Brazilian Corporate Debt Issuance: Should One Invest In Local Or International Bonds?*

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Abstract

The goal of this study is to analyze the yield difference between corporate debt issuance of Brazilian companies in local and foreign markets. From the perspective of the investor, we attempt to answer whether it is better, on average, to acquire a local debenture or an international bond from the same issuer after controlling for risk. To this end, we examine 177 local and 119 international bond issuances of 31 Brazilian non-financial companies from January 2004 to April 2013. Panel regressions with fixed effects to control for the issuer's characteristics show that, on average, international bonds yield 164 to 197 bps more than local debentures, and that this difference is statistically significant.

Keywords: Corporate bonds, Credit markets, Issuance costs, Offshore.

JEL Codes: G11, G12, G15.

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1. Introduction

The Brazilian corporate debt market has shown marked growth in previous years, both in volume and number of issuances. Data from ANBIMA show average annual growth of 18.31% in the financial volume of private issuances between 1995 and 2009. Some of the reasons for this growth include a higher number of issuers in the market, economic growth and greater sophistication of the economic agents. In this aspect, we can see that there was a change in how Brazilian corporations are financed. In the past they usually borrowed directly from banks and have started to rely more heavily on capital markets since 2009.

A company has basically two options for debt financing using the capital market: issuing local debentures or international bonds. The criteria used for this decision is usually tied to the issuing cost and to the potential appetite of investors for the debt characteristics. In general, an international bond is usually the best choice when the company seeks to lengthen their debt profile. According to Leal and Silva's (2008) survey of 30 corporations, the international bond market offers more long term financing. However, more recently, there has been a gradual lengthening of the local debt market profile. This means that many corporations no longer have to turn to a foreign issuance to lengthen the debt maturity.

The objective of this study is to understand if it is better to invest in local or international bonds. That is to say, contrary to most of the literature on the topic, we are not concerned with the issuer's point of view, but that of the investor. Before discussing how we answer this specific question, it is paramount to describe the main characteristics of the corporate debt issuance in Brazil and abroad.

As for issuances of non-financial corporations, there are two main instruments used in the local market. Commercial papers are short term instruments (usually with maturity of less than a year), whereas debentures have a longer maturity. The local market has also seen a popularization of the so-called "structured operations", in which receivables are securitized, as in the case of Certificates of Real Estate Receivables (CRI) and the Certificates of Agribusiness Receivables (CRA). Alternatively, companies can assign credit rights using, for example, the Receivables Investment Fund (FIDC). In the international market, both financial and non-financial institutions usually issue bonds.

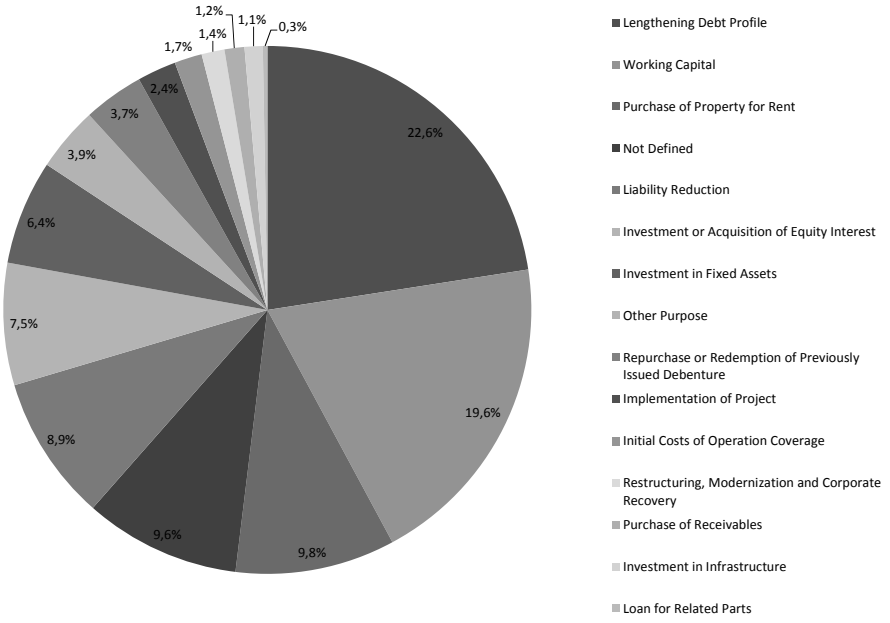
AMBIMA defines debentures as "fixed income securities that can be issued by private or public corporations". The actual use of this instrument began in 1976, after the Corporation Act (Lei das Sociedades Anônimas), under the regulation of CVM. The instrument became popular after 1987, when ANBIMA created the National Debentures System, making the existence of a secondary market possible. However, the economic instability at that time impaired the evolution of this market. With the implementation of Plano Real and the corresponding improvement of the economy, the debenture market finally took off.

The main advantage of using debentures for financing is flexibility. The issuances characteristics – maturity of each series, guarantees, interest payment flow

and amortization – can be tailored to suit the needs of each corporation. The cost reduction is another important advantage. Because they are predominantly long term securities, the debentures have lower funding costs when compared to short term bank loans. Clauses about renegotiation, profit sharing and convertibility to shares help reduce the issuing costs.

Regarding capital structure, when compared to the issuing of shares, the advantage of the debentures is that interest payments are deductible as a financial expense in the annual report in stark contrast to dividends. Additionally, the issuing of debentures makes financing possible without changes to the control of the corporation, as long as they are not convertible. In regard to the use of resources, the lengthening of the debt profile is, as expected, the greatest argument in favor of issuing debentures, followed by the composition of working capital and the acquisition of assets for leasing. Figure 1 displays the main uses of the resources from debentures.

Figure 1
Main uses of resources obtained through the issuing of debentures – Percentages of total



Apart from leasing issuers, debentures are most commonly used by the electricity, information technology and telecommunication sectors (see Figure 2 for more details).

Figure 2
Participation in percentage of each sector in the total of debentures issuances

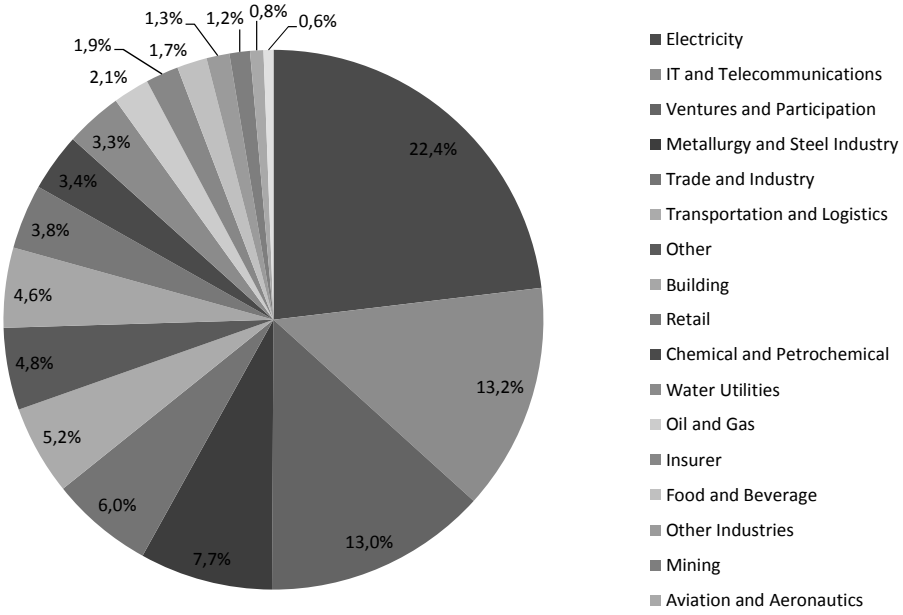
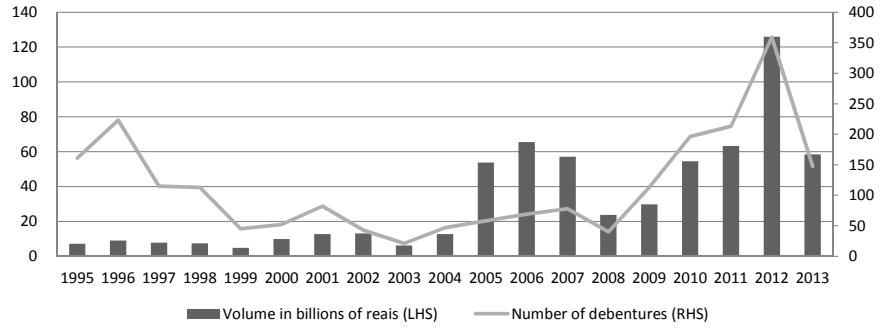


Figure 3 presents the evolution of the debentures market in Brazil since 1995. Figure 4 shows a comparison of the evolution in the volume of issuance of the main securities since 2009. The participation of debentures in the total volume of bonds issued saw enormous growth as from 2010 due mainly to the CVM 476 instruction in 2009. Among other benefits, this instruction allows companies to issue public debentures and commercial papers more easily, though it restricts the initial offering to a maximum of 50 potential qualified investors. The premise of CVM is that qualified investors have enough knowledge to understand and measure the risks involved in the operation. The instruction CVM 476 made the process of issuing of debentures, previously regulated by instruction CVM 400, less bureaucratic, removing even the need for credit classification and of registering the issuer at CVM. These changes meant that unlisted companies could now be eligible for these loan certificates.

Figure 3
Volume of debentures issued in billions of reais and number of issuances from 1995 to 2013 (until July)



To understand the importance of this law, Table 1 documents the substantial increase in the percentage of issuances regulated by instruction CVM 476 over the years. It is nonetheless important to highlight that the instruction CVM 476 had also negative consequences for this market. It aggravates to some extent liquidity issues, since debentures tend to be concentrated on the hands of a small number of investors.

In the international market, bonds are a rather common practice in the financing of local or international companies. The main debt instruments are the *Eurobonds*, *foreign bonds* and *global bonds*. The *Eurobonds* are bonds issued in a currency other than the one from the country where they are issued. These bonds are underwritten by an international bank consortium and are distributed in several countries. For example, a Brazilian company issuance of debt securities denominated in US dollars to be traded in Europe and Asia. Such bonds follow no

Figure 4
Volume of the main securities in billions of reais and the participation of debentures in the total volume issued from 2009 to 2013 (until September)

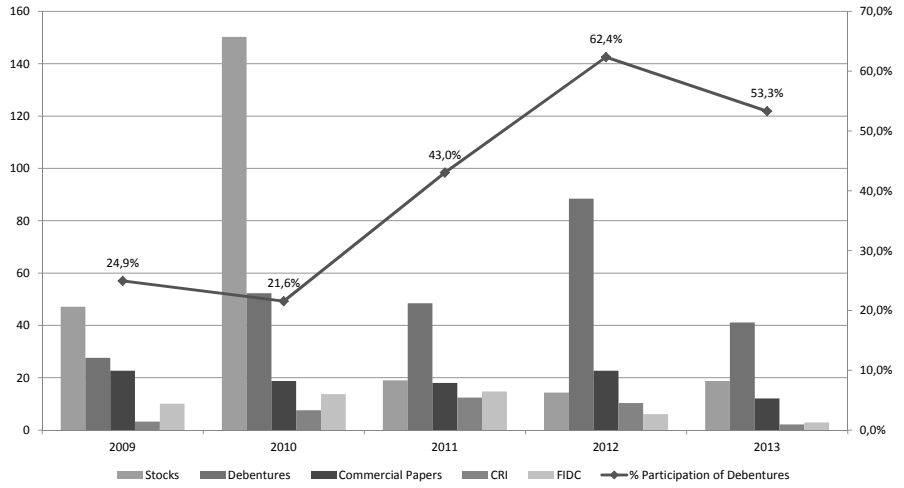


Table 1
Participation of debentures issued under instruction CVM 476 in the total from 2009 to 2013 (until July)

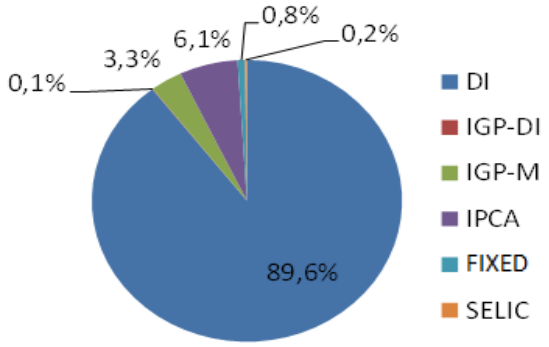
Year	CVM 400 (R$ bi)	% CVM 400	CVM 476 (R$ bi)	% CVM 476
2009	15,5	51,8%	14,4	48,2%
2010	15,8	28,9%	38,8	71,1%
2011	3,3	5,2%	60,0	94,8%
2012	49,1	39,0%	76,8	61,0%
2013*	7,9	13,5%	50,5	86,5%
Total	91,5	27,6%	240,5	72,4%

* Until July 2013.

specific jurisdiction. Foreign bonds, on the other hand, are traded only in the region where they are issued, under local jurisdiction and following local regulations. Global bonds are issued for investors all over the world and allow multimarket negotiation, seeking to minimize the costs of transactions between markets. They are similar to the US local bonds, but they trade in several markets (Petrasek, 2010).

It is important to point out some differences in the local and international debt market. As for indexation, in general, local debt bonds have floating rates, with a yield defined as CDI plus a fixed rate or as a percentage of CDI annual rate. In longer-term debt bonds, it is also common to find indexed securities, yielding inflation plus a fixed annual interest rate. Figure 5 shows the indexation composition of the debt market in Brazil.

Figure 5
Percentage of the total volume of debentures in the local market for each indexer from 1995 to 2013 (until June)



On the other hand, in the international market, almost all bonds have fixed rates, usually with semiannual coupons. Maturity is usually longer, if compared to local securities, with perpetual bonds being common. Bonds enjoy a much greater liquidity in the secondary market. This comes together with a much greater volatility than in the local market, due to the practice of marking to market of based on trades in the secondary market.

Because of the availability of bonds from the same issuer in both markets, many investors wonder about where would be most advantageous to trade them. In other words, which debt issuance entails the largest yield to maturity. This is the question we attempt to answer in this study. We find that, in average, the international corporate debt security yields 164 to 197 bps more than in the local market, a statistically significant difference. We conclude the difference is due to a captive demand of institutional investors in the local market and the lack of

integration between both markets. The greater availability and variety of bonds in the international market, besides the participation of individuals, also explain the difference in yield found. There is also a possible higher debt structuring cost charged by investment banks in the local market, which weakens the rates offered to investors. To explain why this difference is not arbitrated, we list a series of factors, including the mere lack of knowledge of local investors and the obstacles such as transaction costs and the impossibility of short selling in the local market. This causes an overpricing of the local bonds, reflecting the greater activity of more optimistic investors. We also suggest a greater sensitivity of local institutional investors to the volatility of returns as a relevant factor.

We organize the remainder of this study as follows: Section 2 contains a review of the literature, where we discuss the main results of previous studies. Section 3 describes the methodology and data we employ, whereas Section 4 discusses our empirical findings. Section 5 offers some concluding remarks.

2. Literature Review

Most of the studies on capital structure and financing of companies focus on the stock market, with many studies on the difference between local and international issued shares. As per the corporate credit market, some authors study the difference between debt securities issued in the local and international markets, focusing on the reasons to issue debt securities internationally, the debt profile in each market by maturity and credit classification, issuance costs etc. Few studies analyze the differences for Brazilian companies and none so far investigates the difference in yield from the point of view of the investor.

Merton (1974) is the first study on the yield of corporate bonds. He posits that, given the maturity of a bond, the risk premium is a function of the ratio of the present value of expected cash flow of the issuers minus the risk free rate, to the volatility. Kim and Stulz (1988, 1992) study the difference in returns between US bonds and Eurobonds. They find significant abnormal positive returns on the Eurobonds, and argue that issuers with international reputation can benefit from this difference by issuing in that market instead of in the US. The existence of such advantageous financing opportunity for companies is possibly due to the segmentation of the bonds market.

According to Kapur et al. (1997) and Fabozzi and Mann (2005), the World Bank was one of the first issuers to take advantage of the difference in rates between its debts in dollars in the Eurobonds and in the US market. The adopted strategy was to issue the first global bond in the market, which could be traded in both markets and also between them. Because of these characteristics, those bonds overcame the problem of fixed income international market segmentation, making lower issuing rates possible. See, for example, Stulz (1981) or Errunza and Losq (1985).

Miller and Puthenpurackal (2005) examine data on global bonds to identify

possible benefits of the securities' tangibility, in other words, the possibility to place these bonds simultaneously in several markets. The authors test the impacts of issuing these bonds on the issuer's cost of capital, cost of emission, liquidity and wealth of shareholders. It is, therefore, a study from the perspective of the issuer, using a sample of 230 global bonds issued by 94 companies between 1996 and 2003. The results show that companies can reduce their debt cost by issuing global bonds. The reaction in the prices of shares of those companies to the issuing is positive and significant, differently from the issuing of comparable local bonds and Eurobonds in the same period.

Petrasek (2010) investigates the effects of global bonds trading in multiple markets on the liquidity, price, and cost of debt of these assets. He compares, in particular, a sample of transactions in the primary and secondary markets of debt securities of a same issuer in the US market as well as in the Eurobonds and global markets. His results show that, on average, global bonds trade with a yield 15 to 25 bps smaller than local bonds of the same issuer. Speculative graded bonds issued in periods of crisis account for the largest difference. Additionally, the greater liquidity of global bonds explains only a small difference in yields between local and international bonds. Petrasek concludes that, because international corporate bond markets are not completely integrated, global bonds can reduce the debt cost of companies.

Black and Munro (2010) study companies in the Pacific and Asia that issue debt securities in the international market, in an attempt to measure the impact in the behavior of the local credit market. They find that firms from countries with little developed markets may opt for issuing bonds in the international market because of price differences, of the access to international investors, and of lower issuing rates, in addition to longer maturities and greater volume. These characteristics tend to correlate to the size of the international bond market. Their results corroborate the idea that deviations from the covered interest rate parity are actively arbitraged by issuers from weaker currency countries, as well as by internationally active debt issuers. They conclude that those issuers benefit from the liquidity and diversification of the international bond market.

Gozzi et al. (2012) analyze the main features of corporate bond issuances in local and international markets. After examining 116,338 corporate bonds from 13,920 companies in 99 countries, they find that for both companies in developed countries and in emerging markets, international bond issuances are mainly in foreign currency with a higher proportion of fixed rate, greater financing volume, and lower maturities. They also find that most companies remain active in the local market after accessing the international market, sometimes using both markets for different types of bonds. This suggests that the markets do not compete, but complement each other, offering different financial services.

Anderson (1999) is the first to study debentures in the Brazilian market. The sample period between 1989 and 1993 coincides with a time of hyperinflation

and great volatility in the Brazilian economic activity, characterized by strong government interventionism. The environment was highly unfavorable for the financing of Brazilian companies. Anderson documents a series of mechanisms that investors used to reduce inflationary risk. Examples include the existence of acceleration clauses that provided periodical opportunities for selling back the security or renegotiating, and the scarcity of clauses that constraining the issuers' decisions on investment, financing and payment of dividends.

Valle (2002) assesses the difference in the rate paid in Brazilian corporate debt securities in the international market, and the relation between funding costs and credit risk ratings. He focuses on the pulp and paper sector, using a sample of securities from Brazilian, Canadian and US firms. The results show that Brazilian companies have the same funding costs of speculative-level Canadian and US companies, which in turn have a much higher cost than investment-grade companies. The larger premium paid by the Brazilian companies is attributed to their economic and financial characteristics, which determine the credit classification of their bonds, with the highest possible level being the sovereign classification of the issuer country.

Mellone et al. (2002) study the issuing rates of debentures in Brazil from 2000 to 2002. They attempt to link the characteristics of the debentures to the interest paid by the issuers. Among the characteristics, they consider the maturity and date of issuance, as well as the credit rating, class and type of debenture. They describe some important characteristics of the local Brazilian issuances. In particular, securities are typically indexed to a percentage of the CDI or to inflation, plus a fixed rate. They observe that those characteristics are in contrast with those of the US corporate debt market, where issuances have fixed rates. Their findings show that bonds pegged to the CDI show greater negative association between the interest rate and credit rating. In contrast, they find no such a connection for inflation-indexed bonds.

Pimentel (2006) examines the characteristics of the Eurobonds market for securities issued by Brazilian companies between 2002 and 2005. He argues that issuing Eurobonds to lengthen the debt profile is only feasible for large companies. In addition, these companies have, on average, a larger participation of third-party capital in their capital structure, and hence greater leverage. Souza (2012) aims to understand the main reasons underlying the decision of some Brazilian firms to issue bonds in the international market. His results indicate a preference for liquidity, longer maturity and a larger differential in the interest rates relative to the local market.

This paper contributes to the literature by studying the difference in yield of debt securities of a same Brazilian company in the local and international markets from the investor's point of view. The analysis is very similar to that of Petrasek (2010). The main difference is that we focus only on primary issuances.

3. Data Description

There are many reasons to focus our attention on the primary market. Despite the liquidity of the international bond market, the local debenture market has low liquidity, making it hard to identify the daily market price of each paper. The debentures market essentially caters for institutional investors, such as financial institutions, investment funds, and pension funds (Lopes et al., 2007). The growing participation of issuances under instruction CVM 476 tends to aggravate market concentration.

ANBIMA publishes daily prices for a selection of debentures, based on a survey with the main market players. However, this list comprises only a small number of debentures and, in addition, the rates may differ severely from market reality. In other words, such data are not very reliable. The main concern about data from only the primary corporate debt market is the presence of temporary factors, such as the undervaluing of new issuances (Cai et al., 2007). However, Petrasek (2010) finds no evidence of bias in the primary market as compared to the yields in the secondary market.

Because issuing costs are not considered, such as fees charged by debt structuring investment banks, the analysis here reflects only the point of view of the investor that buys debentures. To reflect the issuer's point of view, one would look at the yield to maturity of the bond based on the net resources obtained (that is, resources minus the structuring fees and other issuing costs). Despite this information being readily available in the international market, it is scarce for the local market. For instance, they are not publicly available for debentures issued under instruction CVM 476. This makes the analysis of the difference in issuing cost for the company impossible. However, Petrasek (2010) argues that corporate issuers are more concerned with the cost of the debt, including the interest of the security and issuing structuring fees. The price of corporate bonds, on the other hand, is much more important for the investors. This makes the issuer's and investor's perspectives complementary.

The database includes all the debentures and bonds of Brazilian companies issued between January 2004 and April 2013. Local market data are from ANBIMA, which maintains a large database of debentures issuances in Brazil since 1981. The data include information about the nominal debt value, indexer used to update it, how the interest is calculated, maturity date, payment flow, issuer proposed yield, collateral, etc. For the international market, we extract from Bloomberg information about every international bonds issuance by Brazilian companies since January 2004. The data include the amount issued in dollars, bonds coupon, yield to maturity, maturity, debt rating (unclassified, investment grade or speculative grade), type of collateral, and subordination level.

It is worth emphasizing that we do not contemplate issuances by financial institutions. Although they issue bonds in the international market similarly to nonfinancial corporations, they do not issue debentures in the local market. Their

activity is usually restricted to other types of instruments, such as Bank Deposit Certificate, Financial Treasury Bill and Notice Account Deposit with special guarantee from the Credit Guarantee Fund. Because these instruments are typically issued with specific partners (in most cases without a public offer) and with different levels of rates for each investor, the collection of data and its treatment would be too complex. Additionally, Pimentel (2006) argues that, in most cases, the issuances refer to the funding for resource allocation regarding international financial intermediation, which differs from traditional funding.

For the reasons described above, only the non-financial companies which issued corporate debt securities both in the domestic and the international market in the sample period will be considered. This allows us to control for differences in the quality of credit among the corporations with access to the external market and those that only have access to the local market. In general, this also solves the problem of selecting companies, since those that issue debt securities in the international market are probably different from those that only issue in the local market.

All the local debt security issuances of the local sample are denominated in Brazilian reais, while the international issuances are in US dollars. To make the data more homogeneous, we exclude from the sample the 18 debentures indexed to the referential rate issued in that period. We have also removed 21 infrastructure debentures because the tax exemption created by law number 12,431 could distort the results. In fact, several of these infrastructure debentures were used as an artifice for companies to bring in resources obtained oversees to Brazil with tax exemption. Finally, we also exclude 8 convertible debentures, because we do not have access to their conversion conditions.

The final sample has 296 securities, of those 119 are international bonds and 177 are debentures, issued by 31 Brazilian companies. Table 2 shows the composition of the debt securities we consider in this study. It is clear that, until 2009, there was a balance between the numbers of issuances in both markets. After 2009, there is a relatively marked growth in the number of debentures issued. However, the amount brought in from abroad is still larger.

Table 2
Number of securities and volume (in billions of reais) issued each year in each market and in total of the sample

	Debentures		Bonds		Total	
Year of Issuance	Number of Issuances	Volume of Issuances	Number of Issuances	Volume of Issuances	Number of Issuances	Volume of Issuances
2004	10	1,82	10	6,38	20	8,20
2005	12	5,90	9	4,79	21	10,69
2006	13	10,92	16	17,00	29	27,92
2007	8	2,59	11	4,76	19	7,34
2008	8	3,23	4	2,27	12	5,50
2009	33	9,97	10	11,44	43	21,41
2010	41	11,75	18	19,42	59	31,17
2011	18	7,85	15	13,63	33	21,47
2012	28	15,67	20	21,40	48	37,07
2013*	6	2,55	6	6,44	12	8,99
Total	177	72,24	119	107,51	296	179,75

* Until April 2013.

In the next section, we describe in detail how we calculate a standardized measure of yield to maturity for each security for the different types of indexation.

3.1 Comparing the yield to maturity of each security

We standardize all the issuing rates in the form of a spread of the Brazilian DI interest rate. This allows us to isolate the effect of variation in the interest rate curve, focusing only on the credit spread. Therefore, we do not need to treat the data of local issuances that pay interest in the form of CDI plus a fixed annual rate (CDI+). For other issuances, we transform the rate into an equivalent credit spread in the following manners.

• Local issuances with percentage of CDI:

$$i_{CDI+} = \left\{ \left[(1 + DI_{t,T})^{1/252} - 1 \right] * i_{\%CDI} + 1 \right\}^{252} - 1$$

where i_{CDI+} is the issuance spread on the Brazilian DI interest rate curve (percentage per year), $i_{\%CDI}$ is the percentage of CDI of the issuance, and $DI_{t,T}$ is the spot DI on date t for maturity T (percentage per year).

• Local issuances with IPCA plus a fixed annual rate (IPCA+):

$$i_{CDI+} = \left\{ \frac{[(1 + IPCA_{t,T}) * (1 + i_{IPCA+})^{BD_{t,T}/252}}{(1 + DI_{t,T})^{BD_{t,T}/252}} \right\}^{252/BD_{t,T}} - 1$$

where $IPCA_{t,T}$ is the spot implicit inflation (measured by CPI in percentage per year) on date t for maturity T, i_{IPCA+} is the issuance spread over the period's

accumulated CPI (percentage per year), and $BD_{t,T}$ is the number of business days between dates t and T.

• Local issuances with IGP-M plus a fixed annual rate (IGPM+):

$$i_{CDI+} = \left\{ \frac{[(1 + IGPM_{t,T}) * (1 + i_{IGPM+})]^{BD_{t,T/252}}}{(1 + DI_{t,T})^{BD_{t,T/252}}} \right\}^{252/BD_{t,T}} - 1$$

where $IGPM+_{t,T}$ is the spot implied inflation (measured by IGP-M) on date t for the maturity T (percentage per year), and i_{IGPM+} is the issuance spread on the accumulated IGP-M of the period (percentage per year).

• International pre-fixated issuances:

$$i_{CDI+} = \left\{ \frac{[(1 + i_{YTM}) * (1 + E_{t,T}(\triangle e))]^{BD_{t,T/252}}}{(1 + DI_{t,T})^{BD_{t,T/252}}} \right\}^{252/BD_{t,T}} - 1$$

where i_{YTM} denotes the yield to maturity of the pre-fixated issuance, expressed in percentage per year, and $E_{t,T}(\triangle e)$ is the expected exchange rate devaluation on date t projected for maturity T, expressed in percentage per year.

Next, we must define the formulae for the implicit inflation and for the expected exchange rate devaluation. In particular,

$$IPCA_{t,T} = \left[\frac{(1 + DI_{t,T})^{BD_{t,t/252}}}{(1 + DI \times IPCASprd_{t,T})^{BD_{t,T/252}}} \right] - 1$$

where $DI \times IPCASprd_{t,T}$ is the spot DI spread over IPCA on date t for maturity T expressed in percentage per year, whereas

$$IGPM_{t,T} = \left[\frac{(1 + DI_{t,T})^{BD_{t,t/252}}}{(1 + DI \times IGPMSprd_{t,T})^{BD_{t,T/252}}} \right] - 1$$

where $DI \times IGPMSprd_{t,T}$ is the spot DI spread over IGP-M on date t for maturity T expressed as percentage per year. Lastly,

$$E_{t,T}(\triangle e) = \left[\frac{(1 + DI_{t,T})^{BD_{t,T}/252}}{(1 + DollarCoupon_{t,T} * \frac{CD_{t,T}}{360})} \right]^{252/BD_{t,T}} - 1$$

where $DollarCoupon_{t,T}$ is the dollar spot coupon on date t for maturity T expressed in percentage per year, and $CD_{t,T}$ is the number of calendar days between dates t and T. All interest rates are in the exponential/252 convention, except for the dollar coupon, which follows the linear/360 standard.

We obtain the DI interest rate, the implicit inflation measured by IPCA, implicit inflation measured by IGP-M, and the implicit exchange rate devaluation

for the dates and maturities of the issuances using exponential interpolation and extrapolation between the maturities of the respective curves:

$$DI_{t,T} = \left\{ (1 + DI_{t,T_b})^{BD_{t,T_b}/252} * \left[\frac{(1 + DI_{t,T_p})^{BD_{t,T_b}/252}}{(1 + DI_{t,T_b})^{BD_{t,T_b}/252}} \right] \right\}^{252/BD_{t,T}} - 1$$

for $T_p > T > T_b$, where T_b is the maturity of the spot DI interest rate curve immediately before the maturity T, T_p is the maturity of the spot DI interest rate curve immediately after the maturity $T, DI_{t,T}$ is the interpolated spot DI rate between maturities T_b and T_p of the DI interest rate curve on date t for maturity T expressed in percentage per year, DI_{t,T_b} is the DI spot rate on date t for maturity T_b in percentage per year, DI_{t,T_p} is the DI spot rate on date t for maturity T_p in percentage per year, and $BD_{t,s}$ is the number of business days between dates t and s. The historical DI interest rate curves maturities, DI spread over IPCA, DI spread over IGP-M and Dollar coupon are taken from the BM&FBovespa website.

It is worth mentioning that the fixed rates for international issuances follow the logic of an investor carrying out hedge operations against exchange rate and fixed rate variations. By buying securities in the international market, the investor would sell FX futures for the maturity of the operation in the amount of future cash flow the investor expect to receive in dollars, so as to avoid exchange rate risk. At the same time, the investor would buy DI futures for the maturity of the operation, neutralizing any fixed rate risk. We do not consider, however, transaction costs and the margin account for operations with derivatives.

When the issuing of bonds coincides with Brazilian bank holidays, we use the closest previous date for which a curve is available for the calculation of spreads and implicit exchange rate variation. Table 3 shows the descriptive statistics of the credit spread, for the market and total of the sample.

Table 3
Credit spread, for each market and total of the sample

Credit Spread of Issuances (%)			
	Debentures	Bonds	Total
Mean	1,86	3,04	2,34
Median	1,57	2,86	1,89
Maximum	4,00	14,07	14,07
Minimum	0,15	-1,50	-1,50
Standard deviation	1,12	2,16	1,71
Asymmetry	0,57	1,37	1,76
Excess kurtosis	-0,76	4,73	7,29

The average spread of a bond issuance is considerably larger than that of

a debenture issuance. However, we should control for differences in maturity, structures of guarantees, and class of debt and credit ratings. Additionally, credit spreads also vary significantly throughout time and among issuers, making direct comparisons of yield impossible. In section 4, we carry out a formal comparison using a panel regression model that controls for these features.

3.2 Controls

In this section, we discuss the controls we use to formally compare the spreads of securities issued in the local and international market.

International Issuance We create a binary variable $IntB$ that takes value one in the case of international issuance and value zero in the case of local issuance.

Volume For the size of issuance in reais, the amount in dollars in the securities issued internationally are converted using the day's closing exchange rate of the dollar spot on the day of issuance (source: Bloomberg). To adjust the scale in the regressions, we standardize the volume in units of hundred million reais. Table 4 shows the descriptive statistics of issuances volume, in billions of reais. In line with Black and Munro (2010), Souza (2012) and Gozzi et al. (2012), the average and median volume of issuance in reais in the international market is more than twice as large as in the local market.

Table 4
Volume of issuance, in billions of reais, for each market

Volume of Issuances (R$ bi)			
	Debentures	Bonds	Total
Mean	0.41	0.90	0.61
Median	0.29	0.62	0.43
Maximum	4.00	5.38	5.38
Minimum	0.01	0.10	0.01
Standard deviation	0.47	0.79	0.66
Asymmetry	3.56	2.71	3.08
Excess kurtosis	20.76	10.34	14.21

Maturity date The maturity of bonds and debentures has a positive effect in the spreads of investment grade securities (Merton, 1974) and of speculative grade securities (Helwege and Turner, 1999, Chen et al., 2007). To check robustness, we also create a binary variable LTB that has value one if the security has a maturity of four years or more, according to the system described in Sheng (2005), and zero otherwise. For perpetual bonds, the maturity is the first call date, that is, the

first date in which it would be possible for the issuer to buy it back. We have also considered the binary variable *Perp* that has value one in the case of a perpetual bond, and zero otherwise. Table 5 shows the descriptive statistic of the maturity in years for each market. International issuances have, on average, maturities that are nearly twice as long as the domestic market issuances. This corroborates the evidence in Pimentel (2006), Leal and Silva (2008), Black and Munro (2010) and Souza (2012) that companies usually turn to the international market to lengthen their debt profile. However, this statistic contradicts the results in Gozzi et al. (2012) possibly because the differences in the sample. Their study indeed contains many more markets on which there is local demand for longer maturities.

Table 5
Maturity in years, for each market and total sample

Maturity (years)			
	Debentures	Bonds	Total
Mean	6,06	10,48	7,84
Median	6,00	10,01	7,00
Maximum	12,67	35,44	35,44
Minimum	1,00	0,04	0,04
Standard deviation	2,69	7,42	5,57
Asymmetry	0,17	1,91	2,70
Excess kurtosis	-0,76	3,03	8,99

It is possible to see by the standard deviation of the credit spread, volume and maturity that there is much more variety in the international market than in the local market.

Call provision The binary variable $CallB$ has value one for securities that have a call provision, and zero otherwise. Table 6 displays the number of issuances, total amount issued, and mean credit spread for securities with and without call provision. This type of provision gives the issuer the possibility to pay the debt earlier, usually offering a larger premium for that. The figures are in line with this notion in both markets, with the credit spread for callable issuances being nearly twofold those noncallable bonds in the international market.

Credit Rating Tang (2009) shows that credit ratings play a major role in the minimization of information asymmetry between potential investor and debt issuer. Such reduction, in general, represents a lower financing cost and greater possibility of lengthening the debt. We expect that the worse the credit rating of the issuer, the greater the interest rate paid by their debt securities. We employ credit ratings from Fitch. If unavailable, we then use the ratings from

Table 6
Call provision for each market

	Debentures		Bonds		Total	
	Callable	Noncallable	Callable	Noncallable	Callable	Noncallable
Number of issuances	30	147	57	62	87	209
Volume of issuances(R$bi)	7,71	64,53	41,66	65,85	49,37	130,38
Mean spread (%)	2,96	1,64	4,02	2,13	3,65	1,79

Standard&Poor's or Moody's. Table 7 reports the equivalence scale between these credit ratings.

In local issuances, the database of ANBIMA does not supply information on credit ratings. We thus proxy with the global credit classification of the issuer on the date of issuance of the debenture (source: Bloomberg). We classify issuances without any rating as NR (Not Rated). Table 8 shows the number of securities and volume in billions of reais for each market by credit rating. In general, both markets are more concentrated in issuances with grades between BBB– and BB. In the international market, however, there is also a substantial volume of issuances with rating B+. In the local market, we observe a considerable frequency of issuances with rating B, but with little financial volume. The greatest part of the issuances with no rating is in the local market, though those in the international market have higher financial volume.

To avoid an excessive number of coefficients in the regressions, we group investment grade ratings (BBB– or higher) and speculative grade ratings (BB+ or lower, including unrated). The binary variable $InvGrade$ has value one if the issuance is investment grade and zero otherwise. Table 9 shows the descriptive statistics of the credit spread for ratings in each market.

As expected, the premium demanded by investors for speculative grade securities is clearly larger. It is possible to notice that, in the international market, the difference in premium is greater. Because of this large difference, we also create the binary variable $IntBInvGrade$, that takes value one if the security is an international bond with investment grade, and zero otherwise.

Guarantees There are four types of debt securities in the sample: subordinated, unsecured, with floating guarantee and secured. Subordinated securities pay after other debts, but before shareholders, in case of liquidation. Unsecured bonds have no sort of collateral. Floating guarantee bonds have collateral, but the latter is not linked to the issuance and hence open for renegotiation. In secured securities, the collateral is linked to the issuance, making it impossible for the company to renegotiate it. Table 10 shows the number of securities and volume for each type of guarantee in both markets. In general, the unsecured issuances predominate, especially in the international market. In the local market, the number of secured issuance is also relevant.

Table 7
Credit rating equivalence among agencies

Fitch	Moody's	S&P
AAA	Aaa	AAA
AA+	Aa1	AA+
AA	Aa2	AA
AA-	Aa3	AA-
A+	A1	A+
A	A2	A
A-	A3	A-
BBB+	Baa1	BBB+
BBB	Baa2	BBB
BBB-	Baa3	BBB-
BB+	Ba1	BB+
BB	Ba2	BB
BB-	Ba3	BB-
B+	B1	B+
B	B2	B
B-	B3	B-
CCC	Caa1	CCC+
CC	Caa2	CCC
C	Caa3	CCC-
RD	Ca	CC
D	C	C
D	C	D
WD	WR	-
PIF	-	-
NC	NC	NC

Table 8
Number of securities and volume (in billions of reais) issued for each credit rating in the local and international markets

	Debentures		Bonds		Total	
Credit rating	Issuances	Volume(R$bi)	Issuances	Volume(R$bi)	Issuances	Volume(R$bi)
BBB+	6	4,80	4	8,89	10	13,69
BBB	11	9,01	6	10,94	17	19,95
BBB-	24	17,89	24	31,53	48	49,42
BB+	22	11,67	22	14,14	44	25,80
BB	39	10,24	16	11,02	55	21,26
BB-	28	9,39	16	8,41	44	17,80
B+	8	2,36	18	16,92	26	19,28
B	16	0,95	10	4,94	26	5,89
B-	3	0,21	1	0,12	4	0,33
NC	20	5,72	2	0,61	22	6,33
Total	177	72,24	119	107,51	296	179,75

Table 9
Credit spread for debt security rating, in each market and total of sample

	Debentures		Bonds		Total	
	Investment grade	Speculative grade	Investment grade	Speculative grade	Investment grade	Speculative grade
Mean	1,45	1,99	1,41	3,69	1,43	2,64
Median	1,20	1,73	1,43	3,72	1,26	2,30
Maximum	3,45	4,00	4,66	14,07	4,66	14,07
Minimum	0,21	0,15	-1,50	0,28	-1,50	0,15
Standard deviation	1,01	1,12	1,16	2,12	1,08	1,78
Asymmetry	0,96	0,48	0,36	1,50	0,61	1,77
Excess kurtosis	-0,18	-0,83	1,66	5,61	0,82	7,17

Table 10
Number of securities and volume (in billions of reais) issued for each type of guarantee

	Debentures		Bonds		Total	
	Issuances	Volume(R$bi)	Issuances	Volume(R$bi)	Issuances	Volume(R$bi)
Subordinated	11	4,85	6	2,47	17	7,32
Unsecured	111	57,31	111	102,32	222	159,63
Floating guarantee	3	0,49	1	0,17	4	0,66
Secured	52	9,59	1	2,56	53	1,79

We create the binary variable *Guarantee*, which has value one if the issuance is either floating or secured, and zero otherwise. Table 11 shows the descriptive statistics of the credit spread for secured and unsecured issuances in each market. It is possible to see that there are some differences in the local and international market. While in the international market the secured bonds have a markedly smaller credit spread then unsecured ones, in the local market the opposite is true. This can be a result of the fact that companies with low credit scores can only issue debt securities if they can offer investors some type of collateral. This factor would be especially sensitive for local investors, who, due to the lack of liquidity, have greater likelihood of holding the security up to the maturity. To reflect this difference between markets, we also create a binary variable *IntBGuarantee*, that has value one if the security is an international bond with collateral (secured or floating), and zero otherwise.

Year We have created dummy variables for each year, from 2004 to 2013, to isolate time-specific effects. Table 12 shows the mean credit spread of issuances per year in each market. It is possible to see that only in the year 2009 does the debenture market show a greater credit spread than that of bonds. Curiously, in the year 2013, the issuances have shown a greater spread in total credit, the majority of it due to the international market. Aggregately, that year the credit spreads are even greater than in 2009, when the effects of the financial crisis began to be strongly felt in the local market.

Issuer To control for other issuer-specific characteristics, we included fixed effects for each of the 31 issuers in the panel regression. The advantage of using fixed effects, instead of a more parsimonious specification with random effects, is

Table 11
Credit spread for secured and unsecured securities, for each market and total of the sample

	Debentures		Bonds		Total	
	Secured	Unsecured	Secured	Unsecured	Secured	Unsecured
Mean	2,85	1,42	1,60	3,06	2,80	2,22
Median	2,68	1,34	1,60	2,87	2,68	1,62
Maximum	4,00	3,90	2,52	14,07	4,00	14,07
Minimum	0,41	0,15	0,68	-1,50	0,41	-1,50
Standard deviation	1,08	0,81	1,30	2,16	1,10	1,81
Asymmetry	-0,59	0,87	-	1,35	-0,56	1,99
Excess kurtosis	-0,75	0,58	-	4,69	-0,80	7,59

Table 12
Mean credit spread of securities per year in each market and total of the sample

Year of issuance	Debentures	Bonds	Total
2004	1,72	2,51	2,12
2005	1,34	3,82	2,40
2006	0,83	2,50	1,75
2007	0,67	3,19	2,13
2008	1,72	1,90	1,78
2009	2,92	2,31	2,78
2010	2,28	3,09	2,53
2011	2,10	3,34	2,66
2012	1,15	3,09	1,96
2013*	1,12	4,73	2,93
Total	1,86	3,04	2,34

*Until April 2013.

that it allows correlation between controls and issuer-specific effects.

In the next section, we discuss the results of the panel regression so as to answer whether it is better to invest in international or local securities.

4. Should One Invest In Debentures Or In Bonds?

Below we present the panel regression model with issuer fixed effects that we use to compare the rates of bonds and debentures issued by the same company in different markets. The main advantage of using a specification with issuer fixed effects is having a way to control for the self-selection of companies in the groups of local and international issuers. The specification of the regression model is:

$$\begin{aligned} CreditSpread_{i,j} \\ &= \alpha_j + B(t)_i + \beta_1 IntB_{i,j} + \beta_2 Volume_{i,j} + \beta_3 LTB_{i,j} \\ &+ \beta_4 CallB_{i,j} + \beta_5 Perp_{i,j} \\ &+ \beta_6 InvGrade_{i,j} + \beta_7 IntBInvGrade_{i,j} + \beta_8 Guarantee_{i,j} \\ &+ \beta_9 IntBGuarantee_{i,j} \end{aligned}$$

where α_j denotes a fixed effect of issuer $j = 1, \ldots, 31$ and $B(t)_i$ a fixed effect of year $t = 2004, \ldots, 2013$ of i-th issuance of company j. Notice that the issuer fixed effects control for unobservable qualities of credit among issuers of debentures and bonds. When compared with companies that issue only debentures, those that have access to the international market probably have non-observable characteristics that may increase their credit quality. The models with fixed effects can effectively compare debentures and bonds issued by the same company even under the omission of regressors that are company specific (but time-invariant). Additionally, it has the advantage of producing robust standard errors by clustering issuers.

Petrasek (2010) points out that the fixed effect panel regression assumes that the credit risk for each issuer remains constant, as long as their credit rating remains unchanged. However, it is possible for small changes in the credit quality of the issuer not to result in changes of rating. For comparison purposes, four specifications of the presented regression were tested: with fixed effects of issuer and date of issuance; without fixed effects of issuer, but with year of issuance control; with fixed effect of issuer, but without year of issuance control; without fixed effect of issuer and year of issuance.

Table 13 reports the results of the panel regressions. In all cases the spread of the Brazilian DI interest rate curve responds positively to *international* issuances. The $IntB$ coefficient varies between 164 and 197 bps, being significant in all regressions. It is also interesting to observe that it is greater when we control for issuer and year effects. The omission of controls for year of issuance indeed alters only marginally the estimate of this coefficient.

Table 13
Results of regressions

	With fixed effect and with control for year	Without fixed effect and with control for year	With fixed effect and with control for year	Without fixed effect and with control for year
IntB	1.969	1.825	1.961	1.637
	(7.77)**	(7.78)**	(7.65)**	(7.02)**
Volume	0.001	-0.034	-0.006	-0.035
	(0.04)	(2.35)*	(0.35)	(2.44)*
LTB	0.345	0.421	0.169	0.403
	(1.51)	(1.87)	(0.74)	(1.81)
CallB	0.478	0.755	0.634	0.942
	(2.30)*	(3.53)**	(3.06)**	(4.54)**
Perp	1.157	0.535	0.833	0.349
	(3.41)**	(1.57)	(2.51)*	(1.04)
InvGrade	0.962	-0.095	0.827	-0.109
	(3.29)**	(0.40)	(2.82)**	(0.44)
IntBInvGrade	-1.694	-1.648	-1.514	-1.369
	(4.78)**	(4.44)**	(4.25)**	(3.69)**
Guarantee	0.979	0.880	1.239	0.984
	(3.96)**	(3.77)**	(5.03)**	(4.32)**
IntBGuarantee	-1.675	-1.590	-1.725	-1.728
	(1.90)	(1.65)	(1.92)	(1.77)
Constant	1.175	0.935	0.921	1.251
	(3.64)**	(2.79)**	(3.89)**	(5.73)**
Nr of observations	296	296	296	296
R^2	0.66	0.48	0.62	0.43

Absolute value of the t-statistic in parentheses.
* significant at 5%; ** significant at 1%.

Volume is significant only for models without issuer fixed effects. The coefficient estimates without fixed effects are negative, indicating that, for each hundred million reais in volume, the credit spread declines approximately 53 bps. The result is not surprising, since larger issuances tend to be pulverized and, consequently, investors demand lower liquidity premium.

The dummy variable of long maturity exhibits a positive, though statistically insignificant, connection to the dependent variable. The dummy variable *Call* displays a significantly positive coefficient in every regression, varying from 48 to 94 bps. The magnitude is smaller when we control for issuer and year effects. This result reflects the larger premium demanded by investors for issuances with this type of provision, since it increases the risk of reinvestment for the holder.

The coefficient estimates show that perpetual bonds have a credit spread between 83 and 116 bps higher than nonperpetual bonds. This gap increases greatly if we control for issuer and year effects. However, only the estimates with issuer fixed effects are significant. Naturally, investors demand a premium for buying perpetual debt given that it is a hybrid capital instrument.

Credit rating yields mixed results. In general, the results show that, for international issuances, the investment grade classification significantly reduces the spread by 137 to 160 bps. In the local market, however, such classification significantly increases the spread by 83 to 96 bpsas long as we control for issuer fixed effects. In the models without fixed effects, the coefficient estimates for the local market are negative, but not statistically different from zero. The change in sign suggests a negative correlation between issuer fixed effects and the investment grade status. The positive sign we find for the local issuances could well be an artifact due to the use of the company's global credit rating in the moment of issuance as proxy, and to the inclusion of issuances without credit rating in the speculative grade group. It is important to point out that Sheng and Saito (2005) also find a positive sign for local issuances of investment grade bonds.

The dummy variable relating to guarantees entails a similar result to debt ratings. There is no statistical significance for the coefficient estimate of $IntBGuarantee$, despite the negative sign of coefficients. In the local market, paradoxically, the presence of guarantees significantly increases the spread by 88 to 124 bps. The coefficient has greater magnitude if we control for issuer fixed effects, but smaller if we control for the year of issuance. As previously discussed, this may occur because some companies with a higher credit risk may have to offer collateral to attract investors. The companies with better credit quality, on the other hand, do not have to do so, because their issuances naturally have a lower credit spread.

We believe it is worth pointing out that the model with both issuer and year fixed effects is the one we consider most relevant. The model controls for possible idiosyncrasies of certain years of issuance, and also guarantees that unobservable characteristics of the issuer do not affect the results.

4.1 Discussion

Several studies point to a positive connection between the price of corporate debt securities and their liquidity, both in the international (Longstaff et al., 2005, Chen et al., 2007, Bao et al., 2008, Nashikkar et al., 2009), and Brazilian markets (Sheng and Saito, 2008, Sheng and Gonçalves, 2010). For this reason, given the greater liquidity of the international market, the spread of local issuances may exceed those of international issuances. However, even with a known greater liquidity than debentures, bonds show a spread on the Brazilian interest rate curve that is significantly higher. On average, it is more advantageous for an investor to buy corporate credit securities in the international market than in the local market. In what follows, we discuss some alternative hypothesis to explain the differences we find in the yields.

The supply of corporate debt securities in the international market is significantly higher than in the local market, both in financial volume, number of issuers and number of issuances. Additionally, not only securities from Brazilian companies are available, but also of foreign companies. We thus conjecture that this allows investors to be more selective in the international market, forcing companies to pay a higher premium to attract them.

On the demand side, the main investors in the local market are institutional investors, such as investment funds, bank treasuries, insurance companies and pension funds. This implies a captive demand for local credit securities, since many investment funds mandate a minimal allocation to this asset class. On the other hand, the international demand is partly driven by individual investors, with a participation of about 10% to 15% in the primary market for investment grade securities. For speculative grade issuances, their participation is even greater, reaching 30%. These investors are more flexible in their investment options, preferring other asset classes if the premium offered by bonds is not attractive enough. Similarly to Kim and Stulz (1988, 1992), we believe there is a lack of integration between the Brazilian and international bond markets. This market segmentation prevents an adjustment of supply and demand of Brazilian corporate debt securities.

The question of issuance cost for the company can also help explain the difference we find. There is little public data on the structuring costs in the local market, as well as marketing of the issuance, roadshows with potential investors and investment bank's fees for the structuring of debts. However, it is well known that today, in Brazil, there is a great concentration in the market of corporate debt structuring. There are essentially five large investment banks that dominate this market. The pulverization in the international market is much larger, fostering competition and hence lower fees. Table 14 lists the five biggest debt structures in 2013 (until October 2013) by volume issued in each market according to Bloomberg data.

Table 14
List of the five largest structurers of bonds and debentures issuances for Latin-American companies, from January to October 2013

Structurer	Ranking	Market participation (%)	Structured volume (USD MM)	Number of issuances
Latin American Corporate Bond Market				
HSBC Bank PLC	1	10,1	15.102	106
Citi	2	9,9	14.852	87
Bank of America Merrill Lynch	3	8,4	12.489	54
Deutsche Bank AG	4	7,7	11.480	43
Banco do Brasil SA	5	6,7	9.969	72
Total		42,8	63.892	362
Debentures Market				
Banco do Brasil SA	1	26,4	13.555	54
Bradesco BBI SA	2	18,6	9.540	70
Banco Itau BBA SA	3	16,8	8.624	68
Banco Santander SA	4	9,1	4.668	52
HSBC Bank PLC	5	8,7	4.448	40
Total		79,6	40.836	284

The complete list has 105 Latin-American bond structurers, but only 27 debentures structurers. Concentration is evident in the local market, with the five biggest players enjoying 79.6% of the local market against only 42.8% of the international market. Given the higher structuring cost in the local market as compared to the international market, issuers may offer a larger premium in the international market, with the same amount of total debt cost.

Apart from the possible market forces that explain this difference in yields between debentures and bonds, it is paramount to discuss the limits to arbitrage. The first is inattention, that is to say, investors simply do not know about this difference. In the international market, bonds are in US dollars and feature fixed rates. The difference in yields is not obvious at first because investors must carry out at least two more operations to protect themselves against exchange rate fluctuations and shifts in the yield curve. Additionally, given that the same issuer usually issues in both markets at different times, and with very dissimilar characteristics, the perception of this difference without a formal econometric analysis to isolate these factors is not trivial.

Even if investors notice this difference, there are additional operational obstacles to exploit this apparent arbitrage. Brazilian funds that invest in corporate debt usually have restrictions on operating in the international market. Even the unrestricted investors face problems relating to the liquidation and custody of assets in the international markets as well as to margin accounts for hedge operations, among other transaction costs. These issues greatly reduce, if not completely kill, the opportunity for gains. Edwards et al. (2007) claim that transaction costs sometimes impose unsurpassable limits to arbitrage between local and international markets, especially for speculative grade bonds. Brunnermeier and Pedersen (2009) and Stein (2009) also highlight that, in times of financial distress,

financing restrictions constrain severally arbitrage strategies.

Another relevant snag is the fact that it is not possible to short debentures, only bonds. This fact alone eliminates the possibility of operating at both ends of the arbitrage operation. The only possible strategy is the short selling of the bond, using the proceeds to buy the debenture. However, such operation would go against the difference we find in their yields. Indeed, the arbitrageur should sell the debenture (most expensive asset) and buy the bond (cheapest asset) rather than the contrary.

The impossibility of short selling helps explain not only the absence of arbitrage, but also the difference we find in the yields. Miller (1977) argues that, in the presence of heterogeneous expectations, asset prices are driven by the demand of the most optimistic investors for a fixed supply. Allowing for short selling increases the supply and, as a result, less optimistic investors start holding the assets. This brings the prices closer to the average assessment in the market. Assets under short selling restrictions are then usually overpriced because their prices reflect less the views of the pessimist investors. Accordingly, it is not so surprising that we find a higher price for debentures and a higher spread for bonds.

Finally, one must also consider differences in volatility in the local and international markets. The absence of an active secondary market in Brazil makes debenture's mark to market deficient. This reduces the volatility of the securities in the local market. Fajardo and Dantas (2013) find that a Brazilian investor who has lived through hyperinflation is 32% less likely to invest in highly volatile markets. For this reason, local investors may prefer the (false) lower volatility of the debentures to the higher volatility of the international bonds.

5. Conclusion

This study shows that, if investors protect themselves against exchange rate and interest rate risks, it is more advantageous, on average, to invest in Brazilian corporate debt securities in the international market than in the local market. We indeed find a difference in yield between 164 to 197 bps. There is a number of reasons for this difference. There is a greater supply and variety of corporate debt securities in the international market, in addition to a captive demand of institutional investors for debentures in the local market. The lack of integration between the international and local debt markets makes the adjustment of supply and demand of Brazilian corporate debt securities difficult. The possibly higher cost of debt structuring in the local market can also help explain this difference. There are also several aspects that limit the arbitrage between these markets as, for instance, the impossibility to short sell debentures. We leave for future research a more in-depth examination of these limits to arbitrage.

References

Anderson, C. (1999). Financial contracting under extreme uncertainty: An analysis of Brazilian corporate debentures. *Journal of Financial Economics*, 51:45–84.

Bao, J., Pan, J., & Wang, J. (2008). Liquidity of corporate bonds. Working Paper, MIT.

Black, S. & Munro, A. (2010). Why issue bonds offshore? Working Paper 334, BIS.

Brunnermeier, M. K. & Pedersen, L. H. (2009). Market liquidity and funding liquidity. *Review of Financial Studies*, 22:2201–2238.

Cai, N., Helwege, J., & Warga, A. (2007). Underpricing in the corporate bond market. *Review of Financial Studies*, 20:2021–2046.

Chen, L., Lesmond, D. A., & Wei, J. (2007). Corporate yield spreads and bond liquidity. *Journal of Finance*, 62:119–149.

Edwards, A. K., Harris, L. E., & Piwowar, M. S. (2007). Corporate bond market transaction costs and transparency. *Journal of Finance*, 62:1421–1450.

Errunza, V. & Losq, E. (1985). International asset pricing under mild segmentation: Theory and tests. *Journal of Finance*, 40:105–124.

Fabozzi, F. J. & Mann, S. V. (2005). *The Handbook of Fixed Income Securities*. McGraw-Hill, New York.

Fajardo, J. & Dantas, M. (2013). The impact of past hyperinflation on current investment behavior. Technical report, Escola Brasileira de Administração Pública e de Empresas, Fundação Getulio Vargas, Rio de Janeiro.

Gozzi, J., Levine, R., Peria, M. S., & Schumukler, S. (2012). How firms use domestic and international corporate bond markets. Policy Research Working Paper 6209, World Bank.

Helwege, J. & Turner, C. M. (1999). The slope of the credit yield curve for speculative-grade issuers. *Journal of Finance*, 54:1869–1884.

Kapur, D., John, L. P., & Webb, R. C. (1997). *The World Bank: Its First Half Century*. Brookings Institution Press, New York.

Kim, Y.-C. & Stulz, R. M. (1988). The Eurobond market and corporate financial policy: A test of the clientele hypothesis. *Journal of Financial Economics*, 22:189–205.

Kim, Y.-C. & Stulz, R. M. (1992). Is there a global market for convertible bonds? *Journal of Business*, 65:75–91.

Leal, R. & Silva, A. (2008). O Mercado de Títulos Privados de Renda Fixa no Brasil. Relatório Econômico, ANDIMA.

Longstaff, F. A., Mithal, S., & Neis, E. (2005). Corporate yield spreads: Default risk or liquidity? New evidence from the credit default swap market. *Journal of Finance*, 60:2213–2253.

Lopes, C. F. L. R., Antunes, L. P., & Cardoso, M. A. S. (2007). Financiamento de longo prazo: Mercado de debêntures e programa de emissão da BNDESPAR. *Revista do BNDES*, 14:43–70.

Mellone, G., Eid Júnior, W., & Rochman, R. (2002). Determinação das taxas de juros das debêntures no mercado brasileiro. In *Segundo Encontro Brasileiro de Finanças*.

Merton, R. (1974). On the pricing of corporate debt: The risk structure of interest rates. *Journal of Finance*, 29:449–470.

Miller, D. P. & Puthenpurackal, J. (2005). Security fungibility and the cost of capital: Evidence from global bonds. *Journal of Finance and Quantitative Analysis*, 40:849–872.

Miller, E. M. (1977). Risk, uncertainty, and divergence of opinion. *Journal of Finance*, 32:1151–1168.

Nashikkar, A., Subrahmanyam, M., & Mahanti, S. (2009). Limited arbitrage and liquidity in the market for credit risk. Working paper, New York University.

Petrasek, L. (2010). Multimarket trading and the cost of debt: Evidence from global bonds. Working Paper Series 1212, European Central Bank.

Pimentel, R. (2006). O mercado de eurobonds e as captações brasileiras: Uma abordagem empírico-descritiva. Master's thesis, Departamento de Contabilidade de Atuária da Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo.

Sheng, H. H. (2005). *Ensaios sobre emissões de corporate bonds (debêntures) no mercado brasileiro*. PhD thesis, Escola de Administração de Empresas de São Paulo, Fundação Getulio Vargas.

Sheng, H. H. & Gonçalves, P. (2010). O apreçamento do spread de liquidez no mercado secundário de debêntures. *Revista de Administração*, 45:30–42.

Sheng, H. H. & Saito, R. (2005). Determinantes de spread das debêntures no mercado brasileiro. *Revista de Administração*, 40:193–205.

Sheng, H. H. & Saito, R. (2008). Liquidez das debêntures no mercado brasileiro. *Revista de Administração*, 43:11–13.

Souza, L. (2012). Dívidas corporativas brasileiras: Emitir no mercado interno ou no externo? Master's thesis, Escola de Economia de São Paulo, Fundação Getulio Vargas.

Stein, J. C. (2009). Sophisticated investors and market efficiency. *Journal of Finance*, 64:1517–1548.

Stulz, R. M. (1981). On the effects of barriers to international investment. *Journal of Finance*, 36:923–934.

Tang, T. (2009). Information asymmetry and firms' credit market access: Evidence from Moody's credit rating format refinement. *Journal of Financial Economics*, 93:325–351.

Valle, M. R. (2002). Mercado de bonds: Risco, rating e funding costs. *Revista de Administração*, 37:46–56.