns. In this paper we describe the construction of a database with these features. We gather all the bonds issued in the period 2000-2014 which are guaranteed by emerging economies firms; and we match them with firm-level data. Using this data, we describe how firm-specific features affect the market in which they issue international bonds. Typically, firms with less ability to comply with demanding securities regulation and fewer gains from doing so –due to their informational asymmetries or credit risks- will prefer issuing in the Eurobond market or the US institutional market.

Key words: bond markets, market-depth, securities regulation, debt choice.

JEL classification: F34; F36; G15; G30

[1] We are very grateful to Branimir Gruic for helpful discussions on debt securities data. The author's views need not coincide with those of Banco de España or the Eurosystem. Corresponding author: alberto.fuertes@bde.es.

1. Introduction

The post-crisis international financial markets are defined by the transition towards market-based financing. Emerging economies firms are obtaining substantial amounts of funding from international bond markets, and they are managing to do so at long maturities (Shin (2013)). This easy access to debt-markets is attributed to global financial conditions (Lo Duca et al. (2014), Ayala et al. (2015), Feyen et al. (2015)). Among the lenders, non-bank institutions have stepped into the provision of credit, in a context of low returns on traditional assets. Overall, the process is deemed to pose significant risks for international financial stability: borrowers could be raising too much debt; lenders could be underestimating the risk.

Many interesting insights of the process have been highlighted using international data on debt securities, and more specifically the International Debt Securities compiled by the BIS. For instance, how firms often use affiliates incorporated overseas to accede international debt markets (Shin (2013), McCauley, Upper and Villar (2013)). Recent developments suggest as well a growing reliance on international bond funding in local currency (Gruic and Wooldridge (2013));

Overall, the trends identified with the international debt statistics open a number of relevant questions. Addressing some of them requires, to an important extent, complementing aggregate statistics with micro-level data.

The credit risks of firms borrowing in markets are one of these aspects. To investigate the issue, we have constructed a database matching firm-level and deal-specific information for all emerging economies firms active in international markets during the period 2000-2014, in line with parallel work. A distinctive feature of our database is that it is built around the firms guarantying the debt-securities, which need not be the issuer companies. Debt-guarantors are the entities which would be liable in case of distress. The database contains information on firms' financial accounts, corporate structure, and non-financial information; and on the type of debt-securities issued. Overall, there is information for 1,584 firms, which issue a total of 3,944 securities, for a total amount of 1.2 USD trillion. The database covers unlisted firms, firms listed in local exchanges, and firms cross-listed in the US.

Using the dataset, we investigate if firm-specific factors matter for the choice of international market of issuance: global, US institutional (Rule 144A), and Eurobond markets. These markets differ in relevant dimensions, being one their different regulation; this implies they differ in how demanding is the disclosure of financial information. Issuing a global bond requires complying with US regulation –if a tranche of the bond is placed in the US. Comparatively, the regulation of the US 144A bond market is lighter. Firms can issue in the Eurobond market without the need of complying with burdensome disclosure of financial information. While complying with regulation has a benefit –the sales of the bond in the secondary market are unrestricted, and thus liquidity is enhanced-, it imposes costs on the issuer; these costs are mostly firm-specific. Accordingly, theory predicts that firms borrowing in less regulated markets, such as Eurobond markets, have less ability to absorb high flotation costs, exhibit more informational asymmetries, and exhibit lower credit quality –compared to issuers of Global bonds. Univariate analysis and results of multinomial models of choice confirm the first two hypotheses, and give mixed support for the third one. After the global financial crisis, firms' propensity to issue debts in US 144A and Eurobond markets has increased. Overall, issuance in less regulated debt-markets signals more uncertainty on borrowers' credit quality.

Our paper is related to substantial parallel work matching bond and firm-level data to zoom into the broader implications of funding patterns. Along the same lines, Bruno and Shin (2015) match firm and bond-level data to investigate the connection between bond issuances and firms' hoarding of cash. Besides, similar data has been used to gauge the evolution of financial vulnerabilities for firms active in international bond markets, which underscores a trend towards worsening of financial conditions (Fuertes and Serena (2014) and IMF (2015)).

The rest of the paper is structured as follows. Section 2 describes the construction of a micro-level dataset relevant for financial stability analysis. Section 3 presents our empirical exercise. In section 4 we discuss the main conclusions.

2. Constructing a Database to Investigate Credit Risks of Firms' Active in International Bond Markets

2.1. Main features

We use Bloomberg to construct a dataset matching firm-level data with information of debt-securities issued in international debt markets in the period 2000-2014, and guaranteed by emerging economies firms. Our focus is on 36 countries of four emerging economies regions: Emerging Asia, Latin America, Emerging Europe, and Africa and Middle East[2].

The database has three defining features. First, it is built around the firms guaranteeing the debt-securities, instead of the issuer entities. This allows mimicking properly the risk-analysis carried out by international investors, when deciding to invest in a given debt-security. Second, the debt-securities information contains foreign bonds, issued in the global bond market, US 144A bond market, and Eurobond market. Thus, it is not limited to public offerings of bonds, and encompasses private placements. Finally, we match bond-level data with firm-specific information, and cover more than 80% of the total amount issued; the coverage is, overall, good, albeit relatively poorer in 2006 and 2007.

Overall, these three features make our database comprehensive and consistent: it contains 3,944 debt-securities, issued by 1,584 firms in the period 2000-2014, which make up a total amount of 1.2 USD trillion.

2.2. Monitoring credit-risks of firms guaranteeing debt-securities

The exercise of investigating the risks that investors assume by investing debt-securities issued in international debt markets is extremely challenging. A reason is that the organizational structures of firms have become very complex. They expand well beyond their domestic boundaries, posing important challenges for the analysis of financial risks (see, for instance, Avdjiev et al. (2015), and references therein).

Thus, we follow previous work in tracking firms' activities on a consolidated basis. Since our interest is gauging the credit risks of investing in a bond, we delve into the actual financial dependence between affiliates with respect to their parent companies. We do so because, while some affiliates are fully-supported, others are fully-independent; and some other might receive explicit guarantees for specific financial operations.

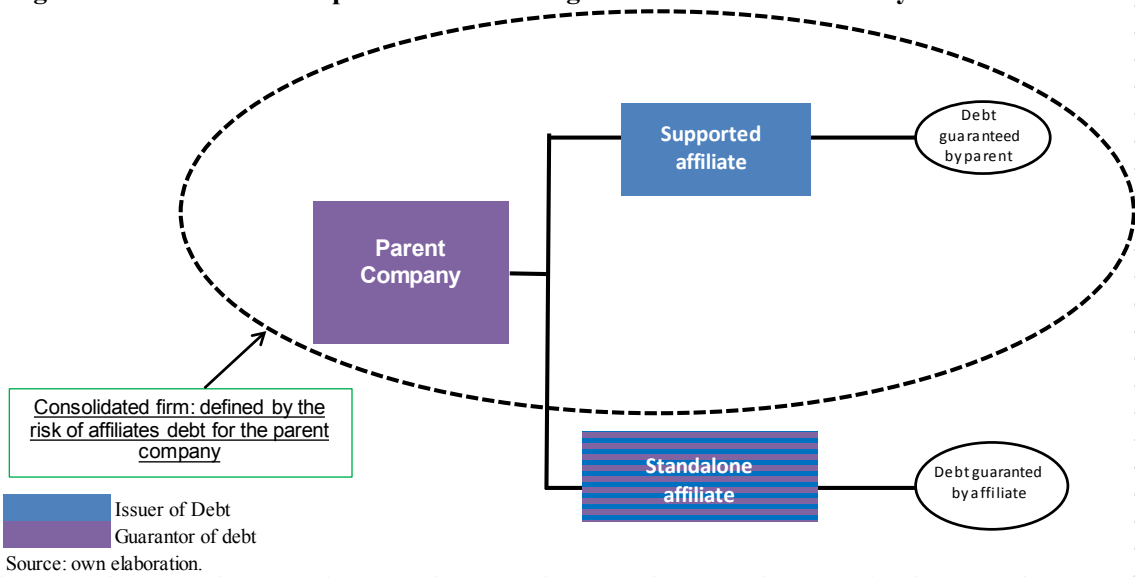
Accordingly, we make a distinction between supported and standalone affiliates. If an affiliate issues debt with guarantees from its parent company, we treat it as part of a consolidated entity; we interpret the issuer is transferring upstream its risk to the guarantor. This criterion applies to all issuer-entities -non-financial affiliates and offshore/onshore financial vehicles-. If, alternatively, an entity issues debt without explicit guarantee of another company, we treat the affiliate on a individual basis. Most probably, this affiliate will be non-financial, fully-independent from its parent company[3].

[2] Latin America includes Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Venezuela; Emerging Europe includes Bulgaria, Belarus, Bosnia, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine; Africa & Middle East includes Egypt, Morocco, Nigeria, Saudi Arabia, South Africa, UAE. Emerging Asia includes India, Indonesia, Malaysia, Philippines, Thailand, South Korea.

[3] There are two options: it can be an emerging economy firm, and be in our sample; alternatively, it can be an advanced economy firm, and be excluded from it.

Figure 1 provides an example of how our criterion works. It shows a company with two affiliates -these entities can be incorporated domestically or overseas-. We assume investors assess the risks of investing in their bonds analyzing the guarantor-company. We consider the supported affiliate as part of a non-financial conglomerate, and match its bonds with the parent company balance-sheet. The case of the standalone company is, in contrast, financially independent -the debt-securities it issues do not receive any explicit guarantee-. Thus, we consider investors perform the risk-analysis using its financial accounts; accordingly, we treat it as a different company.

Figure 1. Non-financial corporations and their guarantees on debt issued by affiliates



Source: own elaboration.

The reason why we use this criterion is that we want to mimic the risk-analysis carried out by international investors; we assume investors price the risk of investing in a bond analyzing the soundness of the firm guaranteeing it: legally, it is the entity liable in case of distress.

Although we are the first to use this criterion, its interests had already been suggested (Esho, Lam, and Sharpe (2001)). Due to the problems to match systematically the debt-security with the underlying firm-level data, previous research had opted to use a more conservative approach and focus only on observations in which debt-issuers and debt-guarantors coincide.

2.3. Firms guarantees on affiliates' debt securities: identification of upstream transfers of risks

Implementing this criterion requires identifying transfers of risk from debt-issuers to debt-guarantors. But, how can such upstream transfers of risk be identified, in practice? Our main input is the fundamental company ticker underlying each debt-security. This ticker identifies the firm guaranteeing the debt-security; it need not coincide with the issuer-firm, or with the ultimate parent company of the issuer-firm. The country of incorporation of the debt-guarantor firm is equivalent to the country-risk of the debt-security. This is an ISO code constructed using four factors listed in order of importance: management location, country of primary listing, country of revenue, and reporting currency of the issuer. In practical terms, the primary listing status and managerial location are key to determine the holder of the risk, while the reporting currency is the least important factor. As a robustness check, we have cross-checked our conclusion using firms' financial reports.

Using this method, we identify two types of upstream transfers of risk. Firstly, transfers of risk of financial vehicles; these entities are used to tap international markets and are often referred to as "offshore vehicles" since most are incorporated overseas (see Shin (2013), Avdjiev et a. (2015), and references therein). Table 1 lists some recent deals in which emerging economies firms have tapped international markets through offshore financial vehicles. They include debt securities issuances by Petrobras Global Finance, Lukoil International Finance BV, or AngloGold Ashanti Holdings PLC, among others. A way of confirming that there is a transfer of risk is comparing the country of risk of

these securities with the country of the ultimate parent company. In these cases they do coincide. This reflects that these entities are always explicitly guaranteed by their parent companies, and so it is the debt they issue. The debt is guaranteed by emerging economies firms. Entities issuing these debt securities are, though, incorporated in advanced economies such as Netherlands, Luxembourg, or Ireland. Thus, these deals would not be included in analyses of debt-issued by emerging economies firms, since these financial vehicles are domiciled in advanced economies.

Table.1. International debt securities issuances by offshore financial vehicles

Company Name	Parent Company	Country of Incorporation	Country of Risk	Country of Ultimate Parent Company	CUSIP	Amount (US bn)
Petrobras Global Finance BV	PETROBRAS - PETROLEO BRAS-PR	Netherlands	Brazil	Brazil	71647NAF6	3.5
Lukoil International Finance BV	LUKOIL OAO	Netherlands	Russia	Russia	EJ6431419	1.5
Gazprom Neft OAO Via GPN Capital SA	GAZPROM NEFT OAO-CLS	Luxemburg	Russia	Russia	EJ9515473	1.5
Russian Railways via RZD Capital PLC	RUSSIAN RAILWAYS JSC	Ireland	Russia	Russia	EJ6158582	1.308
AngloGold Ashanti Holdings PLC	ANGLOGOLD ASHANTI LTD	Isle of Man	South Africa	South Africa	03512TAD3	1.25
Metalloinvest Finance Ltd	METALLOINVEST HOLDING CO OAO	Ireland	Russia	Russia	EJ8456547	1
SABIC Capital II BV	SAUDI BASIC INDUSTRIES CORP	Netherland	Saudi Arabia	Saudi Arabia	EJ8456547	1

Source: Bloomberg, own elaboration.

Secondly, non-financial affiliates can also transfer upstream risk to their parent companies. This happens when their debt is guaranteed by its parent companies. Albeit less frequent, this is not rare. Table 2 lists a number of debt securities issuances in which the risk of non-financial affiliates debt issuances is transferred to parent companies. There are relevant examples. For instance, JBS Investment GmbH is an Austrian affiliate of a Brazilian company, whose debt is guaranteed by its parent company, JBS S.A; therefore the risks are transferred upstream to Brazil. Rolta LLC is a US affiliate of an Indian firm, Rolta India, which guarantees its debt; similarly, the risk is transferred to its parent.

Table.2. International debt securities issuances of affiliates and guaranteed by parent companies

Company Name	Parent Company	Country of Incorporation	Country of Risk	Country of Ultimate Parent Company	CUSIP	Amount (US bn)
JBS Investment GmbH	JBS SA	Austria	Brazil	Brazil	46611DAA3	1
OAS Investments GmbH	CMP Participacoes	Austria	Brazil	Brazil	67089RAA1	0.875
PT Portugal SGPS SA	Telemar Patcipacoes (OI SA)	Portugal	Brazil	Brazil	EJ2496895	0.491
Sappi Papier Holdings GmbH	Sappi Ltd.	Austria	South Africa	South Africa	803071AC3	0.4
Rolta LLC	Rolta India Ltd.	United States	India	India	775793AA0	0.2

Source: Bloomberg, own elaboration.

This method is important as well to treat standalone affiliates. In emerging economies there are affiliates of foreign firms which do not receive financial support from their parent companies. They shall be considered as standalone entities, since their debt issuances are not guaranteed by their parent companies. An example is given by Kansas City Southern Lines, a US-headquartered company, which has a standalone affiliate in Mexico. The affiliate is Kansas City Southern de México, which obtains financing without the guarantees of its parent company[4]. Thus, investors will weigh the interest

[4] The number of these foreign-owned, independent affiliates, operating in emerging economies is not large in the case of non-financial corporations. Though, there are other examples. For instance, in Mexico Concesionaria Mexiquense SA, an independent subsidiary of Obrascón Huarte Lain, S.A, a Spanish company; SatMex, the Mexican telecommunication company, was acquired by the French firm Eutelsat in 2014, but its country of risk remains Mexican.

of acquiring its bonds delving into the soundness of the Mexican affiliate. Accordingly, we treat these affiliates as emerging economies' firms -even if they are owned by foreign companies, as happens in this example.[5] The financial risks of their activities lay in emerging economies. Besides, the bond shall be matched with the financial information of the affiliate.

Interestingly, emerging economies' firms have also standalone affiliates outside their jurisdictions. Table 3 lists some bonds issued by them. Most of these standalone affiliates are large and well-known companies: Jaguar Land Rover, Pilgrims' Pride, Novelis, among others. Novelis is a US–nonfinancial affiliate of Hindalco, an Indian company. Pilgrim Pride is a US–nonfinancial affiliate of JBS, the Brazilian food producer. The debt-securities issued by these foreign-owned affiliates are not guaranteed by their parent companies; the telltale sign there is not a risk transfer is that the country of risk assigned to these securities is equivalent to the country of incorporation of the subsidiary (and different to the ultimate parent company country). The controlling interest of these affiliates -in India and Brazil, respectively- does not guarantee their foreign-owned affiliates' debt-securities. These entities are not considered in our analysis, since are incorporated in advanced economies.

Table 3. International debt securities issuances of affiliates not guaranteed by parent companies

Company Name	Parent Company	Country of Incorporation	Country of Risk	Country of Ultimate Parent Company	CUSIP	Amount (US bn)
Jaguar Land Rover Automotive PLC	Tata Motors Ltd.	United Kingdom	United Kingdom	India	EK0498676	0.65
Novelis Inc.	Hindalco Industries	United States	United States	India	67000XAL0	1.1
Rain CII Carbon LLC /CII Carbon Corp.	Rain Industries Ltd.	United States	United States	India	EJ4718106	0.4
Moy Park Bondco PLC	Marfrig Global Food	United Kingdom	United Kingdom	Brazil	EK2879899	0.33
Springs Industries Inc.	Cia de Tecidos do Norte de Minas	United States	United States	Brazil	851783AB6	0.47
Pilgrim's Pride Corp.	JBS SA	United States	United States	Brazil	72147KAB4	0.49

Source: Bloomberg, own elaboration.

We look at firms' financial reports and credit agencies' rating opinions and find support for our decision of treating these entities as standalone entities. Jaguar Land Rover Automotive PLC (JLR) is an interesting example, since it is very active in international debt markets. It is incorporated in United Kingdom as a subsidiary of Tata Motors, an Indian firm. JLR subscribes liabilities, which are not guaranteed by Tata Motors. Accordingly, it does not transfer its risk upstream. When deciding to price the risk of acquiring JLR debt-securities, international investors will look at JLR financial information. Consistently, we treat JLR as an UK company. Since our analysis focuses on emerging economies firms, it is not in our sample. Similar insights are obtained from external credit agencies decisions: Fitch rates JLR on a standalone basis, highlighting there is no parent support.[6]

3. Analyzing credit risks in international bond markets: Does lack of harmonization in securities regulation segments firms?

3.1. How lack of harmonization in regulation can segment international bond markets

This dataset is useful to investigate the credit risks of firms active in international bond markets. We conjecture that it is a key factor behind their choice of international market of issuance. As a corollary, we expect the credit quality of firms to differ substantially across markets. We describe the underlying theory behind the hypothesis.

[5] These affiliates are integrated with their parent companies in some relevant dimensions, such as revenues or profits, but not in terms of financial stability risks: they retain the risk.

[6] From JLR debt-securities offerings JLR announced the 23th of April 2015 a 10-year 400 £ million senior note offering, stating that these securities "*will be guaranteed (the "Guarantees") on a senior unsecured basis by Jaguar Land Rover Limited and Jaguar Land Rover Holdings Limited.*" Interestingly, the announcement was welcomed by both the CFO of Jaguar Land Rover and Tata Motors. This suggests that, beyond legal risk-fencing, there could be a reputational or informal support.

The starting point is that, conditional on their decision to tap foreign investors, firms have several options: issuing foreign bonds, targeting the US institutional investors, issuing in the Eurobond market, or issuing Global bonds. International bonds are those in which the issuer is not domiciled in the jurisdiction, and the issuer is subject to a non-local regulation (BIS-ECB-IMF (2015))[7]. But firms can choose among many options. First, they can issue foreign bonds –Yankees, Samurai, Bulldogs, etc- are bonds issued in a foreign local market; at least since 2000, they are rarely issued by emerging economies firms. As an alternative, they can target the US institutional investors by issuing private placements with Rule 144A rights; these bonds can be sold in the secondary market among institutional investors (qualified institutional buyers, QIBs). Besides, firms can issue Eurobonds; this is an offshore market, whose main financial centers are Luxembourg, Ireland, or London. Finally, firms can issue Global bonds, which are simultaneous issuance in at least two markets. Global bonds are fully fungible –which enhances liquidity-; since they often involve a placement in the US domestic market, they are fully subject to the SEC regulation.

Theory suggests that firm-specific factors are relevant in firms' choices. The markets described differ in several dimensions, being a relevant one their different regulation: it is more demanding in some markets than in others. Complying with the regulation required to issue a global bond is more demanding than the required to issue a bond with 144A rights; issuing these bonds is, finally, more costly than issuing a Eurobond. Complying with regulation enhances bond liquidity. However, it is costly since requires disclosing publicly financial information. Providing such information is costly, but these costs are firm-specific. Theory suggests that firms with less ability to comply with regulation, suffering more informational asymmetries, and exhibiting higher credit risks, will resort to less regulated bond markets. In a nutshell, complying with regulation is less burdensome for firms which are larger, or are already compliant –due to, for instance, being already cross-listed in an US exchange. Overall, the stringency of regulation leads to an increase in the flotation costs in Global bond markets. The benefits of issuing in a regulated bond market are lower for firms with higher credit risks. Typically, these bonds are placed among a larger base of investors; thus, due to coordination problems, in an event of distress, the recovery value of the firm will be lower. Similarly, firms with more severe informational asymmetries are more amenable to financing in less regulated markets; here, borrowers can informally gauge the interest of bond investors, and customize bonds to incorporate options and enhancing its value (for further details, see Denis and Mihov (2003), Fuertes and Serena, mimeo).

The importance of the firm-specific costs of complying with regulation has been widely study in the literature. Existing research has compared Yankee (US foreign) and US144 bonds (Chaplinsky and Ramchand (2004), Fenn (2001), Esho et al. (2001), Gomes and Phillips (2012)); Yankee and Eurobonds (Miller and Puthenpurackal (2001)); or the choice between Yankee, US144A, and Eurobonds (Gao (2011)). In this article we expand the analysis to investigate the choice between Global, US144A, and Eurobonds; foreign bonds have lost ground in the period 2000-2014, at least for emerging economies, and thus we left them aside. Table 4 shows the number of bonds issued in each market, during this period. Eurobonds represent the bulk of total issuances. Bonds issued in the US institutional market rank as the second in importance, and grew markedly in 2014. The number of Global bonds is comparatively lower. Foreign bonds have become infrequent over these years.

[7] For instance, a Mexican firm issuing a bond in the US; in contrast, a firm domiciled in the US issuing a debt security in the US, is carrying out a US domestic placement. The popular distinction between domestic and international debt markets reflects the relationship between the residence of debt issuer and the market of issuance location. Following this convention, domestic debt issuances are placements by resident issuers in their home-countries.

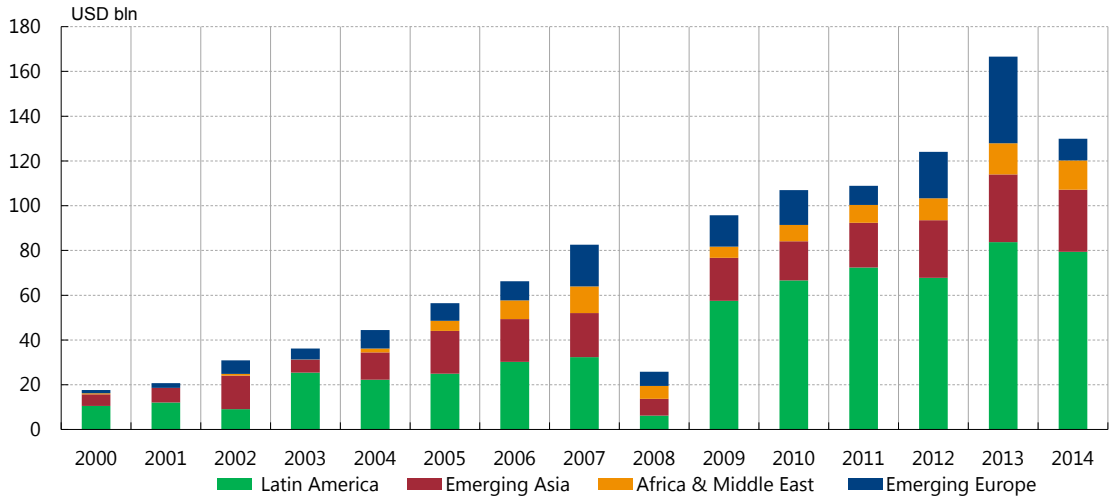
Table 4. Number of deals per year. Breakdown by market of issuance

	Total	Global Bond Markets	Foreign Bond Markets	US 144A Bond Market	EuroBond Market
2000	163	8	11	43	101
2001	179	6	4	31	138
2002	168	14	4	34	116
2003	175	20	4	51	100
2004	293	16	7	43	227
2005	434	20	7	60	347
2006	593	27	5	36	525
2007	386	15	4	15	352
2008	104	3	5	7	89
2009	196	17	4	39	136
2010	233	15	1	38	179
2011	206	17	10	22	157
2012	247	20	3	30	194
2013	327	29	7	45	246
2014	240	22	1	105	112
Total	3944	249	77	599	3019

Note: Foreign Bond Market include Samurai, Shogun, Yankee; and US Domestic placements of foreign affiliates of emerging economies firms which are guaranteed by their parent companies.

Chart 1 displays the total amount raised by firms of each region, and breaks it down by year. Latin-American firms have guaranteed debt-securities for an amount of more than 600 USD bn; Emerging Asian firms are second in importance, and have guaranteed 250 USD bn, while Emerging Europe and Africa & Middle East stand as third and fourth, with a total of 250 and 171 USD bn.

Chart 1. Debt-guaranteed by emerging economies firms. Breakdown by region.



Source: Bloomberg, own elaboration.
Note: breakdown by country of risk (nationality of the firm guaranteeing the debt-security).

3.2. Firm-year database

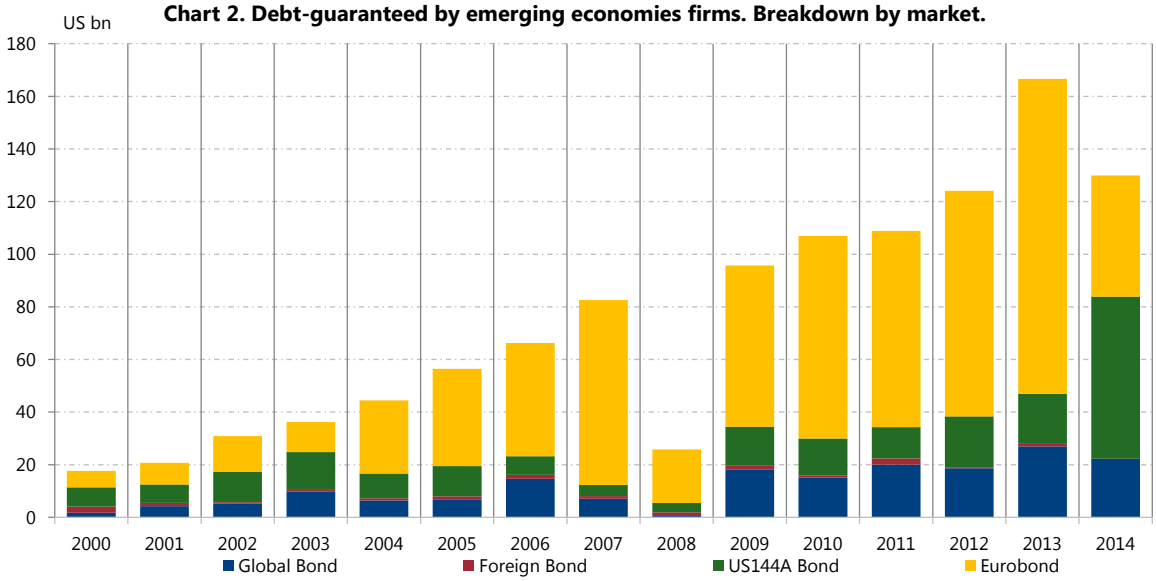
To carry out the analysis, we construct a firm-year database. This is important since some firms have medium term note (MTN) programs. This allows them issuing through shelf-registration; firms file a prospectus describing in general terms firms' funding plans, and define the specific conditions when carrying out bond issuances -in some cases through reverse enquiry (at demand of the investor). Overall, these firms tend to issue many bonds of small amounts; this makes convenient to carry out

analyses on a year basis. Otherwise there is a risk of overestimating the number of bonds issued, and underestimating its average size. Similar methodological decisions have been taken in previous research (Esho et al. (2001)).

Thus, for each firm, we map all the debt-securities issued in a given year into a single observation. If a firm issues only once, the annual observation coincides with the deal-level observation described in the previous sub-section. But if a firm issues several times in a given year, we need construct a single observation.

Once we have constructed a firm-level database, we classify firms according to the market in which they issue. We classify firms in three main groups: firms able to issue Global bonds, firms issuing in the US institutional (US144A) market, and firms issuing Eurobonds. We remove firms which switch between US institutional and the Eurobond market. Chart 2 shows the volume issued in each market. The volume issued in the Eurobond represents the bulk of the total; the amount issued in the US institutional market ranks second in importance; finally, the amount issued in the Global bond market is the smallest. These differences remain constant over time. Though, in 2014 there is a contraction in the relative importance of the Eurobond, and an increase in the US institutional market.

Chart 2. Debt-guaranteed by emerging economies firms. Breakdown by market.



Source: Bloomberg, own elaboration.

3.3. Identification method and summary of statistics

We use different variables to identify firms' ability to cope with flotation costs, asymmetries of information, and credit risks. They can be classified in two groups: firm-information; and variables related to the type of financial contracts that firms subscribe. We refer to them as financial contract characteristics. They include measures of the type of bonds issued, and are a valuable source of information of firms' credit quality, which reflects how lenders assess their risk.

We start describing the firm-information. We interpret that firms can comply more easily with the regulation required to issue a Global bond if they are larger, already file their financial accounts with a US GAAP or IFRS, and are cross-listed in the US through ADR. We consider that firms suffer more informational asymmetries if they have lower ratios of net fixed assets to total assets, their financial information is not familiar to international investors (for instance, report with a local GAAP), or have less coverage by international analysts (again, cross-listed in the US is a good proxy); informational asymmetries can also be signaled by rapid recent growth (average growth in firms' assets in the last five years).

Table 5. Firm-level variables. Descriptive statistics (median values).

	Firms with Access to Global Market	Firms Issuing only on US144A Market	Firms Issuing only on Eurobond Market
A. Firm-information			
Total Assets ($ mm)	11,620	4,295	936
Fixed Assets to Total Assets	0.58	0.46	0.38
Altman Score	1.93	1.82	1.92
Leverage	2.46	2.58	2.35
Return on Assets (%)	4.38	3.19	3.39
Current Ratio	1.34	1.29	1.36
Interest Coverage Ratio	3.47	2.88	2.55
Asset growth (5 years)	16.50	18.00	22.80
Local GAAP (%)	6%	20%	27%
US ADR (%)	48%	25%	13%
B.Financial contract characteristics			
Amount Issued ($ mm)	650	300	55
Maturity (years)	9.38	6.69	5.00
Sinking Fund (%)	4%	18%	6%
Convertible Rights (%)	6%	6%	29%
Call option (%)	32%	38%	15%
Put option (%)	3%	4%	35%
Rating (%)	86%	76%	34%
Bond Holder Rights (%)	9%	23%	33%

Source: Bloomberg, own elaboration.

As proxy of credit risk, we use the Altman score. We use as well firm-year variables constructed using the type of bonds which firms issue. The total amount issued is a proxy of ability to cope with regulatory costs –since flotation costs are typically mostly fixed, the relative cost decreases-. The average maturity of bonds indicates informational asymmetries; typically, investors will be willing to lend at longer tenors to more trustworthy firms. We construct a dummy variable indicating if the firm has issued at least a bond with rating: credit ratings indicate arms' length finance; they increase transparency only for firms with low informational asymmetries, otherwise a more direct engagement by lenders is required –and bonds are not rated. Finally, we construct dummies indicating if firms embed options to enhance the value of the bond for investors: sinking funds, put options, or convertible rights[8]. They all indicate that there is uncertainty surrounding a firms' value: attaching a sinking fund to a bond is conceptually similar to posting collateral, and signals credit risks; put options give bondholders the right to sell back the bond; and convertible rights allow lenders to convert bonds into equity, this way allowing them to gain equity-like returns.

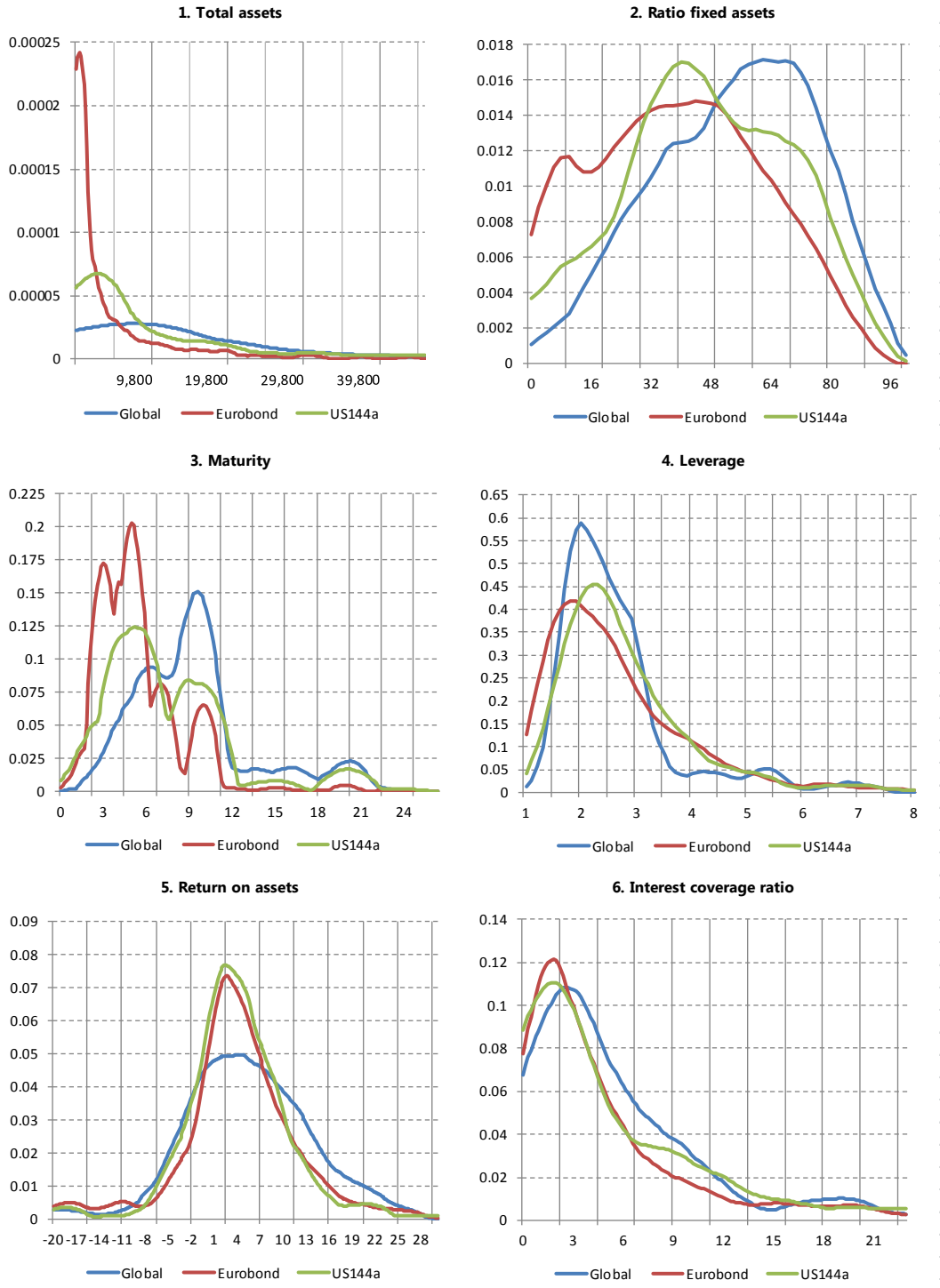
Table 5 shows descriptive statistics for firms active in each market. All variables shown are firm-specific. Typically, firms with access to the Global bond market are larger, and have less costs of complying with regulation: they rarely file their financial accounts with a local GAAP, and 48% of these firms are cross-listed in the US through ADR. They exhibit less informational asymmetries: on the top of the signals given by the two latter two variables, they have higher ratios of net fixed assets to total assets, issue at longer maturities, and rarely enhance bond holder rights. Most global bonds have a public rating. Interestingly, firms issuing in the US144A market rank second in all the variables. This is consistent with the predictions of theory, which suggests a ranking between the markets.

[8] Dummies take values 1 of all bonds contain the corresponding embedded option (sinking fund, convertible rights, put options). Bond holder rights take value 1 if all bonds include at least one of the embedded options. The proportion of firms issuing with call options is shown for comparison purposes –it is not a signal of informational asymmetries.

3.4. Empirical evidence

Chart 3 plots the density function of a number of variables for different types of firms: firms with access to global bond market; firms issuing debt only in the Eurobond market and firms issuing debt only in the US144A market.

Chart 3. Kernel density function estimation



Source: Bloomberg and own calculations.

Note: Global: firms with access to Global market. Eurobond: Firms only issuing Eurobonds. US144a: Firms only issuing US144a bonds. Charts show estimated kernel density functions for different periods. We use the "Epanechnikov" kernel function and the "optimal" window width (the one that minimizes the mean integrated square error). Robustness checks using different kernel functions and window widths show similar qualitative results. To control for the potential influence of outliers, we exclude observations in the 1% from upper and lower tails of the distribution.

Visual inspection suggests that firms with access to global bond markets are larger, have a better ratio of fixed assets to total assess and issue at longer maturities. These firms also have better interest coverage ratios and larger ROA. Firms issuing only in the Eurobond market are smaller and have lower ratio of fixed assets than those in the US144A market. Issuers of Global bonds tend to be more profitable (higher ROA), and have a better interest coverage ratio; while its median leverage its very similar, the distribution suggests tail risks are stronger in firms issuing in US 144A or Eurobond markets. In unreported results, we use tests for stochastic dominance which confirm that the distributions are different, and in accordance with theoretical predictions.

To investigate if these variables determine firms' choices, we estimate a multinomial logit model. The results –not reported- support that low ability to cope with the costs of complying with regulation, and informational asymmetries, make firms less likely to issue in the global bond market. Firms issuing in the Eurobond market are, compared to firms issuing in the US144 market, less likely to be cross-listed in the US through ADR, and are comparatively more opaque; this suggests they exhibit higher asymmetries of information, and might find binding the requirements of the Rule 144A[9]. To gauge the importance of the results, in table 6 we report the average marginal effects computed with the estimated parameters, of one standard deviation in the continuous variables, and one unit change in the binary variables.

Table 6. Average Marginal Effects

	Global	US 144A	Eurobond
Total Assets	3.15%	1.60%	-4.74%
	0.05	0.29	0.01
Term	2.24%	1.30%	-3.54%
	0.00	0.22	0.01
Local GAAP	-5.35%	3.26%	2.09%
	0.00	0.26	0.49
ADR	4.37%	1.23%	-5.61%
	0.00	0.60	0.03
MOVE Index	1.22%	1.89%	-3.11%
	0.20	0.11	0.02
Rated Security	7.19%	13.78%	-20.97%
	0.00	0.00	0.00
Bond Holder Right	-5.25%	5.54%	-0.29%
	0.01	0.10	0.94
Market Based	-4.07%	1.83%	2.24%
	0.02	0.44	0.42
Fixed Assets to Total Assets	0.65%	-0.09%	-0.57%
	0.48	0.94	0.66
Altman score <1.21	2.09%	8.51%	-10.60%
	0.33	0.01	0.00
Baseline Values	8.05%	14.67%	77.28%

Note: marginal effects computed on binary changes in categorical variables; and one-standard deviation in continuous variables.p-values of the test change is 0 reported below the marginal effects. We compute the Altman score for private companies; in the analysis we use a dummy taking value 1 if it is in the distress zone (below 1.23). Market based is a dummy taking value 1 for years after 2009 (post-crisis period). MOVE index shows the average value of the index in the 20 days before the issuace.

An increase in total assets increases the chances of issuing in the global bond market (+3 pp), relative, in particular, to the Eurobond market (-4.7 pp). Firms cross listed in the US, and reporting with US GAAP or equivalent, are 4 and 5 pp more likely to issue in the Global bond market. We find as well that if firms do not rated their bonds, the chances that they issue in the Eurobond market increases substantially (+20 pp), relative to the other two markets (where chances of issuing in the Global and US144A markets decrease in 7 and 13 pp , respectively).

[9] This is consistent with anecdotal evidence among firms issuing corporate infrastructure bonds (see Ehlers,T., F. Packer, and E. Remolona (2014))

After the crisis, the chances of issuing in the Global market have decreased (-4 pp), relative to the US144A or Eurobond market. Finally, it is worth mentioning that having an Altman score in the distress zone (i.e., below 1.23, the threshold suggested) increases the chances of issuing in the Eurobond market.

Overall, results suggest that firms issuing global bonds can cope better with demanding regulatory requirements, and are less opaque. Firms issuing in the Eurobond are set apart from issuers in US institutional market by their lack of US footprint, and opacity; though, the Altman score suggests their balance-sheets are sounder.

4. Conclusions

The transition towards market-based finance is one of the current defining features of the global financial system. The new statistics on debt securities have highlighted a number of features of the process, and opening relevant questions.

In this paper we have used matched firm-bond level data to investigate a specific issue: the credit risks of firms borrowing in international bond markets. We find that there is a bifurcation bifurcation in bond markets by credit quality. Larger and less opaque firms issue in the Global bond market. Issuers in the US 144A are comparatively smaller and less likely to prepare their financial accounts with accounting principles different from IFRS or US GAAP. Compared to the latter, issuers in the Eurobond market have less US footprint, and more opaque. This is underscored by the low proportion of these firms which are cross-listed with ADR in the US. The low proportion of firms which rates their bonds underscores these firms are less amenable to arms' length financing, suggesting higher informational asymmetries.

Overall, the analysis underscores the interest in using microeconomic data to zoom into topics of specific interest. Matching firm data with information on their funding patterns is helpful to understand real-side implications of financing patterns.

References

1. Avdjiev, S., R. McCauley, and H. Shin (2015), "Breaking free of the triple coincidence in international finance" , *BIS Working Paper No 524*
2. Ayala, D., M. Nedeljkovi, and C. Saborowski (2015), "What Slice of the Pie? The Corporate Bond Market Boom in Emerging Economies", *IMF Working Paper n°xxx*
3. BIS-ECB-IMF (2015), *"Handbook of Securities Statistics"* IMF
4. Bruno, V. and H. Shin, "Global dollar credit and carry trades: a firm-level analysis", *BIS Working Paper No 510*
5. Chaplinsky, S. and L. Ramchand (2004), "The Impact of SEC Rule 144A on Corporate Debt Issuance by International Firms", *the Journal of Business, vol 77. No°4*
6. Denis, D. and V. Mihov (2003), "The choice among bank-debt, non-bank private debt, and public debt: evidence from new corporate borrowing", *Journal of Financial Economics 70 (2003) 3-28*
7. Ehlers,T., F. Packer, and E. Remolona (2014), "Infrastructure and Corporate Bond Markets in Asia" C*onference volume of the 2014 RBA Annual Conference on "Financial Flows and Infrastructure Financing*", July.
8. Esho, N., Y.Lam, and G. Sharpe (2001), "Choice of Financing Source in International Debt Markets", *Journal of Financial Intermediation 10 276-305*

9. Fenn, G.W (2000), "Speed of issuance and the adequacy of disclosure in the 144A high-yield debt market", *Journal of Financial Economics 56*

10. Feyen, E., S. Gosh, K. Kibuuka, S. Farazi, (2015) "Global Liquidity and External Bond Issuance in Emerging Economies and Developing Economies", *mimeo*

11. Fuertes, A. and J.M. Serena (2014), "Firms financial soundness and access to capital markets", *Financial Stability Review Banco de España nº 27*

12. Fuertes, A. and J.M. Serena, "How firms borrow in international bond markets: securities regulation and distribution of credit risks", mimeo

13. Gao, Y. (2011), "The Sarbanes-Oxley Act and the Choice of Bond Market by Foreign Firms", *Journal of Accounting Research vol 49*

14. Gomes, A. and G. Phillips (2012), "Why do public firms issue private and public securities?" *Journal of Financial Intermediation 21*

15. Gruic, B., C. Upper, A. Villar, "What does the sectoral classification of offshore affiliates tell us about risks?", *Box 1, BIS Quarterly Review, December 2014*

16. IMF (2015*), "GFSR-Vulnerabilities, Legacies, and Policy Challenges Risks Rotating to Emerging Markets"*, October 2015

17. Lo Duca, M., G. Nicoletti, and A. Vidal Martinez (2014), *"Global bond corporate issuance: What role for US quantitative easing?" ECB Working Paper N1 1649 March 2014*

18. McCauley, R., C. Upper, and A.Villar (2013), "Emerging market debt securities issuance in offshore centres", *Box 2, BIS* Quarterly Review, September 2013

19. Miller, D. and J. J. Puthenpurackal (2002), "The Costs, Wealth Effects, and Determinants of International Capital Raising: Evidence from Public Yankee Bonds", *Journal of Financial Intermediation 11*

20. Resnick, B. (2012), "Investor yield and gross underwriting spread comparisons among US dollar domestic, Yankee, Eurobond, and global bonds", *Journal of International Money and Finance 31*

21. Shin, H. (2013), "The Second Phase of Global Liquidity and its Impact on Emerging Economies" Keynote address at the Federal Reserve Bank of San Francisco Asia Economic Policy Conference

Irving Fisher Committee on
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BANK FOR INTERNATIONAL SETTLEMENTS

IFC workshop on *"Combining micro and macro statistical data for financial stability analysis. Experiences, opportunities and challenges"*

Warsaw, Poland, 14-15 December 2015

Insights from matched firm-bond level data – Market of issuance and credit quality[1]

Alberto Fuertes and Jose Maria Serena, Bank of Spain

[1] This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS or the central banks and other institutions represented at the meeting.

Insights from matched firm-bond level data: Market of issuance and credit quality

Alberto Fuertes (Banco de España)

José María Serena (Banco de España)

WARSAW, 15 DECEMBER 2015

*THIS PRESENTATION IS THE EXCLUSIVE RESPONSIBILITY OF THE AUTHOR AND DOES NOT NECESSARILY REFLECT THE OPINION OF BANCO DE ESPAÑA, OR THE EUROSYSTEM.

OUTLINE

I. MOTIVATION

II. DATA AND CONSOLIDATED ANALYSIS

III. SECURITIES REGULATION AND DEBT CHOICE

MOTIVATION

- International markets transition towards market-based financing. Financial disintermediation and search for yield stand as drivers.

- Most studies use aggregate data that only include information about bond characteristics from sources such as Dealogic or SDC Platinum New Issues Database from Thomson Reuters (amount issued, coupon, maturity, currency…).

- BIS debt securities statistics provides comprehensive aggregate data.

- Some studies also use balance-sheet data, mainly from S&P Capital IQ or Worldscope.

- We construct a comprehensive data set for bonds guaranteed by EM firms and balance-sheet characteristics of the issuers using Bloomberg to analyze potential vulnerabilities of the corporate sector.

DATA

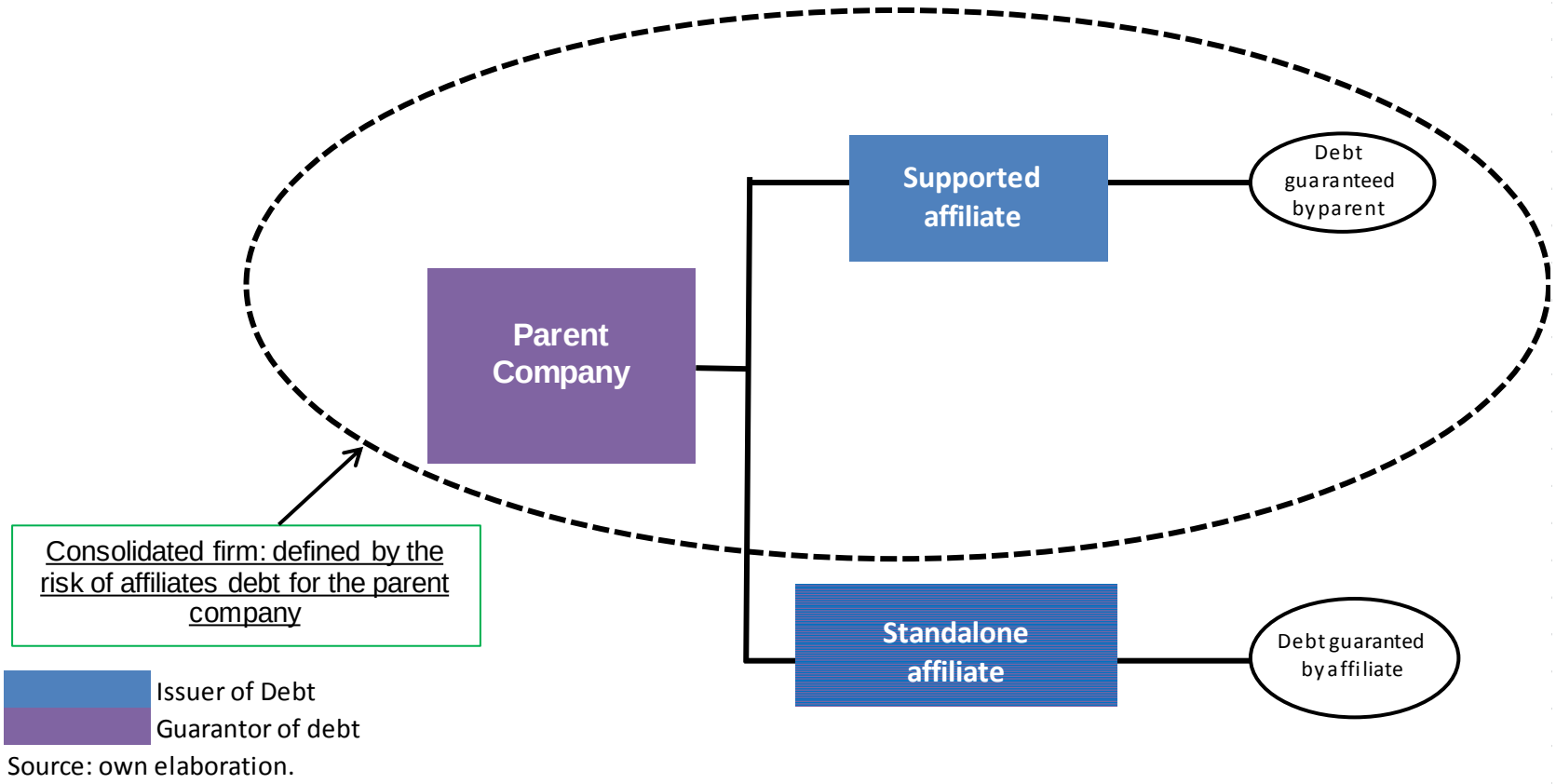
- Bond level information: 3,943 bonds issued in 2000-2014, guaranteed by 1,585 EM firms, from 36 countries (exc. China). 1.2 USD trn, overwhelmingly in hard currency. We construct the data base using Bloomberg.

- Balance-sheet information: match bond CUSIP with ticker of fundamental company, firm liable in case of distress.

- We conduct analysis with firm-year observations (to prevent biases of MTNs).

DATA

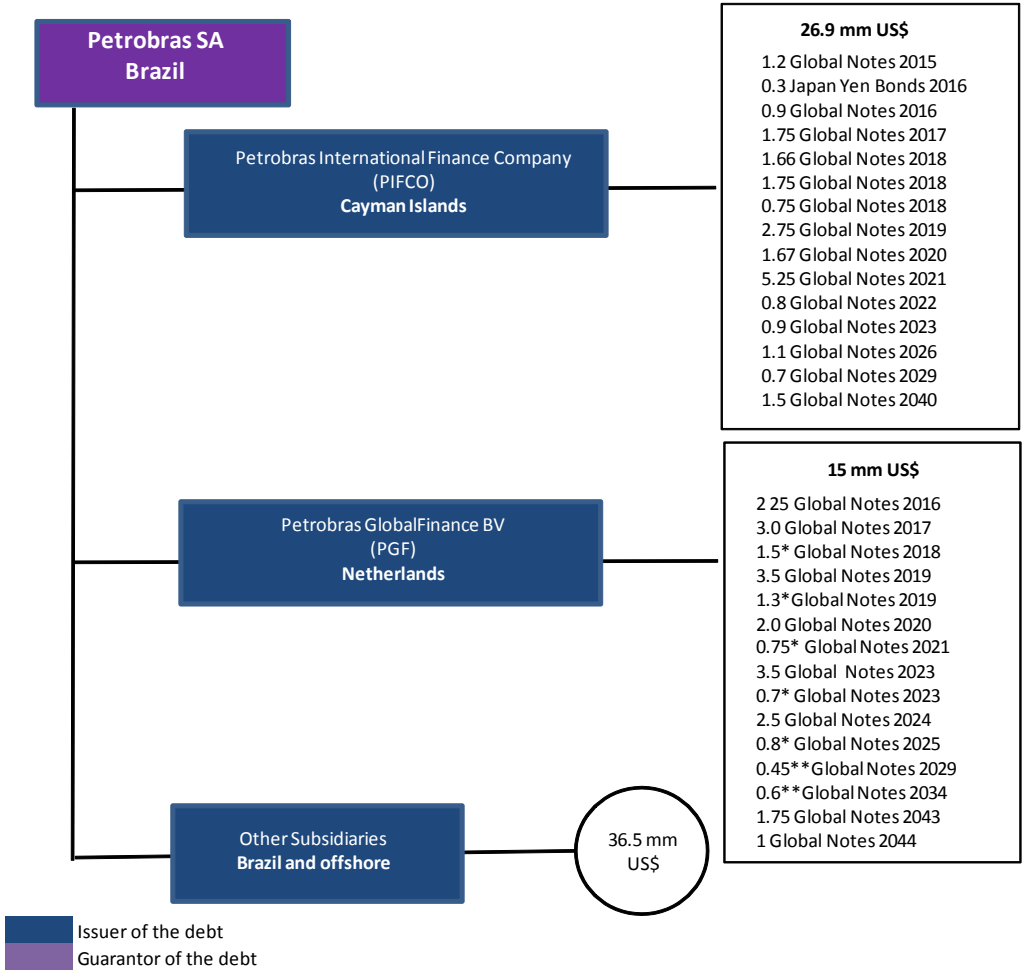
- Non-financial corporations as consolidated entities. Defining boundaries by firms 'guarantees on their affiliates debt.



Source: own elaboration.

DATA

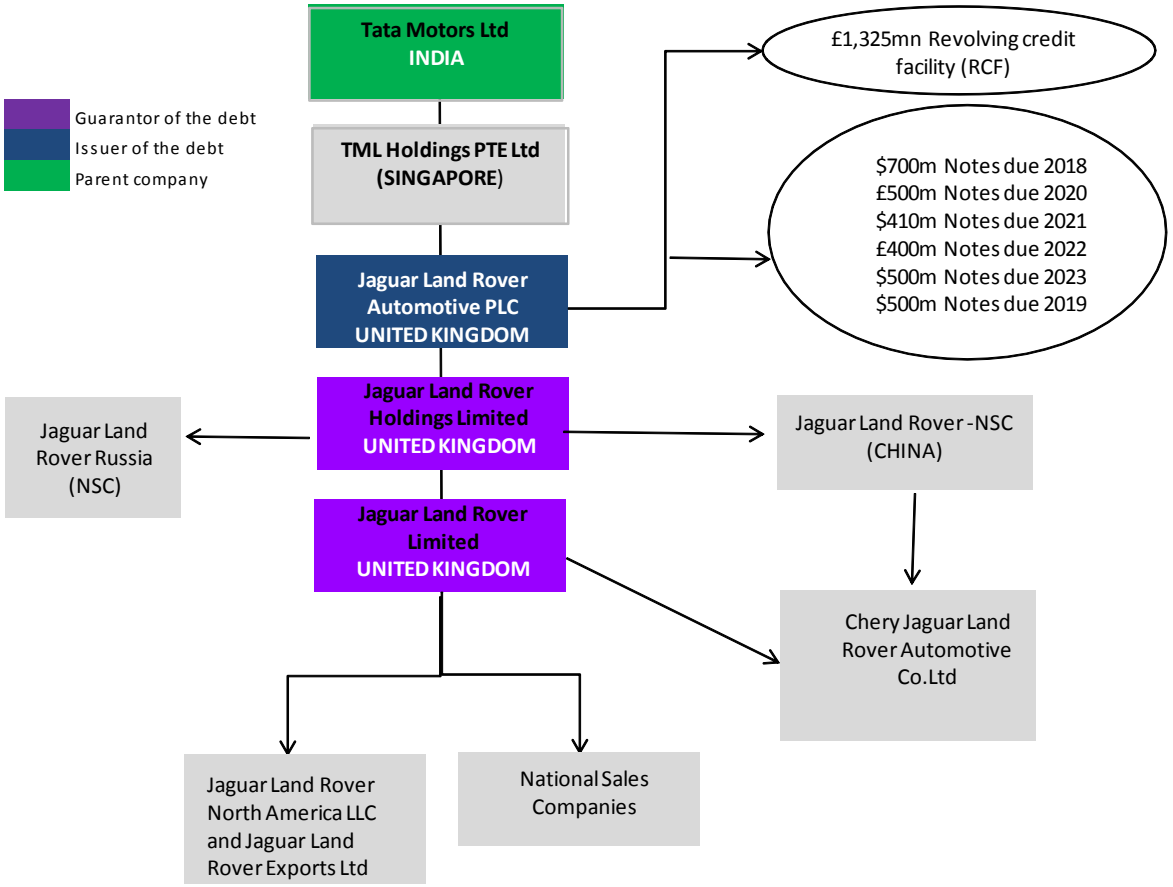
- Dependent affiliates: Organizational structure of Petrobras.



Source: Bloomberg, Standard&Poors, Fitch Ratings, Petrobras annual report 2013, own elaboration.
Note: the chart shows only outstanding debt (not loans).

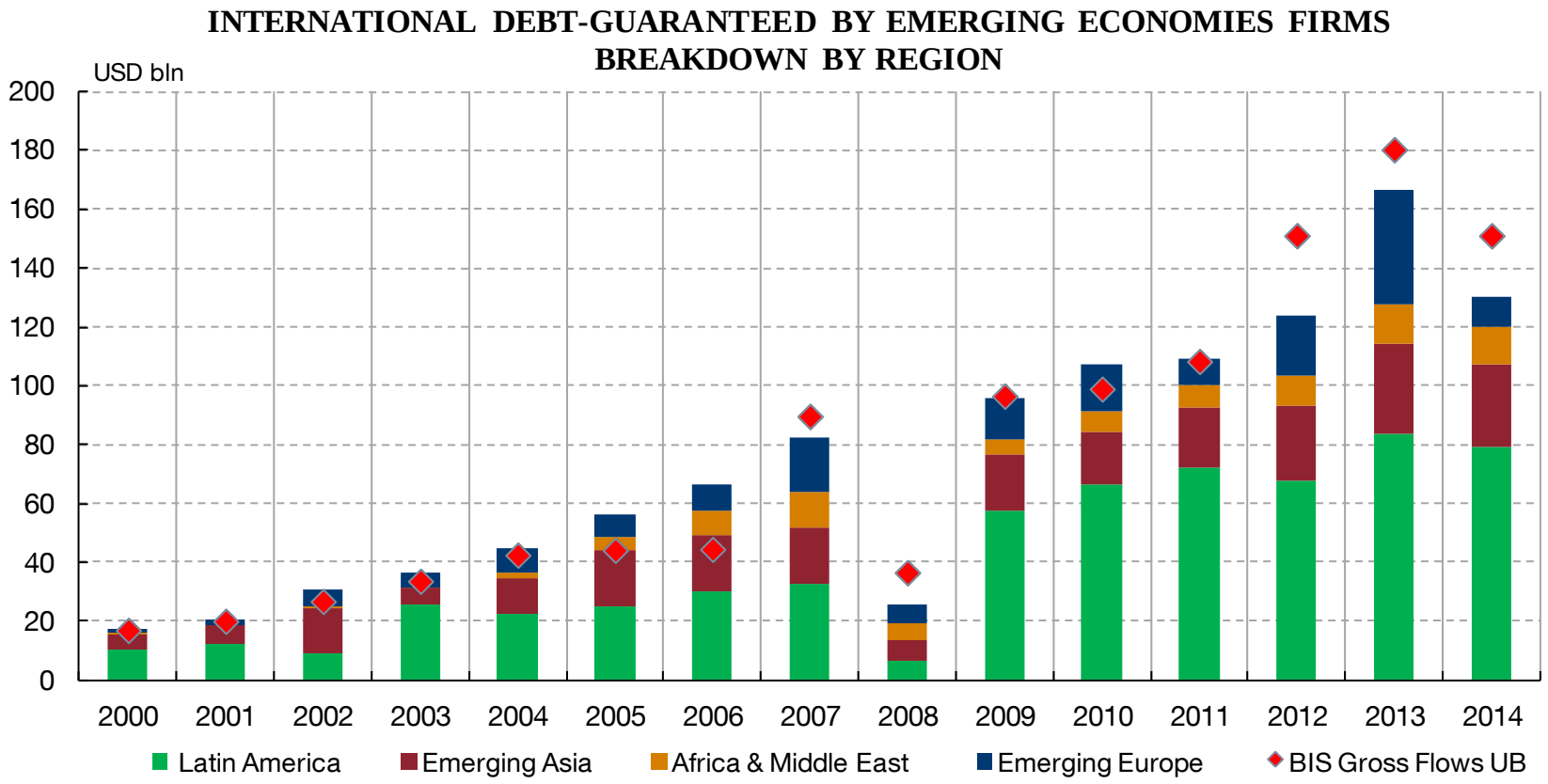
DATA

- Firms have independent affiliates, typically large –non-random distribution.



Source: Jaguar Land Rover Overview, November 2014; own elaboration.

DATA



Source: Bloomberg, own elaboration.

DATA

- Fuertes and Serena (2014) find that NFCs from EMEs do not show worst financial conditions that in the past and they access capital markets with better conditions.

- They also find that the credit risk distribution among issuers is heterogeneous, identifying “pockets of risk”.

SOURCE: Bloomberg, own elaboration.

SECURITIES REGULATION AND FIRMS 'BOND MARKET CHOICE

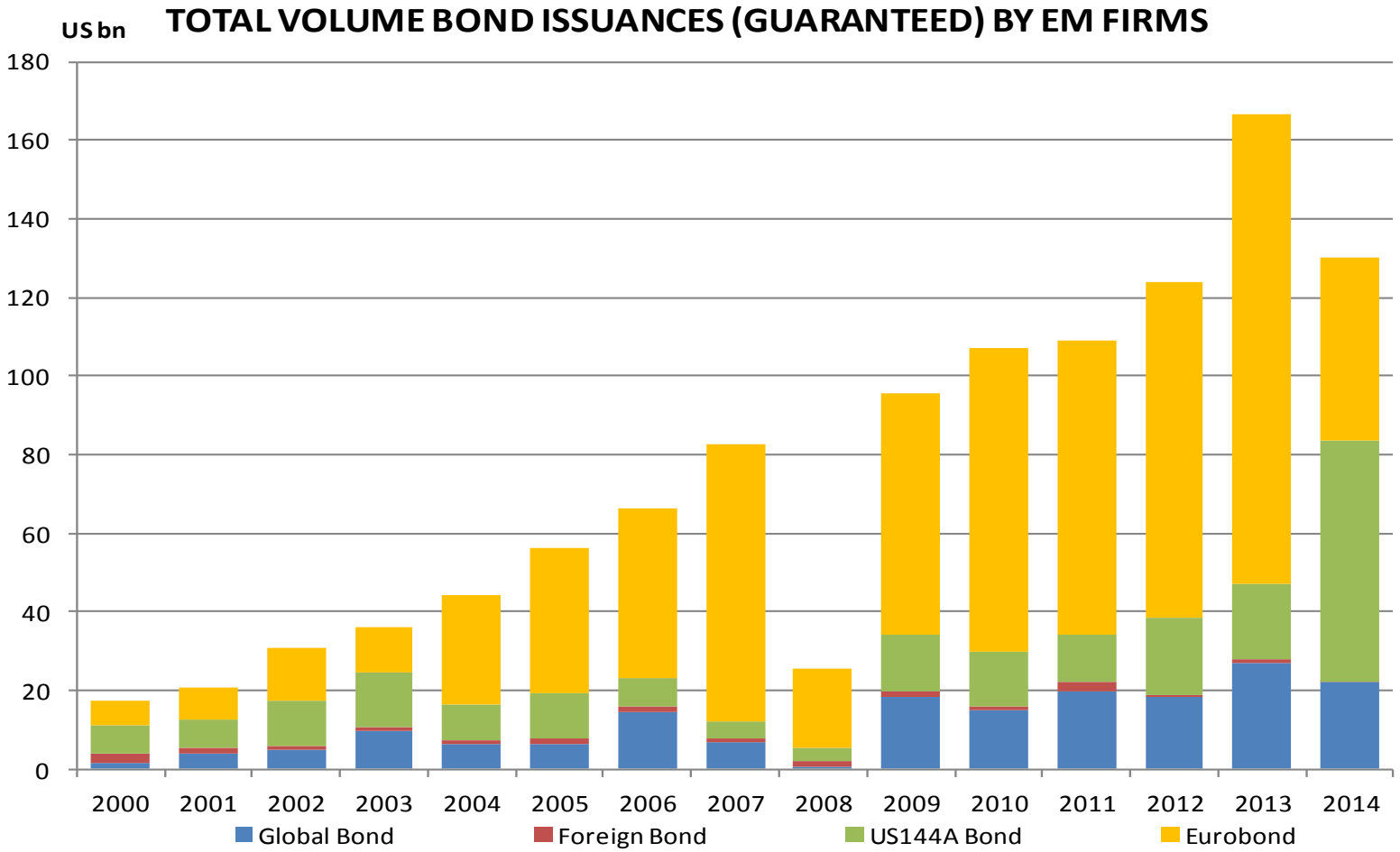
- Firms have a menu of options, conditional on their decision to issue a bond overseas :

Type of International Market	Description	Type of Regulation
US Institutional [US144A]	US private placement, with Rule 144A rights: trade in the secondary among QIBs.	Mild: partial disclosure of financial information, uncertain quality.
Eurobond	ICMA-exempted from Prospectus Directive	Low: no material requirements of financial disclosure
Global	Simultaneous issuance in two markets,at least a local one; enchances liquidity, but assuming US tranche, fully-subject to SEC regulation	High: ongoing disclosure of high-quality financial information

Note: foreign bonds are left aside; they are rare in the sample under analysis.

- Compliance with regulation has a widespread benefit –liquidity. Its costs are mostly firm-specific.

SECURITIES REGULATION AND FIRMS 'BOND MARKET CHOICE



SECURITIES REGULATION AND FIRMS 'BOND MARKET CHOICE

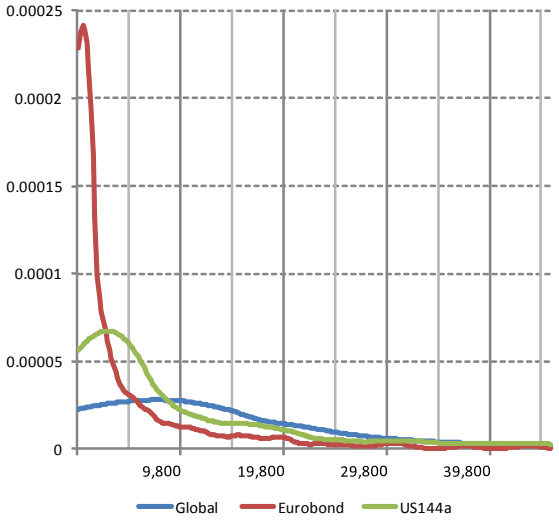
- Univariate analyses -kernel, tests equality distributions, stochastic dominance- show statistical difference and ranking.

Descriptive statistics (median values)

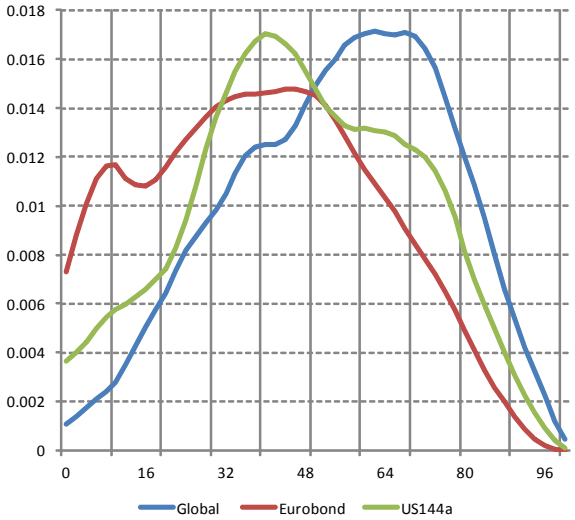
	Global	US144A	Eurobond
A. Firm-level information			
Total Assets ($ mm)	11,620	4,295	936
Fixed Assets to Total Assets	58%	46%	38%
Altman Score	1.93	1.82	1.92
Leverage	2.46	2.58	2.35
Return on Assets (%)	4.38	3.19	3.39
Current Ratio	1.34	1.29	1.36
Interest Coverage Ratio	3.47	2.88	2.55
Local GAAP (%)	6%	20%	27%
US ADR (%)	48%	25%	13%
Number observations	110	193	1251
B.Firms' financing conditions (in a given year)			
Amount Issued ($ mm)	650	300	55
Maturity (years)	9.38	6.69	5.00
Bond Holder Rights (%)	9%	23%	33%
Sinking Fund (%)	4%	18%	6%
Convertible Rights (%)	6%	6%	29%
Call option (%)	32%	38%	15%
Put option (%)	3%	4%	35%
Rating (%)	86%	76%	34%
Number observations	142	311	2163

SECURITIES REGULATION AND FIRMS 'BOND MARKET CHOICE

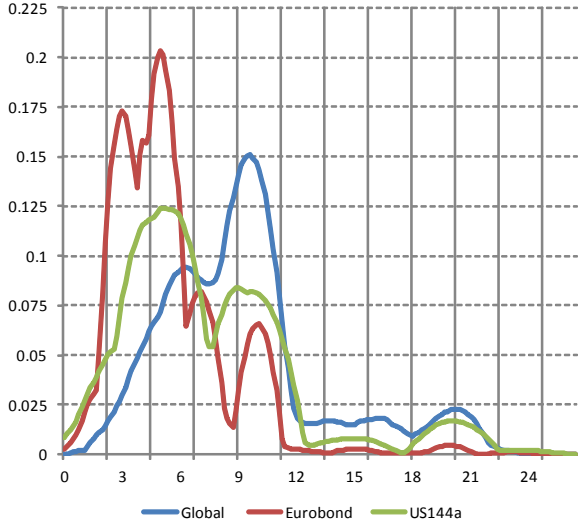
1. Total assets



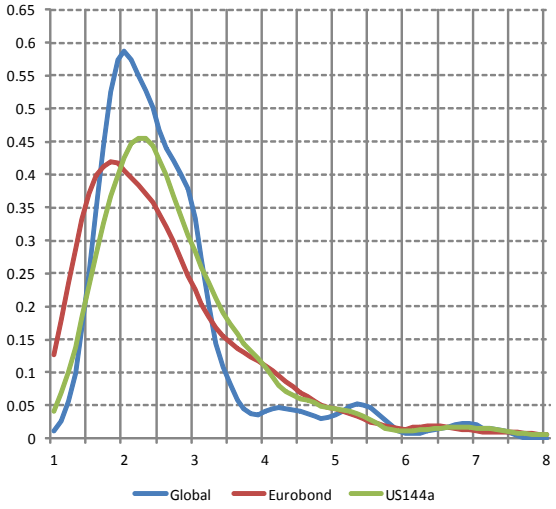
2. Ratio fixed assets



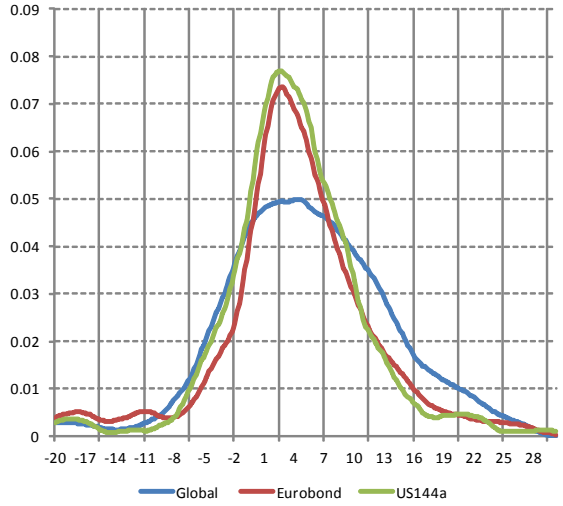
3. Maturity



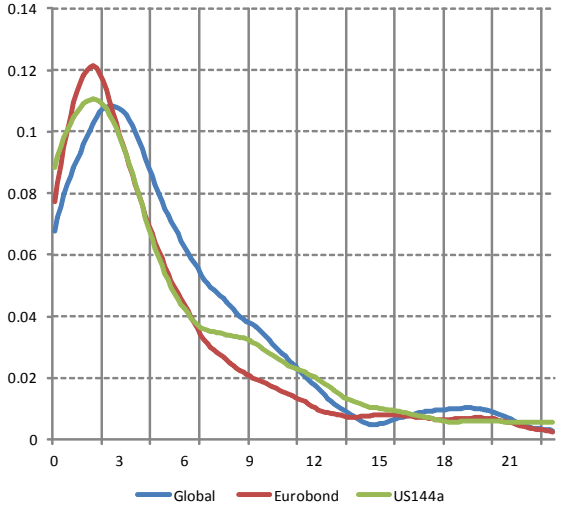
4. Leverage



5. Return on assets



6. Interest coverage ratio



SECURITIES REGULATION AND FIRMS 'BOND MARKET CHOICE

Multinomial Logit. Odd Ratios. Base outcome is access to global

	No Balancee-Sheet Data		Balancee-Sheet Data	
	US144A	Eurobond	US144A	Eurobond
Amount Issued (1) / Total Assets (2)	1.082	0.742***	0.794**	0.794**
	[0.112]	[0.070]	[0.086]	[0.079]
Term	0.945***	0.925***	0.953**	0.927***
	[0.015]	[0.015]	[0.020]	[0.021]
Local GAAP	3.375***	3.144***	3.323**	2.867**
	[1.388]	[1.206]	[1.603]	[1.297]
ADR	0.410***	0.408***	0.591*	0.489***
	[0.103]	[0.094]	[0.164]	[0.119]
MOVE Index	0.996	0.988***	0.998	0.990*
	[0.004]	[0.004]	[0.006]	[0.006]
Rated Security	0.824	0.311***	0.477	0.148***
	[0.324]	[0.109]	[0.273]	[0.077]
Bond Holder Right	2.325**	1.682	3.776**	2.845*
	[0.813]	[0.543]	[2.318]	[1.679]
No Financial Info	1.143	1.098		
	[0.296]	[0.264]		
Market Based	1.633*	1.553*	1.794*	1.816**
	[0.412]	[0.365]	[0.567]	[0.534]
Fixed Assets/Total Assets			0.996	0.996
			[0.007]	[0.006]
Altman score <1.21			1.264	0.589*
			[0.420]	[0.184]
Observations	2,579	2,579	1,193	1,193

Note: no time dummies, includes constat (not reported). Robust standard errors in brackets*** p<0.01, ** p<0.05, * p<0.1

THANK YOU

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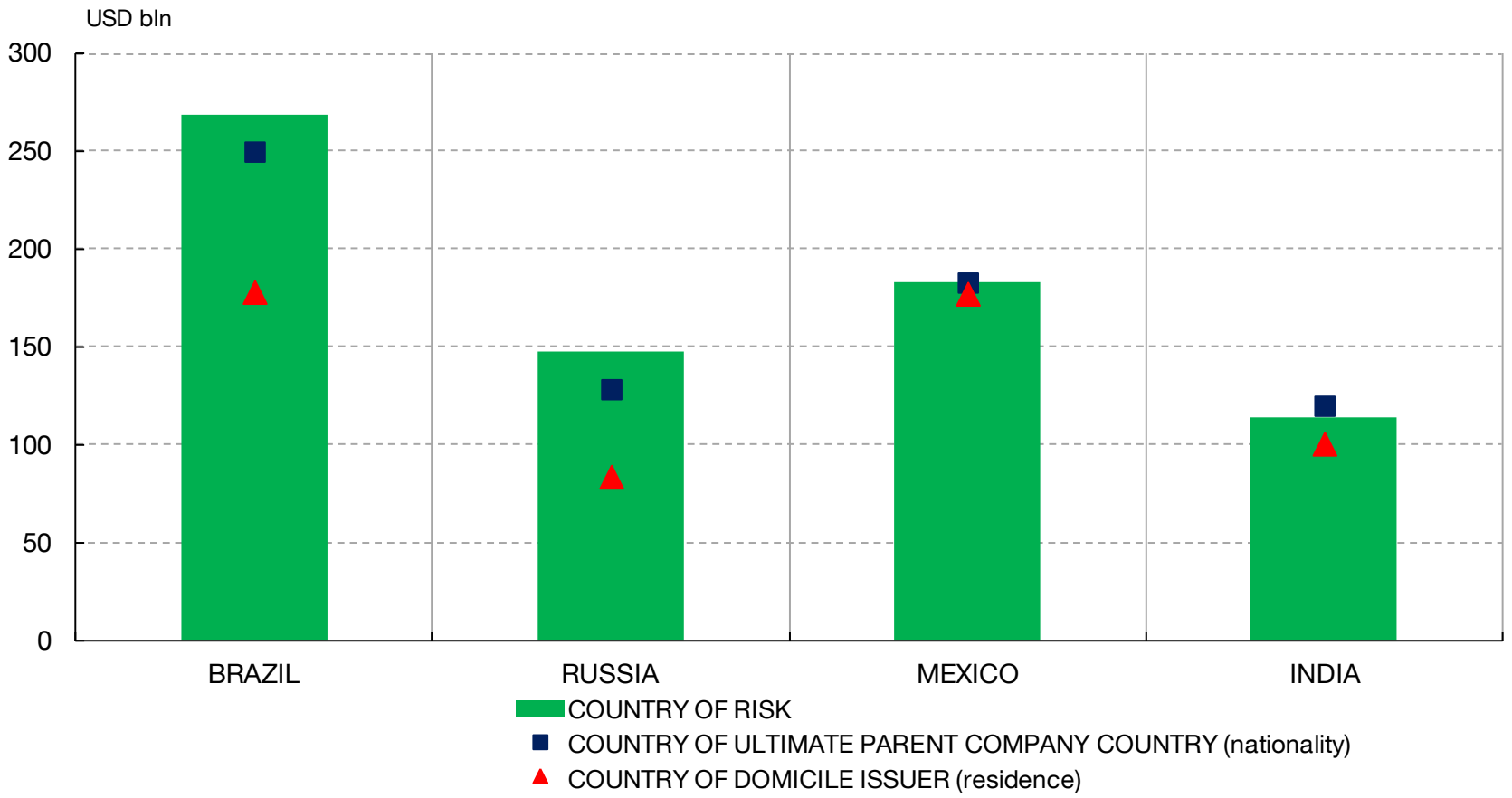
INTERNATIONAL AFFAIRS

APPENDIX

- Different metrics of international debt issuances: by country.



Source: Bloomberg, own elaboration.

APPENDIX

- International debt securities issuances by offshore financial vehicles.

EXAMPLES OF BONDS ISSUED BY FINANCIAL SPECIAL PURPOSE VEHICLES

Company Name	Parent Company	Country of Incorporation	Country of Risk	CUSIP	Amount (USD bln)
Petrobras Global Finance BV	PETROBRAS - PETROLEO BRAS-PR	Netherlands	Brazil	71647NAF6	3.5
Lukoil International Finance BV	LUKOIL OAO	Netherlands	Russia	EJ6431419	1.5
Gazprom Neft OAO Via GPN Capital SA	GAZPROM NEFT OAO-CLS	Luxemburg	Russia	EJ9515473	1.5
Russian Railways via RZD Capital PLC	RUSSIAN RAILWAYS JSC	Ireland	Russia	EJ6158582	1.3
AngloGold Ashanti Holdings PLC	ANGLOGOLD ASHANTI LTD	Isle of Man	South Africa	03512TAD3	1.3
Metalloinvest Finance Ltd	METALLOINVEST HOLDING CO OAO	Ireland	Russia	EJ8456547	1.0
SABIC Capital II BV	SAUDI BASIC INDUSTRIES CORP	Netherland	Saudi Arabia	EJ8456547	1.0

SOURCE: Bloomberg

APPENDIX

BONDS ISSUED BY AFFILIATES AND NOT GUARANTEED BY PARANT COMPANIES

Company Name	Parent Company	Country of Incorporation/Country of Risk	Country of Ultimate Parent Company	CUSIP	Amount (US bn)
Jaguar Land Rover Automotive PLC	Tata Motors Ltd.	United Kingdom	India	EK0498676	0.65
Novelis Inc.	Hindalco Industries	United States	India	67000XAL0	1.1
Rain CII Carbon LLC /CII Carbon Corp.	Rain Industries Ltd.	United States	India	EJ4718106	0.4
Moy Park Bondco PLC	Marfrig Global Food	United Kingdom	Brazil	EK2879899	0.33
Springs Industries Inc.	Cia de Tecidos do Norte de Minas	United States	Brazil	851783AB6	0.47
WPE International Cooperatief UA	Venti SA	Brazil	Luxembourg	92935NAA4	0.39
Pilgrim's Pride Corp.	JBS SA	United States	Brazil	72147KAB4	0.49

Source: Bloomberg, own elaboration.