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Search for Yield in Large International Corporate Bonds: Investor Behavior and Firm Responses

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Abstract

Emerging market corporations have significantly increased their borrowing in international markets since 2008. We show that this increase was driven by large-denomination bond issuances, most of them with face value of exactly US$500 million. Large issuances are eligible for inclusion in important international market indexes. These bonds appeal to institutional investors because they are more liquid and facilitate targeting market benchmarks. We find that the rewards of issuing index-eligible bonds rose drastically after 2008. Emerging market firms were able to cut their cost of funds by more than 76 basis points by issuing bonds with a face value equal to or greater than US$500 million relative to smaller bonds. Firms contemplating whether to take advantage of this cost saving faced a tradeoff after 2008: they could benefit from the lower yields associated with large, index-eligible bonds, but they paid the potential cost of having to hoard low-yielding cash assets if their investment opportunities were less than US$500 million. Because of the post-2008 "size yield discount," many companies issued index-eligible bonds, while substantially increasing their cash holdings. We present evidence suggesting that these post-2008 behaviors reflected a search for yield by institutional investors into higher-risk securities. These patterns are not apparent in the issuance of investment grade bonds by firms in developed economies.

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1. Introduction

After the 2008 global financial crisis (GFC), interest rates in developed countries reached historically low levels, especially for safe assets. Several studies argue that persistently low interest rates on safe assets have led investors to search for yield by expanding the range of investments they consider and by making them willing to accept increases in risk. As a consequence, the search for yield has expanded the demand for emerging market securities, especially corporate bonds issued in international markets.[1]

Because the international market for debt securities is dominated by institutional investors, who face limits in their incentives or ability to undertake risk in unfamiliar asset classes, the search for yield does not entail an unlimited willingness to accept new risks as the demand for emerging market corporate debt rises. One way to limit risk, while expanding investments into riskier emerging market corporate debt, is to demand liquid emerging market instruments. These securities allow investors to more easily sell positions when needed or to increase them when desired, with minimal price impact and low transaction costs. Also, institutional investors are often penalized with withdrawals or rewarded with inflows by the ultimate investors (who are the principals in those investments). This disciplining mechanism encourages managers to think of the risk that affects them (as agents) in terms of deviations from the market benchmark indexes.

By purchasing bonds that are included in major indexes, institutional investors both enhance liquidity and limit the risk of underperforming relevant indexes.[2] Bonds that are included in market indexes are bought and sold more frequently and are held by a wide

[1] We use the phrase "search for yield" to describe either (1) a broadening of the range of investments by institutional investors (e.g., U.S. corporate bond funds) to include riskier (e.g., emerging market corporate) bonds, or (2) decisions by ultimate individual investors to allocate more of their portfolios to riskier investments (e.g., emerging market bond funds).

[2] There have been several studies that document that institutional investors such as mutual funds do not deviate too much from their respective indexes. See Cremers and Petajisto (2009) for evidence on the U.S. equity mutual fund industry. Cremers et al. (2016) and Raddatz et al. (2017) show this pattern at the international level. An extreme instance of this strategy is that used by exchange-traded funds (ETFs), the importance of which has increased (Converse et al., 2018).

range of investors, which means that holding a bond that is included in the index enhances its liquidity. Bonds that are included in the index collectively define the benchmark of market performance, which means that holding those bonds also limits an institutional investor's risk of underperforming the market benchmark. The latter is relevant for specialist emerging market corporate debt funds that track the index.

Two of the most relevant benchmark indexes for emerging market bonds are the J.P. Morgan EMBI Global Diversified Index (which focuses on sovereign bonds) and the J.P. Morgan CEMBI Narrow Diversified Index (which focuses on corporate bonds).[3] Both indexes include bonds based on certain security attributes, notably the amount of outstanding debt. Thus, only debt issues with face value equal to or greater than $500 (US$500) million are included in these indexes. A broader index (the CEMBI Broad) also exists, which includes corporate debt with face value equal to or greater than $300 million.

Because of their advantages, some institutional investors that expand their holdings of emerging market corporate debt purchase bonds that are included in the major market indexes. This means purchasing fractions of large bonds that are held by other investors that are familiar with those bonds, facilitating eventual increases or reductions of those positions as managers receive injections and withdrawals. One would expect that this preference would increase bond prices through an index inclusion premium and reduce bond yields, an effect that we label the "size yield discount," the difference in yields between bonds large enough to be included in indexes and smaller bonds. Also, one would expect that this preference would increase the likelihood of issuing large bonds, as firms participating in international bond markets take advantage of cheaper financing costs.

In this paper, we analyze how the change in global market conditions after 2008 interacted with market structure to affect the size and pricing of U.S. dollar-denominated

[3] EMBI stands for Emerging Market Bond Index and CEMBI stands for Corporate Emerging Market Bond Index.

bonds issued by emerging market corporations. Specifically, we analyze a period when the low interest rate environment created by developed countries' monetary policies after the GFC interacted with preferences of international investors that follow rules governing the inclusion of bonds in debt market indexes. We also study how these changes affected firm financing decisions and cash holdings.

Our first novel finding is that the expansion in the demand for emerging market corporate debt was accompanied by an increased preference for bonds large enough to be included in market indexes. After the GFC, we observe a substantial reduction in the yields of bonds issued in international markets with a face value of $500 million, relative to otherwise similar bonds with lower face value. For example, when issuing $500 million bonds instead of $400 million bonds, emerging market corporates paid more than 76 basis points *less* after the GFC than the differential they paid prior to 2008. In other words, the size yield discount increased substantially after 2008. Not only did the average yields of bonds with face value of $500 million significantly decrease relative to the period before the GFC, but also this pattern is much more visible for emerging market issuers than for investment grade developed market firms (considered relatively safe investments).

Our second new finding is that, in the post-2008 period, emerging market firms were much more likely to issue debt securities in international markets with a face value of *exactly* $500 million. In general, when deciding to issue a large, index-eligible bond, firms face a trade-off. On the one hand, they can secure cheaper financing costs. On the other hand, if issuance size exceeds financing needs, firms have to save the difference in cash or cash-like instruments, which have low returns. Our second finding suggests that, after the GFC, the increase in the size yield discount moved the trade-off in favor of issuing $500 million bonds. Some firms chose to issue more than they needed to fund their projects in order to reach the $500 million threshold, and hold cash assets from the proceeds of bond issuance in excess of project funding needs. In addition, we find that firms in countries

with higher expected carry trade (our proxy for return on cash) issued more $500 million bonds, providing further evidence that firms have responded to a trade-off when deciding to issue large bonds in amounts that exceed their funding needs.

We present evidence that the channel driving these results is the investor demand for emerging market debt that is skewed towards index-eligible bonds. Funds that are less familiar with emerging market corporate debt are much larger than specialist funds and significantly increased their holdings of emerging market corporate debt after the GFC. We also show that these funds tend to invest significantly more of their portfolio in bonds with face value equal to or greater than $500 million, relative to funds that specialize in emerging market securities. Overall, this evidence is consistent with investor demand, particularly from developed market debt funds (not specialist in emerging market debt), driving our results on issuances and the size yield discount. That is, the interaction of the search for yield by large developed market investors with the benchmark threshold in $500 million seems to explain the patterns of issuances and yields observed in the data. The dominant role of non-specialist funds in driving the demand for index-eligible debt suggests that the demand for bond liquidity was more important than the desire to limit the risk of benchmark underperformance for explaining the post-2008 attraction of index-eligible emerging market corporate bonds.

Although the literature has emphasized the role of the monetary policy environment in shifting the demand for emerging market securities, it is conceivable that factors in emerging markets could also be contributing to aggregate changes in issuance behavior. For example, changes in the willingness of emerging market firms to issue bonds could reflect higher commodity prices, which increase the profitability of investment opportunities. The fact that we observe emerging market firms clustering their issuances at exactly $500 million after 2008, however, strongly suggests the importance of bond investor demand-side influences on the change in issuance behavior. It is very unlikely that

new investment opportunities leading to greater needs for funds are clustered exactly at issuance amounts of $500 million. Moreover, the fact that yield reductions are discontinuous at the $500 million threshold is highly suggestive of bond investor demand-side influences. Exogenous increases in firms' desires for more funds in each capital raising activity should lead to higher yields, not the lower ones we observe.

Next, we examine heterogeneous effects across the firm size distribution. Specifically, we focus on two hypotheses. First, if the change in investor demand for bonds is driving increased issuance, then large firms (defined as those with investment opportunities that are close to or above $500 million) should be the firms most likely to take advantage of the cost saving from issuing large bonds after 2008. The reason is that firms with large investment opportunities have more immediate use for funds raised in the bond market.[4] We find that, in fact, firms with sufficiently small asset size did not issue large bonds either before or after 2008.

Second, we expect to find that medium-sized firms (defined in relative terms and with respect to the size of investment opportunities in the context of our theoretical model) should see the greatest change in the probability of issuing large-denomination debt when its cost decreases. In contrast, the very largest firms might have been issuing large-denomination debt before 2008 simply by virtue of their more significant financing needs, and the very smallest firms saw prohibitive costs from issuing large bonds. We find that, indeed, medium-sized firms did see the largest increase in the probability of issuing large bonds after 2008. These findings are consistent with the view that changes in investor appetite for large bonds, and the consequences of those changes for reducing yields on large bonds, drove the increase in the issuance of large bonds after 2008.

[4] In contrast, smaller firms responding to incentives from the investor side will likely have a harder time using large issuance proceeds, implying a cost that should make them less likely than large firms to take advantage of the changes in market conditions that favor large-denomination debt.

To conclude the empirical analysis, we estimate how firms use issuance proceeds, distinguishing between the behavior of relatively large and small firms that issued large bonds. We show that emerging market firms that issued dollar-denominated bonds in international markets with face value equal to or greater than $500 million after 2008 tended to hold more cash for every dollar of debt issued than firms that issued lesser amounts. This result provides direct evidence of the trade-off firms faced when issuing large, index-eligible bonds after 2008: they could secure lower financing costs, at the expense of hoarding cash. Moreover, the increased holding of cash was greater for small firms that issued large bonds than for large firms that issued large bonds. This is consistent with small firms "stretching" to issue more debt than necessary to fund their investments in order to take advantage of the size yield discount.

Our paper contributes to at least three different literatures. First, by showing that bond index inclusion results in substantially lower yields and changes in issuance choices by firms, we contribute to a large literature analyzing the effects of indexing on securities prices and quantities. This literature has focused mostly on the effects of index rebalancing on the pricing and liquidity of stocks and bonds.[5] The evidence on the consequences of index investing has been slim (Wurgler, 2011). Our main contribution is to show that the use of indexes by institutional investors has important effects on firms' financial decisions and financing costs. Our evidence provides support for recent theoretical contributions that seek to explain how the use of benchmarks enhances the liquidity of securities (Duffie et al., 2017) and leads asset managers to effectively subsidize investments by benchmark firms (Kashyap et al., 2018).[6] Our paper extends to the global sphere the evidence that an

[5] See, among others, Harris and Gurel (1986), Shleifer (1986), Chen et al. (2004), Barberis et al. (2005), Greenwood (2005), Hau et al. (2010), Claessens and Yafeh (2013), Chang et al. (2015), Raddatz et al. (2017), and Pandolfi and Williams (2019).

[6] The magnitude of our estimates of the reduction in yields of index-eligible bonds is within the same range of the model-implied estimates provided by Kashyap et al. (2018).

increase in demand from passive investors increases firms' propensity to issue bonds in the United States (Dathan and Davydenko, 2018).[7]

Second, we contribute to a growing literature studying how the low interest rate environment after the GFC encouraged dollar-denominated corporate bond issuance around the world at the expense of other forms of financing, such as bank borrowing.[8] We show that the search for yield by institutional investors interacted with the institutional arrangements determining index eligibility. The market structure for international debt securities produced a rising incentive for emerging market firms to issue $500 million bonds after the GFC. This has important consequences for costs and firms' financing decisions.

Third, our paper is related to the literature analyzing the influences on firms' leverage and cash holdings choices, with particular emphasis on the increase in corporate cash holdings.[9] For example, Xiao (2018) argues that firms that substitute from bank financing to bond financing increase their holdings of cash for precautionary savings. In this paper we also find that the structure of the corporate bond market can create strong incentives for "over borrowing" by "medium-sized" firms, which end up holding more cash than needed for their investment projects.

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[7] Firms in the United States responded to that demand by issuing a disproportionate number of bonds with sufficiently large size just to be eligible to be included in the most relevant indexes. We show that this size effect is present for emerging market debt issuers and that there is a large yield discount for issuing index-eligible bonds. We also show that the increased size-related yield discount for emerging market corporate debt had important consequences for the firm size distribution of corporate debt issuers and for cash holdings, especially by medium-sized firms.

[8] See Adrian et al. (2013), Becker and Ivashina (2014, 2015), Shin (2014), Acharya et al. (2015), Carabin et al. (2015), Feyen et al. (2015), McCauley et al. (2015), Du and Schreger (2016), Lo Duca et al. (2016), Bruno and Shin (2017), Chang et al. (2017), Avdjiev et al. (2018), Cortina et al. (2018), and Huang et al. (2018) for analyses on the drivers of issuance in corporate debt markets and the relation with other instruments. A closely related literature studies the behavior of bond funds and how they affect financial conditions for firms (Chui et al., 2014, 2016; Ramos and Garcia, 2015; Goldstein et al., 2017; Shek et al., 2017). Other lines of research explore how investors increased their dollar-denominated cross-border holdings after 2008 (Maggiori et al., 2019), the effects of U.S. monetary policy on emerging market capital flows (Chari et al., 2019), and how low international interest rates induced more banking sector inflows and lower domestic borrowing costs (Di Giovanni et al., 2019; Kalemli-Ozcan, 2019).

[9] See, for example, Bates et al. (2009), Falato et al. (2013), Begenau and Palazzo (2017), and Bruno and Shin (2017).

The rest of the paper is organized as follows. Section 2 provides a theoretical framework to understand how the search for yield can create a yield discount for index-eligible debt, discussing the consequences for issuers. Section 3 describes our data sources. Section 4 presents our issuance-level results. Section 5 examines the role of mutual funds in driving our results. Section 6 reports firm-level evidence that distinguishes among the bond issuance and cash holding behaviors of firms of different sizes. Section 7 concludes.

2. Theoretical Framework

Our theoretical discussion has three parts. First, we review the literature explaining why inclusion in an index can increase the value of a security in the market. Second, we consider why the advantages of inclusion in an index should vary over time for emerging market corporate debt. Third, we apply these theoretical principles to a simple model of index inclusion in the emerging market corporate debt market, where issuance size thresholds are the key determinant of index inclusion.

2.1. Why Does Index Inclusion Increase Corporate Debt Securities Prices?

Duffie et al. (2017) show that introducing a market benchmark improves price transparency and promotes trade. Their paper explains how the existence of market benchmarks – defined as "a measure of the 'going price' of a standardized asset at a specified time" – mitigate search frictions, which are particularly relevant in over-the-counter markets, such as those for corporate debt. Although their study does not consider the effects of a benchmark on different securities, by construction, the information content of the benchmark should be greatest for those large securities that are components of the benchmark. Thus, the benchmark index reduces search costs and increases liquidity for the included securities that participants are willing to hold and trade.

Kashyap et al. (2018) study more directly how inclusion in an index produces a higher price because asset managers – who are penalized by tracking error – face a strong incentive to hold securities that are included in the benchmark, which they term the "benchmark inclusion subsidy." Furthermore, they show that the higher the risk of the investment, the greater the benchmark inclusion subsidy: the pricing premium for inclusion is an increasing function of the security's riskiness.

In summary, irrespective of whether securities are traded directly by investors or by intermediaries, securities that are included in benchmarks will tend to be more liquid and will enjoy a price premium related to liquidity. The presence of institutional investors who care about tracking error adds another pricing premium to securities that are included in the index. This premium, which gives rise to the size yield discount that lowers firms' cost of funds, is an increasing function of risk.

2.2. Why Does the Size Yield Discount Rise in Response to a Sudden Demand Increase?

We hypothesize that a surge in investor demand for high-yield dollar-denominated emerging market debt results in a large increase in the proportion of bonds that are managed by asset managers that have relatively little experience with investing in emerging market corporate debt. Some of these managers might enter as new emerging market specialist funds, and will be particularly interested in minimizing tracking error by purchasing index-eligible corporate debt. Others, such as those managing broader portfolios, will find it attractive to purchase index-eligible debt when "crossing over" into the emerging market asset class because of its greater liquidity. The assets of funds investing in broader portfolios tend to be large and managers value the ability to get in and

out of positions, especially those that are outside their primary mandate, without having a price impact.[10]

Three frictions in asset management can explain the increase in the fraction of the newly issued debt that is managed by fund managers that lack experience in the emerging market asset class. These are: a human-capital-scarcity friction, a relationship-value friction, and a position-size-limit friction.[11] The three frictions pertaining to fund managers, combined with the potential conservatism of new investors, have a clear implication. When low interest rates in developed economies produce a surge in demand for relatively risky emerging market corporate debt, the incremental portfolio position in the new asset class is likely to place more value on securities that are part of the index because of their greater liquidity and lower tracking error. For this reason, the price premium associated with index inclusion should rise. We summarize this implication as:

Hypothesis 1: *A sudden increase in demand for emerging market corporate debt should produce a relative increase in the demand for bonds included in global indexes. This should result in an increase in the price (i.e., reduction in the yield) of large, index-eligible debt.*

The mechanism behind the reduction in the yield of index-eligible bonds relies on an increase in the funds that are managed by managers who are less experienced in emerging market corporate debt and tend to hold more index-eligible bonds. This leads to the following corollary:

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[10] Emerging market securities, and especially corporate securities, are a highly specialized asset class. The risks that affect the value of these securities are often quite different from those affecting developed country sovereign or corporate debt (Beim and Calomiris, 2001; Kaminsky and Schmukler, 2008; Karolyi, 2015; Calomiris and Mamaysky, 2019). The risks include internal and external political and geopolitical events. As a response, a specialized group of mutual funds and hedge funds hire and train asset managers to manage portfolios of emerging market securities. This specialized group of managers are skilled at monitoring and managing the constellation of risks that are relevant to this asset class.

[11] First, it is not possible to suddenly increase the supply of trained and experienced emerging market corporate debt asset managers (a human-capital-scarcity friction). Second, preexisting relationships between investors and fund managers tend to encourage investors to place money in the funds they invested in before, which limits the movement of funds to specialized emerging market funds (a relationship-value friction). Third, fund managers cannot manage an unlimited amount of funds effectively, and so preexisting fund managers who are experts in the emerging market corporate debt asset class might not be able to take on all the new demand, even if ultimate investors were willing to move funds to specialist managers (a position-size-limit friction).

Cross-over Fund Corollary: *The surge in demand for emerging market corporate debt is driven by "cross-over" funds (those managing broader portfolios, such as global debt funds) with less experience in emerging market corporate. These funds will hold a larger proportion of securities that are included in the index than experienced emerging market corporate debt specialists. The new interest in emerging market corporate debt by cross-over funds can explain the size yield discount that is specific to that asset class and to the post-2008 period.*

2.3. Implications for Issuers: A Simple Model of Bond Issuance

Assume a continuum of emerging market firms that are potential bond issuers. Each firm has an investment opportunity of a predetermined scale equal to X, where the cumulative distribution function of X is given by $F(X)$. X represents the size of the firm in the model. Each investment opportunity has the same gross return R and has a positive net present value. Firms finance their investment issuing bonds in foreign currency, so each firm will issue at least the amount X. If firms issue more than X, they hold the difference between the amount issued and X as cash.

Assume there is a corporate debt index that includes only bonds of face value equal to or greater than 500 (equivalent to $500 million in the data). We assume there is a yield discount for index-eligible debt. The interest rate firms pay if they issue X is equal to Y if $X < 500$ and equal to $Y^{500} < Y$ if $X \geq 500$. We denote the size yield discount by D, where $D = Y - Y^{500}$.

Holding cash is costly because it earns a low return of $Y^* < Y - D$. Firms of sufficiently large size $(X \geq 500)$ do not have a choice to make; they simply issue a bond of size X and enjoy the lower financing cost. Other firms ($X < 500$), on the other hand, face a trade-off. They can issue X or "stretch," which implies issuing 500 and holding the remaining $(500 - X)$ in cash. Given the cost of holding cash, firms with $X < 500$, would

never choose to issue amounts of bonds between X and 500.[12] Profits under each alternative (issuing X or issuing 500) are given by:

$$\Pi^{X} = XR - XY, \tag{1}$$

$$\Pi^{500} = XR - 500(Y - D) + (500 - X)Y^{*}. \tag{2}$$

A firm will decide to issue 500 instead of X if and only if $\Pi^{500} > \Pi^{X}$, which implies:[13]

$$\frac{Y}{Y - D} + \frac{Y^{*}(500 - X)}{X(Y - D)} > \frac{500}{X}. \tag{3}$$

This inequality implies a critical value of X above which firms issue 500 in debt:

$$\hat{X} = \frac{500(Y - D - Y^{*})}{(Y - Y^{*})}. \tag{4}$$

Let I denote the optimal issuance size. Each firm's optimal issuance size depends on the size of the firm. Thus:

$$I = \begin{cases} X & if \quad X < \hat{X} \\ 500 & if \quad \hat{X} \leq X < 500. \\ X & if \quad X \geq 500 \end{cases} \tag{5}$$

Firms in the size interval $[\hat{X}, 500)$, stretch to issue 500. For these firms, the amount they issue (I) is greater than the amount of their investment opportunity (X). For smaller firms, $(X < \widehat{X})$, the amount of bond issuance is equal to the size of their investment opportunity. Let $G(I)$ denote the cumulative distribution function of issuance size (i.e., the percentage of issuers that issue the amount I or less):

[12] The profit of a firm with size $X < 500$, issuing X, is $\Pi^{X} = XR - XY$. If that firm issues $X' \in (X, 500)$, it obtains profits equal to $\Pi^{X'} = XR - X'Y + (X' - X)Y^{*}$. We can re-write those profits as: $\Pi^{X'} = XR - XY - X'Y + (X' - X)Y^{*} + XY = \Pi^{X} - (X' - X)(Y - Y^{*})$. Given the opportunity cost of cash ($Y^{*} < Y$), we get that $\Pi^{X'} < \Pi^{X}$, so the firm will never choose to issue $X' \in (X, 500)$.

[13] Intuitively, the first two expressions in this inequality capture the benefits to issue 500 (the lower interest rate paid on debt) and the additional revenues from interest on cash holdings. The third term captures the higher debt service cost associated with a larger amount of debt.

$$G(I) = \begin{cases} F(I) & if \quad X < \hat{X} \\ F(\hat{X}) & if \quad \hat{X} \leq X < 500 \\ F(I) & if \quad X \geq 500 \end{cases}. \tag{6}$$

Figure 1, Panel A plots the cumulative distribution of issuance size. The cumulative distribution is flat between $[\hat{X}, 500)$ because no firm issues in this size interval. There is then a discrete jump in the distribution at 500, driven by the mass of medium-sized firms that find it optimal to stretch and issue 500.

We model an increase in demand for emerging market corporate debt as an exogenous increase in the size yield discount D, in line with Hypothesis 1. Because $\hat{X}$ is a decreasing function of D, the increase in the size yield discount reduces the critical value of asset size above which firms issue 500. Intuitively, as the yield reduction benefit of issuing bonds of 500 increases, firms become more attracted to issue them. This leads to the following hypothesis:

Hypothesis 2: *A sudden increase in demand for emerging market corporate debt should result in an increased propensity to issue debt that is included in the index.*

We illustrate Hypothesis 2 in Figure 1, Panel B. The discrete jump of the cumulative distribution at 500 becomes larger, as more firms with values of $X < 500$ stretch to issue 500 with the increased size yield discount.

Note that $\hat{X}$ is a decreasing function of Y^*. The intuition is that a higher return on cash makes the strategy of issuing a bond larger than X and investing the remaining $(500 - X)$ in cash more attractive. This comparative static implication derived from Equation (4) – stating that the critical value $\hat{X}$ is lower for higher values of Y^* – is summarized in the following hypothesis:

Hypothesis 3: *A higher local interest rate should result in a higher propensity to issue large, index-eligible debt.*

The model also has several cross-sectional predictions. First, by construction, only firms with scale above $\hat{X}$ find it convenient to stretch and issue a 500 bond:

Hypothesis 4: *Large firms are more likely to issue large amounts of debt and, thus, large-denomination bonds that are eligible for inclusion in the index.*

In addition, as explained in Hypothesis 2, because an increase in the demand for bonds that are included in the index increases D (reducing their yield), it also reduces $\hat{X}$. A rise in D makes some firms that previously had an investment size (X) that was too small to warrant an issuance of 500 to switch to that type of issuance. This comparative static response to an increase in D is concentrated in "medium-sized" firms (those with investment opportunities in the neighborhood of $\hat{X}$). Firms with investment opportunities that are either greater than, or far smaller than, the prior value of $\hat{X}$, should not respond to the increase in D by increasing their bond issuance size. We summarize this comparative static result in Hypothesis 5:

Hypothesis 5: *An increase in the benefit of being included in the emerging market corporate debt index causes some medium-sized firms, which previously would not have issued a sufficient amount of debt to gain inclusion in the index, to issue bonds large enough to gain inclusion in the index. The change in the probability of issuing large bonds should be greater for medium-sized firms than for firms in the upper and lower tails of the size distribution.*

Lastly, an increase in the size yield discount D has no effect on the cash holdings of sufficiently large firms, defined as those that would issue 500 or more in debt irrespective of the changes in the yield discount. In contrast, medium-sized firms that prior to the increase in D would have chosen to issue X in debt, respond to the increase in D by choosing to issue 500 in debt, rather than $X < 500$, and accumulate cash equal to $(500 - X)$. Thus, within the group of firms that choose to issue 500 in bonds, firms of

relatively small size will increase their cash holdings more than relatively large issuers of large bonds. We summarize this result in Hypothesis 6:

Hypothesis 6: *Within the group of large bond issuers, relatively small-sized firms will increase their cash holdings by more than relatively large-sized firms.*

3. Data

We use data from different sources. The data on bond issuances come from the Thomson Reuters Security Data Corporation Platinum database (SDC Platinum). This database contains transaction-level information on new issuances of corporate bonds by public and private firms. From this database, we obtain the date a bond is issued, the face value of the bond, and the yield to maturity at issuance. SDC Platinum also contains additional information that we employ, including the rating of the firm at issuance, the country of the firm, the industry of the firm, the market in which the bond is issued, the type of bond (fixed or flexible coupon), the currency of the bond, whether the issuance is public or private, and the maturity at issuance of the bond.

We focus on issuances of corporate bonds in U.S. dollars, which is a prerequisite to being included in the bond indexes we analyze. We study issuances that take place only in international markets, defined as a firm issuing a bond in a market that is different from its country of origin. Additionally, we compare international dollar-denominated bonds issued by emerging market firms with a sample of investment grade bonds issued by firms from developed markets. In this way, we are able to compare yield and issuance outcomes for firms that are inherently riskier (emerging market firms) with a control group of firms that are considered relatively safe (investment grade developed market firms). This comparison is relevant because we hypothesize that investors' search for yield leads them

to increase their exposure to riskier firms around the world.[14] Importantly, investment grade developed market firms should serve as a reasonable comparison group because the major indexes that track investment grade developed market debt (such as the Bloomberg Barclays Aggregate Bond Index) do not have a $500 million index inclusion cutoff.

We include firms from 68 developed and emerging economies (countries or markets) for the period 2000-2016. We use the nationality of the firm that is provided by SDC Platinum to classify firms into developed and emerging markets (as listed in Appendix Table 1).[15] We include both financial and non-financial firms, because the market structure effects that we document affect issuances by any type of firms. However, our results are robust to excluding financial firms. Our sample includes 19,906 issuances from 4,965 firms.

We complement these data with additional information, mainly from three different sources. We use injections/redemptions to emerging market debt funds from Emerging Market Portfolio Research (EPFR) Global to gauge changes in investor interest in emerging market debt. We use data from Morningstar Direct on the asset level portfolios of mutual funds to understand the different types of investors holding emerging market corporate debt. For the use-of-funds analysis, we merge the SDC data with Worldscope data, which provide information on the financial statements of firms. Those data include important information on firms' assets, cash holdings, and sales (reported in balance sheets, income statements, and cash flow statements). Worldscope data are available for 44% of the firms in the SDC database, resulting in a merged dataset of 2,190 firms.

[14] In the Appendix, we provide additional results using jointly high-yield developed market firm bonds and emerging market firm bonds.

[15] SDC Platinum contains a category that classifies the type of bond issued, which sometimes conflicts with our classification using the nationality of the issuer. If this category indicates that an emerging market firm issues the bond, we classify it as such regardless of the nationality of the firm provided by SDC. This affects only 300 observations (1.5% of our sample).

4. Corporate Bond Issuances

4.1. New Findings on Yields and Issuance Behavior

As discussed in Section 2, we conjecture that part of the surge in investor interest in emerging market corporate debt after the GFC reflected a change in the investor base. We hypothesize that this compositional shift, together with the existence of the CEMBI Narrow index, with a $500 million minimum cutoff, produced an increase in the interest of international investors for large ($500 million and greater) emerging market corporate bonds.

To study how the shifts in size-dependent investor interest affected market yields, we begin with simple comparisons. In Figure 2, we plot the evolution of the yield to maturity during 2000-2016 for bonds issued by emerging market corporates with face value below $300 million (0:300), between $300 and $500 million [300:500), and equal to or above $500 million [500:1,000). We observe that yields for all issuance sizes declined after the GFC, but the effect is particularly pronounced for [500:1,000) bonds.

In Figure 3, Panel A, we aggregate within the pre- and post-crisis periods and compare the average yield to maturity of bonds of different issuance size for the two time periods. We observe that, on average, yield to maturity decreases with issuance size. More importantly, consistent with Hypothesis 1, after 2008 we observe a sharp decline in the yield when moving to issuance sizes equal to or above $500 million (a fall of 115 basis points). This decline at the $500 million threshold is much more pronounced than that observed in the pre-2008 period, suggesting that after 2008 there was an increase in bond investors' demand for bonds of issuance size equal to or greater than $500 million. There is also a decline in the yield when moving to the $300 million threshold, consistent with the CEMBI Broad having a minimum size requirement for inclusion of $300 million.[16]

[16] The CEMBI Broad includes smaller securities and has a cutoff of $300 million. The CEMBI Narrow has an inclusion cutoff of $500 million and is composed of more liquid and selected securities. At the end of 2017, $61 billion tracked the CEMBI Broad, and $24 billion the CEMBI Narrow. Whereas this could indicate

However, compared to the pre-2008 period, yields for $500 million emerging market corporate bonds declined after 2008 by relatively more.[17]

Figure 3, Panel B presents the same analysis as Panel A for investment grade corporate issuers in developed markets. Yields for issuances at the $500 million threshold declined after 2008 by about 42 basis points. However, that decline was not much greater than what is observed for the pre-2008 period, 15 basis points, suggesting a much larger relative post-crisis effect on yields for emerging market firms.

Next, we study the implications of the reduction in yields of large, index-eligible bonds on corporate bond issuance behavior. Figure 4 plots the evolution of the total value of U.S. dollar-denominated corporate bonds issued by emerging market firms (Panel A) and the evolution of the total number of issuances (Panel B). The figure shows that the value of international bond issuances by emerging market firms increased sharply after 2008. Between 2008 and 2013, the value of those bond issuances increased by 380%. Consistent with Hypothesis 2, Table 1 also shows that bonds equal to or above $500 million represented only 33% of the total value of bonds issued between 2000 and 2008. After 2008, their share of the total nearly doubled to 62%. This is an important new finding: after 2008, not only did total emerging market corporate bond issuances increased, there was also a dramatic compositional shift from small issuances to large issuances ($500 million or more). Similarly, whereas the number of bonds issued with face value equal to

a larger preference toward $300 million bonds, the assets tracking the EMBI (with a cutoff of $500 million) have been much larger than the assets tracking specifically corporate debt in emerging markets. For a more detailed account of the indexes, timing of their launching, and requirements for inclusion, see Appendix 1 and Appendix Table 2.

[17] Another notable feature in Figure 3, Panel A is the increase in yields from issuing bonds in the bucket size [100:200) to issuing in the bucket size [200:300) in the post-2008 period. It is possible that firms that issued in the [200:300) range were constrained to do so because they could not stretch to issue $300 or $500 million. Firms that were unable to stretch in the post-2008 period might be riskier than firms that issued [200:300) bonds in the pre-2008 period, which could explain why yields for [200:300) issuances remained higher in the post-2008 period. In our formal regression analysis, when controlling for risk, we do not observe this increase in yields from issuing [100:200) bonds to [200:300) bonds, which is consistent with this explanation.

or above $500 million represented 11% of the total number of bonds between 2000 and 2008, their share increased to 33% after 2008, as illustrated in Table 1.

To study this compositional change in more detail, Figure 5, Panel A shows the cumulative distribution of emerging corporate bond issuances by size. We plot the distribution for the periods before and after 2008. Firms issue bonds of all sizes, ranging from amounts less than 10 million to nearly a billion dollars. For the post-2008 period, we observe a discrete jump in the distribution at $500 million, indicating a new discontinuity in the distribution, with 18% of all bond issuances having a face value exactly equal to $500 million. This discontinuity was much more muted in the pre-2008 period. The empirical cumulative distributions of issuance size resemble the model-based distributions plotted in Figure 1.

The fact that we observe emerging market firms clustering their issuances at exactly $500 million after 2008 points to the importance of the investor side. That is, the investor demand for bonds appears to have influenced the change in issuance behavior by firms. We observe a smaller increase for issuances of $300 million after 2008, despite an important decrease in yields in that threshold. One potential explanation is that, because the benefit of reduced yield for issuing $500 million bonds is much larger than for issuing $300 million bonds, many firms decided to issue the former rather than the latter.

Figure 5, Panel B replicates the previous figure, but for the sample of investment grade firms issuing dollar-denominated bonds in developed economies. For those issuers, we observe a smaller jump in the distribution at $500 million, and one that is more similar before and after 2008. This is consistent with low-risk, advanced economy firms with lower bond yields responding less to the post-2008 search-for-yield phenomenon. The difference between corporates across the two types of countries suggests that changes in the investor

side during the post-GFC environment was much more relevant for emerging market corporate bond issuers than for developed country investment grade issuers.[18]

Table 2 reports the statistical significance of the differences in means for yields and issuances, before and after 2008, for emerging economy issuers and investment grade developed market issuers. Panel A shows that yields fell after 2008 for both bonds with face value in the [400:500) range and those in the [500:600) range (expressed in millions of U.S. dollars). But they fell much more for emerging market issuances in the [500:600) range. The triple difference test is statistically significant and shows a differential of almost 100 basis points in the decline in yields between emerging and developed markets. The table shows analogous comparisons in the issuance activity (Panel B), which reacted positively to the yield decrease, again especially in emerging markets in the [500:600) range.[19]

4.2. Regression Analysis

We next use regressions to estimate how yields and issuances of bonds of different issuance size categories changed after 2008 for emerging market firms. These regressions allow us to control for observable and unobservable characteristics that can predict yields and issuance size. As before, we include both emerging market issuers and investment grade developed market issuers in our analysis. We estimate the following type of regression for bond yields:

[18] Results for high-yield developed country issuers' yields and issuances are very similar to those for emerging market firms (Appendix Figure 2). These two sets of firms share two important characteristics. First, they are inherently riskier than investment grade developed market firms. Furthermore, these high-yield developed economy firms also can be included in special indexes that are similar to the CEMBI and EMBI. The Bloomberg Barclays High Yield Very Liquid Index is an important benchmark for these firms that only includes high-yield dollar-denominated debt from developed market firms, with a minimum issue size of $500 million.

[19] Appendix Table 3 reports similar results using narrower bins.

$$Yield_{it} = \sum_{Z=EM,DM} \sum_{X=100,\ldots,900} \beta_X^Z * D_{[X:X+100)_{it}} * D_Z$$

$$+ \sum_{Z=EM,DM} \sum_{X=100,\ldots,900} \beta_X^{Z,Post} * D_{[X:X+100)_{it}} * D_Z * Post + \tag{7}$$

$$\theta_c + \theta_{jy} + \theta_{qy} + Z_{it} + \varepsilon_{it}.$$

In this specification, $Yield_{it}$ is the yield of a bond issued by firm i at time t (the exact date the bond was issued). $D_{[X:X+100)_{it}}$ is a dummy variable that indicates if the bond issued is of size $[X: X + 100)$, where $X = 100, 200, \ldots, 900$ million U.S. dollars.[20] D_Z is a dummy variable that indicates whether a firm belongs to group $Z = EM, DM$. $Post$ is a dummy variable that indicates if a bond was issued in the post-2008 period. θ_c, θ_{jy}, and θ_{qy} are country, industry-year, and quarter-year fixed effects. Z_{it} is a vector of time-invariant bond controls for the bond issued by firm i at time t, including whether the bond rate is fixed or flexible, whether a bond is issued in public or private markets, whether the issuer is foreign owned, and a dummy variable indicating whether the firm is government owned. The regressions also control for the maturity and rating of the bonds.[21] We cluster the standard errors in all regressions by country and quarter-year.

We are interested in the estimation of $\beta_X^{Z,Post}$. These coefficients indicate, for each group (emerging market issuers or investment grade developed market issuers), how the yield has changed in the post-2008 period relative to the pre-2008 period for a bond of size $[X: X + 100)$. More specifically, we estimate the size yield discount for emerging markets, $\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}$, and compare it with the size yield discount for investment grade developed market firms, $\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post}$.

[20] No firm issued bonds equal to or larger than one billion dollars in our sample.

[21] Ideally, we would like to include firm fixed effects in the regression. However, bond issuances by emerging market firms are sporadic, so there are only few firms that issued multiple times in our sample (in particular, before and after 2008). As a result, we lack statistical power to include firm fixed effects in our estimation. For this reason, we add country fixed effects and also include several bond controls, including credit ratings, which represent an overall assessment of the credit worthiness of the bond issuer.

In our issuance regressions, we use the following specification, which we estimate separately for each bucket size:

$$Issuance_{[X:X+100)_{it}} = \theta_c + \theta_{jy} + \theta_{qy} + \beta * Post * D_{EM} + Z_{it} + \varepsilon_{i,t}, \qquad (8)$$

where the dependent variable is a dummy variable that indicates whether a bond issued by firm i, at time t is of size $[X: X + 100)$, where $X = 100, 200, \ldots, 900$. In this equation, we are interested in β, which measures the change in the probability of issuing a bond of a certain size, before and after 2008, for emerging market firms relative to the same change for developed economy firms.

Before the formal regression analysis, we present the evolution over time of the raw data of our variables of interest. Figure 6, Panel A displays the evolution of the average yield to maturity over the period 2000 to 2016 for $500 million bond issuances by emerging market issuers and developed market investment grade issuers, respectively. We observe a similar pattern in yields until 2008, but we observe a sharp decline in the yields of $500 million bonds after 2008, more prominently for emerging market firms. In Panel B, we plot the size yield discount, namely the difference between the average yield to maturity of [500:600) and [400:500) bonds for both emerging and developed market issuers since 2001 (when enough observations are available). Whereas the size yield discount is similar for the two types of firms before 2008, there is a persistent larger size yield discount for emerging market firms after 2008. Panel C shows the evolution of the number of bond issuances of size equal to $500 million, relative to the total number of issuances, for the same two sets of issuers over the same period. Although there is a slight growth of this type of issuances before 2008 by emerging market firms, there is a much sharper increase in the number of $500 million issuances after 2008 only for emerging market bond issuers.[22]

[22] In our formal regression analysis, we show that there is no significant size yield discount in the years just prior to 2008. Additionally, the issuance of $500 million bonds by emerging market firms do not seem to be different from developed market firms in the period 2004-2008 when we control for observable characteristics, as shown in Section 4.3.

Figure 7 illustrates both the sharp drop in the size yield discount at the $500 million threshold and the increase in the volume of $500 million issuances after 2008. On the other hand, in the years prior to 2008 there is a slight increase in bond issuances of greater than $500 million that coincides with an *increase* in the yield to maturity of the $500 million and above bonds. The positive correlation between issuances and yields prior to 2008 suggests that the increase in $500 million bond issuances in those years was driven by a higher supply of bonds (demand of funds) by firms. After 2008, the negative correlation between issuance and yields of $500 million bonds suggests that the increase in issuances was the result of a higher investor demand for those bonds. A similar pattern holds when using bonds in the [500:600) range (Figure 7, Panel B). Moreover, the increase in the total volume of issuances after 2004 likely helped to explain the creation of the CEMBI Broad and Narrow indexes in 2007, which encouraged issues at or above the $300 and $500 million thresholds.

We report the results of estimating Equation (7) in Table 3. To make the table more readable, we report only the coefficients for $\beta_X^{EM,Post}$ and $\beta_X^{DM,Post}$ in the table.[23] We compare the size yield discount for emerging market issuers after 2008 with the size yield discount for developed economy investment grade issuers after 2008, taken relative to the pre-2008 values. The size yield discount for emerging market firms ($\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}$) is 121 basis points, which is statistically different from zero. When we compare this with the size yield discount of developed market firms $(\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}) - (\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post})$, the difference is 99 basis points. The size yield discount for emerging market firms is 93 basis points in the specification with the full set of controls and fixed effects (Table 3, column 2), and when compared to the size yield discount of

[23] In Appendix Table 4, we report all the estimated coefficients for the pre-2008 period.

developed market firms, this number is 76 basis points. Thus, we consider 76 basis points to be a conservative estimate of the post-2008 size yield discount.

We obtain very similar results when we control for the log of issuance size in column 3. Additionally, in column 4, we control for the log of assets of the firm issuing a bond. Since we do not have assets for all the firms, our sample size drops considerably but the main results are very similar and in fact the size yield discount becomes slightly larger.[24]

With respect to issuance quantities, we estimate Equation (8) using the issuance indicator for bonds in different size bins as the dependent variable.[25] Table 4 shows that the coefficient of the interaction term is positive and statistically significant for issuances of size between $500 and $600 million. This means that after 2008 emerging market bond issuers were 8.3 percentage points more likely to issue bonds in this size bin, relative to developed economy investment grade issuers. This is a significant effect, especially when compared to the average probability of an emerging market firm issuing a [500:600) bond before 2008, which is 10.1%.

The issuance of $300 to $400 million bonds also increased after 2008. Consistent with this, the size yield discount for $300 relative to $200 million is 58 basis points, significantly different from zero. On average, the effects for the $300 million issuances and yield to maturity are smaller than the ones for the $500 million bonds, so we focus mostly on the latter. Nonetheless, the effects in $300 million bonds are interesting because they are consistent with the other benchmark index, the CEMBI Broad, having a threshold at

[24] Results are very similar when we use spreads over the maturity-relevant U.S. treasuries, rather than yields, as the dependent variable.

[25] In additional robustness tests, we also include maturity-time and ratings-time fixed effects and results remain very similar.

$300 million.[26,27] We interpret the existence of two size yield discounts at the $300 million and $500 million threshold as indicating that some firms – those that are too small to be able to reach to issue $500 million – might reach to issue $300 million. Firms for which the costs of reaching to $500 million are not prohibitive, will have incentives to do so, given the larger size yield discount at that threshold.

In our main regressions, we focus on issuance size bins rather than on exact issuance size values because for some issuance values there are very few transactions. That said, in Appendix Tables 5 and 6, we show that when we replace the [$500, $600) million size bins with the exact $500 million values, our results for yields and issuances remain unchanged. This indicates that our main results are driven by the changes of yields and issuances of bonds with issuance size of exactly $500 million.

4.3. Placebo and Robustness Tests

To provide a placebo test of whether our results are driven by the index inclusion requirements, we re-estimate Equations (7) and (8) using bonds that are not included in the CEMBI index because of other index-inclusion requirements unrelated to size. Specifically, we keep only floating rate bonds and bonds with less than five years of maturity. Because these bonds are not included in the index, irrespective of size, we expect to find no effects on issuances and yields at the $500 million threshold. Table 5, column 1 reports the results of this exercise for yields and Table 6, Panel A reports the results for issuances. Indeed, we observe no significant size yield discount (the estimate is 3 basis points) and no significant increase in [500:600) issuances. This test supports the hypothesis

[26] In unreported results, we also test whether the treatment effect of index inclusion interacts with the Treasury basis variable constructed by Jiang et al. (2018, 2019), which they interpret as a convenience yield for U.S. Treasuries. Most of the variation in that variable occurs during the 2007-2009 crisis. We find that there is no evidence of an interaction after the crisis.

[27] Table 4 estimates Equation (8) for a sample of strictly positive issuance observations. In Appendix Table 7, we re-estimate the equation for a sample containing all observations (including those with no issuances) and the results remain unchanged.

that the decrease in yields and the increase in issuances after 2008 for bonds of size between $500 and $600 million reflect the effect of index inclusion, not size per se.

We conduct another placebo test by changing the time sample of our estimations. We use 2000-2008 as our sample, and we consider the post period as the years 2004-2008 for yields (Table 5, columns 2 and 3), and issuances (Table 6, Panel B). In this case, the size yield discount is 11 basis points when we consider the full set of controls and fixed effects (Table 5, column 3). So, there is no large size yield discount associated with the increase in large bond issuance that occurs in the years just prior to 2008. Moreover, we find no differential effect for issuances of [500:600) bonds in the period 2004-2008 relative to 2000-2003 when comparing emerging vis-à-vis developed market firms.

We also perform a robustness test where we use a narrower window for our main estimations, considering only the period from 2004-2012, and defining the post period as 2009-2012. The findings regarding the post-2008 period size yield discount (Table 5, column 5) are very similar to our main estimation, being 105 basis points for emerging market firms, and 79 basis points when we compare it to the developed market firms size yield discount. Both estimates are statistically significant from zero at the 95% confidence level. We also observe a slight increase in the probability of issuing [500:600) bonds for emerging market firms relative to developed market firms in this narrower post period (Table 6, Panel C).

4.4. Carry Trade Influences

Our theoretical framework in Section 2 also predicts that, ceteris paribus, firms should be more likely to issue $500 million bonds when they are located in countries where there is a relatively large expected local interest rate from investing in cash (Hypothesis 3). Thus, in Table 7, we remove the country fixed effects to see if we can explain cross-country differences in emerging market corporate debt issuance as related to carry trade incentives,

exploiting the cross-country variation in our sample. For this test, we concentrate on emerging market firms in the post-2008 period. We regress a dummy that is one if a firm issued a $500 million bond and zero if the firm issued any bond below that size on our carry trade variable.[28]

Following Bruno and Shin (2017), our measure of carry trade takes the form of a "carry Sharpe ratio," which is the difference between the local money market interest rate and the U.S. money market interest rate. We deviate from their formulation by adjusting for exchange rate risk by dividing the interest rate differential by the annualized variance of the exchange rate during the previous two quarters.[29] Like a Sharpe ratio, this measure captures the expected profit from investing in local currency adjusted by exchange rate risk. We include time fixed effects to exploit the cross-country variation, along with different sets of fixed effects and bond controls. We find that there is a positive and statistically significant association between the carry trade measure and the probability of issuing $500 million bonds.

In results not reported here, we find no statistically significant carry effect when we do not adjust for the volatility of the exchange rate. This suggests that firms do take the risk of exchange rate depreciation into account when deciding to issue dollar-denominated bonds. Not surprisingly, when we include country fixed effects, there is no significant carry effect. That finding is consistent with recent research showing that, in emerging markets, the exchange rate risk captured by the carry trade variable is largely spanned by country fixed effects (Calomiris and Mamaysky, 2019).

[28] A related literature analyzes the time series variation in uncovered interest rate parity deviations. Kalemli-Ozcan and Varela (2019) show that these deviations are closely related to interest rate differentials (the carry trade) in emerging markets. Our Hypothesis 3 is a cross-sectional prediction about the carry trade. Therefore, our prediction is more closely linked to the literature on carry trade and global dollar credit, as in Bruno and Shin (2017).

[29] Results are similar when we use exchange rate volatility rather than variance, but variance is preferable in theory. The reason is that variance is measured in units of per time period, like interest rates and expected returns. Thus, using variance for the denominator makes the carry trade ratio more consistent as a measure of risk-adjusted returns. We thank Pete Kyle for pointing this out to us.

5. The Role of Institutional Investors

We posit that the driver of change in the importance of index eligibility over time is the movement to a low interest rate environment in developed economies. The search for yield across the world and the increase in investor interest in emerging market corporates raised the value of holding large emerging market bonds that are part of indexes.

We also conjecture that the composition of international investors changed from a near exclusive reliance on a preexisting group of specialist emerging market corporate bond investors toward a broader investor base. The latter includes old and new emerging market sovereign bond funds and developed economy corporate bond funds, managed by agents with relatively little prior experience in the emerging market corporate asset class. We label these developed market institutional investors and emerging market sovereign investors the "cross-over investors," because they are crossing over from other asset classes into the emerging market corporate debt asset class. In the cross-over corollary in Section 2, we hypothesize that these cross-over investors are the ones that have driven the surge in the demand for emerging market corporate debt and that, relative to specialist funds, they tend to invest more in index-eligible bonds.

In this section, we explicitly test the cross-over corollary, using data on different funds' holdings of emerging market corporate bonds. Figure 8, Panel A shows evidence that connect investor interest with changes in the composition of emerging market corporate bond issuance. It plots the cumulative flows into mutual funds that invest in emerging market sovereign and corporate debt from 2003 to 2016. It also plots the number of $500 million bonds issued by emerging market firms, as a fraction of all bonds issued by these firms. The correlation between the two is very high (0.93), showing a clear connection between the growing investor interest in emerging market debt and the growing relative importance of issuances that just meet the threshold of $500 million.

To more formally test our cross-over corollary, we assemble data from Morningstar Direct on debt mutual funds that we classify into emerging market corporate specialists and cross-overs, using the categories provided by Morningstar. Within the cross-over category, we also classify funds into emerging market non-specialists (those that invest in sovereign emerging market bonds), and developed market funds (Appendix 2). Most of the funds in each category hold at least one emerging market corporate bond in their portfolio.

Our data for 2000-2016 contain 1,466 funds, with an average fund size of $1,421 billion in assets under management (Table 8). Funds that specialize in emerging market corporate debt are relatively small compared to non-specialists. Within each category, emerging market corporate debt constituted, on average, 1%, 24%, and 56% of the debt portfolios of developed market, emerging market non-specialist, and emerging market corporate specialist funds, respectively.

We highlight the importance of each type of fund in terms of their investments in the dollar-denominated emerging market international corporate debt market.[30] On average, cross-over funds together invested $34 billion in emerging market corporate bonds, while emerging market corporate specialists invested $4.9 billion in these securities during 2000-2016 (Table 8, column 7). Although advanced market funds held a low fraction of emerging market securities in their portfolios (as a fraction of their total holdings), the fact that the sizes of those funds are very large implies that they held a substantial dollar amount of emerging market debt. These data show the importance of cross-over investors in this market.

Figure 8, Panel B presents our first piece of evidence regarding the cross-over corollary, which refers to changes in behavior post-2008. This figure plots changes over

[30] Most of the funds in our sample invest only in dollar-denominated emerging market corporate bonds issued in international markets. In 2016, these bonds represented 85% of their holdings in emerging market corporate bonds.

time in the total holdings, in U.S. dollars, of emerging market corporate debt securities by the different types of funds. Since 2008, the importance of cross-over funds in the holdings of emerging market corporate debt grew substantially, holding more of the amount outstanding of these securities than emerging market corporate specialist funds. Thus, this figure shows that the increase in the demand for emerging market corporate debt securities was mostly driven by cross-over investors, which together were about nine times larger than specialist funds during 2011-2016.

Table 9 displays our second piece of evidence for the cross-over corollary. For each type of fund, we first compute the total amount of U.S. dollar-denominated corporate emerging market bonds (issued in international markets) held in the portfolio. Then, we compute the percentage of that amount held in each of the following three categories: bonds with face value less than $300 million, bonds with face value between $300 and $500 million, and bonds with face value equal to or greater than $500 million. We compute the average percentage held in each specific bucket size by each mutual fund category during 2009-2016. We compare across funds of different categories, and with respect to the outstanding amount of corporate bonds issued by emerging market firms.

The results lend support to the cross-over corollary. Cross-over funds invest relatively more in bonds with face value equal to or greater than $500 million. In fact, we obtain a consistent fund pecking order with 78%, 75%, and 63% invested in this bucket size by developed market, emerging market non-specialist, and emerging market corporate specialist funds, respectively. We report differences in means tests for each type of cross-over fund relative to the corporate emerging market funds (Table 9, column 4). We find that emerging market non-specialist funds and advanced market funds display statistically significant differences with respect to the holdings of corporate emerging market specialist funds. Additionally, we compare the portfolio of each type of fund with the total amount outstanding of dollar-denominated international corporate emerging market bonds (Table

9, column 5).[31] In general, corporate emerging market specialist funds held a portfolio similar to the outstanding amount of corporate bonds, whereas cross-over funds skewed their portfolio toward large-denomination bonds.

Taken together, the results in Figure 8 and Table 9 show that changes in cross-over funds are likely to have a much bigger effect on emerging market bonds than changes in specialist funds, particularly on large bonds. Their greater influence is the result of both their significantly larger size and their heavier loading on $500 million bonds. We noted in the introduction that there are two motives that can drive the demand for securities that are included in an index: the desire to limit underperformance relative to a benchmark, and the desire for liquidity. The fact that cross-over investors (whose performance does not track the CEMBI index) account for most of the rising demand for bonds included in the index suggests that the primary driver of the post-2008 reduction in yield for index-eligible bonds was the demand for liquidity.

6. Consequences for Firms

Our analysis of yields and issuances in Section 4 is highly suggestive that a shift in bond investor demand (search for yield) has been the main driver of the post-2008 yield decline and issuance increase for large emerging market corporate bonds. However, that evidence does not rule out some potential influences from the issuer side – such as improvements in investment opportunities – in driving some of the increase in large-face value emerging market corporate bond issuances.

In this section, we consider how firm-level differences could affect issuance behavior. This analysis provides additional evidence that sheds more light on the role of bond investor demand changes in driving our results. The evidence is reported in two

[31] We compute the total amount outstanding as the average U.S. dollar-denominated outstanding value of all the international corporate emerging market bonds included in Thomson Reuters Security Data Corporation Platinum database (SDC Platinum) during 2009-2016.

parts. First, we test the two implications about bond demand shifts for cross-sectional differences in issuer responses (Hypotheses 4 and 5), both of which follow from the fact that different sized firms face different economic costs when issuing large amounts in the bond market. Second, we examine the uses of funds raised by firms of different sizes that issue large bonds (Hypothesis 6) as part of our firm-level analysis. In theory, firm size should be measured with respect to the size of a firm's investment opportunity. In practice, investment opportunity size is not observable, so we use asset size as a proxy, assuming a positive correlation between the two. Medium-sized firms are defined, in theory, as those with investment opportunities just below the pre-2008 critical value $\hat{X}$. We have no theoretical prior to predict the corresponding asset size of medium-sized firms in the firm size distribution. In our empirical work, we identify medium-sized firms as those occupying the range of the asset size distribution between small firms (which are too small to respond to the post-2008 increase in the yield discount for $500 million bonds) and large firms (which are so large that they issued bonds equal to or greater than $500 million before and after 2008).[32]

6.1. Bond Issuance Differences and Firm Size

Figure 9 tests a firm-size related implication of the post-GFC investor demand-side shift: medium-sized firms should display the biggest change in their propensity to issue large, index-eligible bonds (Hypothesis 5). Prior to 2008, medium-sized firms should have been less likely than large firms to issue large bonds, but unlike small firms, medium-sized firms (those willing to accumulate excess cash balances to access low-interest funding) decided to stretch and issue $500 million bonds after the GFC. Figure 9 is consistent with this

[32] Firms likely differ in the ratio of asset size relative to investment opportunity size. In our empirical work, therefore, we do not expect to identify a single threshold value of assets that corresponds to a fixed proportion of the theoretical threshold value of medium-sized firms' investment opportunities. Rather, we expect to find that the responsiveness of firms to the increase in the post-2008 yield discount on large bonds should be zero for very small asset size, then rise as asset size increases, and decline at very large asset size.

prediction: the size distribution of firms issuing bonds of $500 million or more shifted to the left after 2008.

In addition, we conduct Probit and Logit estimations, separately for emerging market issuers and developed market investment grade issuers, to estimate how firm size affects the change in the probability of issuing a large bond (equal to or greater than $500 million) after the GFC. We estimate:

$$D_{i,t} = \beta_1 Pre + \beta_2 Post + \beta_3(Pre * Size_{it}) + \beta_4(Post * Size_{it}) + \varepsilon_{i,t}, \qquad (9)$$

where $D_{i,t}$ is a dummy variable equal to one if a firm issued a bond with face value equal to or greater than $500 million, and zero if it issued a bond of smaller size. We measure the size of a firm with the log of total assets.

Table 10, Panel A shows that both interaction terms (β_3 and β_4) are positive and highly significant. This indicates that larger firms were more likely to issue larger bonds than smaller firms, both before and after the GFC. This is consistent with Hypothesis 4. Moreover, for firms of any size, the change in the likelihood of issuing a large bond after the GFC can be calculated from the estimated coefficients reported in Table 10, Panel A. These implied changes (which we label "marginal effects") are reported in Table 10, Panel B for firms of various sizes. Consistent with Hypothesis 5, we find that the marginal effects are zero for very small asset size, then rise as asset size increases, peaking at around the 90th percentile, and decline toward zero thereafter. We interpret this as evidence that medium-sized emerging market firms see the greatest change in the probability of issuing large bonds. The changes reported in Panel B for medium-sized firms are large and statistically significant in emerging markets, but small and insignificant in developed economies. Figure 10 plots the probability of issuing large bonds, pre- and post-2008 for emerging and developed market firms, as a continuous function of asset size.

These results are consistent the view that a shift in bond investor demand for index-eligible debt acted as a treatment effect on emerging market bond issuers. Large

firms were exogenously positioned, by virtue of their size, to better take advantage of the new issuance opportunities, which required firms to issue bonds of large size. Some medium-sized firms in emerging markets, seeking to borrow at unusually low rates available in the post-2008 environment, stretched and engaged in unprecedented issuance of large (index-eligible) bonds, which resulted in a relatively significant increase in the probability of large bond issuance by those firms.

6.2. Uses of Funds from Large Bond Issuances by Firms of Different Sizes

Lastly, we investigate the uses of funds by emerging market firms issuing large-denomination bonds. We focus on differences in the uses of funds by relatively small and large firms issuing them. Firms taking advantage of the yield discount in $500 million bonds might be issuing bonds that are larger than the investment project opportunities they face. As a consequence, some large bond issuing firms might devote a larger share of the money raised in these issuances towards cash and short-term investments. To study this, we follow the methodology by Kim and Weisbach (2008) and Erel et al. (2012). We focus exclusively on the use of funds as measured by changes in cash and short-term investments.

We begin by calculating the accumulation of cash two years after each firm's bond issuance by estimating the following regression:

$$Cash_{ict} = \alpha_c + \alpha_t + \beta log\left[1 + \left(\frac{Issuance}{Assets}\right)_{ict}\right] + \gamma log\left[1 + \left(\frac{Other\ Sources}{Assets}\right)_{ict}\right] + Z_{ict} + \varepsilon_{ict}\ , \tag{10}$$

where $Cash = \log\left[\frac{V_n - V_0}{Assets} + 1\right]$. V stands for cash holdings and short-term investments. $n = 2$ denotes the time period considered for the analysis, that is, the second year after

the issuance that occurs at $n = 1$.[33] $Assets$ are the total assets of the firm in the year previous to the issuance. $Other\ Sources = log\left[\frac{\sum_{i-1}^{n} Total\ sources_i - Issuance}{Assets} + 1\right]$, where total sources of funds represent the total funds generated by the firm internally and externally during a given year. Z_{ict} are firm observable characteristics that we use as controls.

Figure 11, Panel A reports the results of estimating Equation (7) for the change in cash and short-term investments as dependent variable, controlling for the log of initial assets in the year before issuance, growth of sales, and the standard deviation of growth of sales.[34] We report the dollar effects, breaking down our sample into different categories.[35] We find that emerging market firms issuing $500 million and above bonds tended to hold more cash after a bond issuance in post-2008 period relative to the pre-2008 period. Quantitatively, for every million-dollar raised before 2008, they held 0.12 million dollars in cash and short-term instruments one year after the issuance. The estimate for the post-2008 period jumps to 0.71 million dollars. We note that Equation (10) is estimated with relatively few observations, which implies that the true increase may have been less, given that the coefficients are not estimated very precisely. We do not observe this increase in the use of cash and short-term instruments for emerging market firms issuing bonds smaller than $500 million. Firms that issue these smaller bonds held 0.41 (0.25) million

[33] Results for the year of issuing a large bond are similar to those reported for the year after, but the coefficients for the former are larger for both relatively small and large firms. Using the year after issuance mitigates the heterogeneity across firms related to the reporting dates of financial statements (given that offering dates occur at different times within the offering year). In addition, firms might take some time to spend the cash raised in their issuances, so cash holdings in the year of issuance might be less informative. Therefore, we confine our analysis to the one year after issuance.

[34] It is conceivable that these results might be driven by selection bias. Emerging market firms that issued in the pre-2008 period differ on average from those issuing in the post-2008 period. There are several observable characteristics of firms that might be correlated with holdings of cash, such as the size of firms, their growth, and their uncertainty. We control for this possibility by adding these observables to the estimations.

[35] One potential concern is that firms might issue bonds of different sizes during a given year. However, firms issue these types of bonds infrequently. The average emerging market firm only issues bonds of this type once every 6.6 years (Appendix Table 8).

dollars per million dollars issued in before (after) 2008. We do not observe a similar increase for developed market firms (whose estimates decline from 0.49 to 0.34).

To formally test the differences in the coefficients in Table 11, we follow the Kim and Weisbach (2008) analysis for cash and short-term investments within each group (emerging and developed market firms). We use dummy variables to divide issuances into (0:500) and [500:1000) in the pre- and post-2008 periods. We calculate the triple difference in coefficients and find that emerging market firms issuing large bonds hold more cash and short-term investments in the post-2008 period relative to the pre-2008 period, when compared to smaller bonds (column 1). This pattern is not visible for developed market firms (column 2).

If the relatively small emerging market firms issuing large bonds were the ones stretching to take advantage of the yield discount in $500 million bonds in the post-2008 period, then we should observe that these are the firms driving our results in the uses of funds, and specifically the accumulation of cash. In Figure 11, Panel B, we present the Kim and Weisbach (2008) analysis for the post-2008 period for emerging market firms, dividing companies that issued large bonds into high- and low-asset firms (above and below the country median of assets, respectively). During this period, relatively small firms issuing large bonds tended to hold much more cash than large firms issuing large bonds, consistent with our prediction.

7. Conclusions

The GFC led to a persistent period of low interest rates throughout the developed world. This low interest rate environment produced a search for yield by institutional investors that favored some classes of global securities, such as emerging market corporate debt, that had not been as popular among developed countries' institutional investors prior to the crisis. In this paper, we show that institutional investors searching for yield in emerging

market corporate debt after 2008 favored corporate debt securities that were large enough to qualify for inclusion in market indexes.

Inclusion in market indexes provides a liquidity benefit to investors in these bonds because holding a portfolio of bonds included in the index improves the liquidity of investors' positions. Specialist emerging market debt mutual funds that track the CEMBI index also benefit from holding bonds in the index; doing so reduces the risk that their performance will deviate from the market benchmark. The liquidity benefits of index inclusion are especially attractive for cross-over fund investors, which manage a considerable pool of assets, lack experience with emerging market corporate debt, and favor liquidity. Indeed, we find that cross-over funds hold especially significant proportions of large, index-eligible emerging market corporate debt. Thus, it appears that the primary reason for the yield reduction associated with bonds included in the CEMBI index was the demand for liquidity by cross-over investors.

The sudden rise in the demand for emerging market corporate debt by fund investors produced a sizeable increase in the yield discount associated with index eligibility, and a large increase in the proportion of issuance of large, index-eligible corporate debt. The financial rewards of issuing index-eligible debt after 2008 were significant. Firms able to issue a $500 million bond, rather than, say, a $400 million bond, saved more than 76 basis points in yield to maturity. These changes in issuance size were not apparent for investment grade developed country corporate bond issuances, which by virtue of their lower preexisting risk and greater ability to attract institutional investors in the pre-2008 era were less affected by the search for yield after 2008.

Large size emerging economy firms were exogenously better positioned to take advantage of the new opportunities to issue large bonds at lower yields. Medium-sized emerging economy firms, however, saw the greatest change in the probability of issuing large bonds. These medium-sized issuers who stretched and issued large bonds were

willing to retain significant amounts of cash from the proceeds of their bond issuances to access funds at a lower cost.

Our findings raise important questions for future research. First, because the increased discount on emerging market corporate debt was larger for risky debt, it might have constituted a subsidy for greater risk taking. Did firms respond to this subsidy by increasing the riskiness of their operations? Second, with respect to the extra cash holdings of relatively small firms issuing large bonds after 2008, how did the combination of dollar-denominated debt and domestic cash holdings affect their exposure to exchange rate risk, and their other risk-management practices? Also, if equity capital is scarce, did the combination of increased leverage and additional cash from bond issuance by medium-sized firms that stretched to raise their issuance amount crowd in or crowd out productive investments? Third, more data could help to distinguish between the two alternative drivers of the yield discount for index eligibility (greater liquidity or reduced tracking error). If liquidity is relatively important, then one would expect that fund demand for index-eligible debt should be greater for debt with lower bid-ask spreads. If tracking error is relatively important, then even relatively illiquid debt in the index would enjoy substantial yield discounts in the primary market. Furthermore, tracking error should be relatively unimportant for funds that do not track the CEMBI index.

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Appendix 1. The Emerging Market Debt Index Universe

There are relatively few indexes that track emerging market corporate debt denominated in foreign currencies. The most prominent index provider companies that cater to investors interested in emerging market debt are Barclays/Bloomberg, Citigroup, and J.P. Morgan. Among them, J.P. Morgan is arguably the leader in the emerging market segment in terms of the funds that track their performance against its indexes. For instance, as of July 2017, EPFR Global tracks the performance of 450 specialized emerging market debt funds. Of those, 394 funds (88%) declared to be tracking their performance against a J.P. Morgan index. These funds had $317 billion under management, and $280 billion (88%) of those assets are benchmarked against J.P. Morgan indexes.

Throughout the paper we focus on the important J.P. Morgan bond indexes. There are three broad families of J.P. Morgan emerging market indexes: the CEMBI (corporate debt denominated in U.S. dollars) that was launched in 2007, the EMBI (sovereign and quasi-sovereign debt denominated in U.S. dollars) launched in 1999, and the GBI (sovereign debt denominated in local currency) launched in 2005. Appendix Figure 1 presents the assets under management of funds that track their performance against J.P. Morgan indexes divided by family type. Appendix Table 2 presents the different requirements that a bond must fulfill to enter the most popular J.P. Morgan indexes in this segment: the CEMBI Broad Diversified, the CEMBI Narrow Diversified, and the EMBI Global Diversified.

Appendix 2. Fund Classification with Morningstar Direct Mutual Fund Data

We classify Morningstar funds into emerging market corporate specialists and cross-over categories. The cross-over category is also sub-divided into developed market and emerging market non-specialist funds. To categorize funds, we use the Morningstar "global category," which Morningstar created by analyzing the composition of mutual fund portfolios. We consider a fund as emerging market if its global category in Morningstar is "Emerging Markets Fixed Income," "Africa Fixed Income," "India Fixed Income," "Latin America Fixed Income," or "Mexico Fixed Income." We classify the other funds in the database (not related to emerging markets) as developed market funds.

Emerging market funds are subdivided into corporate and non-specialist funds, using the Morningstar variable "primary prospectus benchmark." This variable indicates which index or group of indexes a fund is benchmarked against. If an emerging market fund is solely benchmarked against a corporate (sovereign) bond index or indexes, it is classified as corporate (non-specialist). If a fund is benchmarked against a bond index that follows both corporate and sovereign bonds (disregarding the share in each) or a group of indexes that include corporate and sovereign indexes, it is also classified as non-specialist.

To determine whether the funds are benchmarked against a corporate, sovereign, or mixed bond index or indexes, we use the following guidelines. J.P. Morgan CEMBI indexes and indexes with "corporate" or "non-sovereign" in their name are classified as corporate. J.P. Morgan EMBI and GBI-EM indexes are classified as sovereign. J.P. Morgan ELMI+ indexes are classified as mixed because they are money market indexes. Indexes with "government," "treasury," "sovereign," or a similar term in their name are classified as sovereign. For the funds in the database that do not fall into the guidelines described above or whose "primary prospectus benchmark" is not available, we searched manually the composition of their holdings through Morningstar, the Financial Times, or the official fund's website to determine whether the fund should be classified as corporate or non-

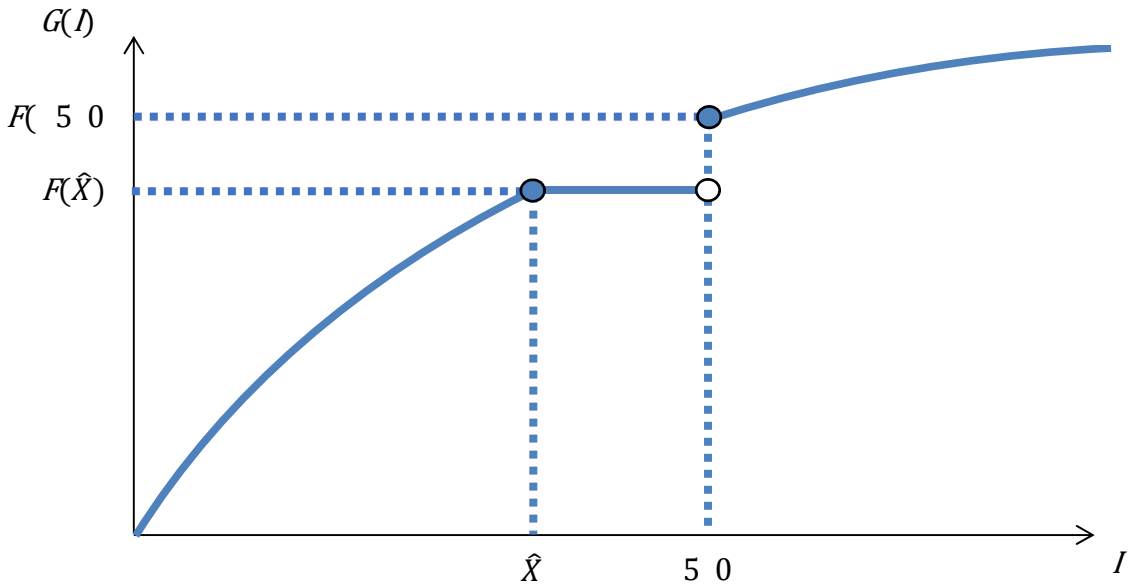
specialist. If a fund only holds corporate (sovereign) bonds in its portfolio, it is classified as a corporate (non-specialist) fund. If a fund holds both corporate and sovereign bonds, it is also classified as a non-specialist fund.

Figu

Model-Based Cumulative Distribu

This figure plots the model-based I cumulative distribution. $G(I)$ denotes the cumulative distribution of firm size, which is the size of firms in the investment opportunity set. Firms in the interval $[\hat{X}, 500)$ issue 500, and firms of size greater or equal to $\hat{X}$ issue 500. Panel A shows the cumulative distribution of I. Panel B shows how the cumulative distribution changes when the size of the $\hat{X}$ firms increases.

Panel A. Cumulative Distribution of Iss



Panel B. Effect of an Increase in the Siz

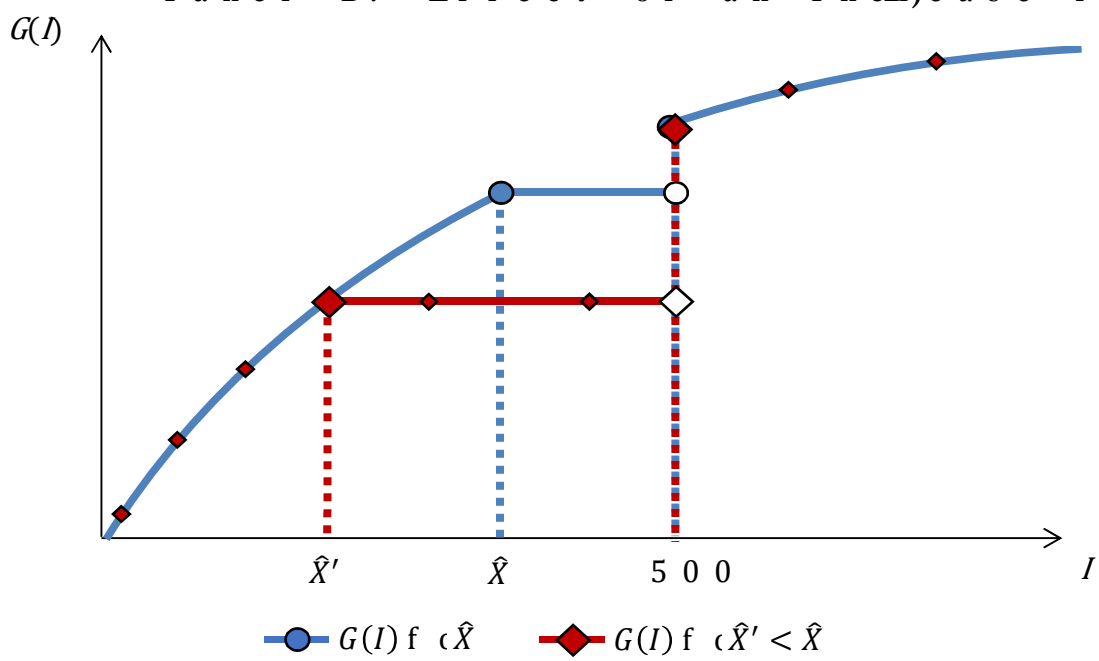


Figure 2

Yield to Maturity of Emerging Market Cor

This figure shows the yield to maturity of international U.S
markets during 2000-2016. The lines show the average yield
$300 million (0:300), between $300 and $500 million [300:50
respectively.

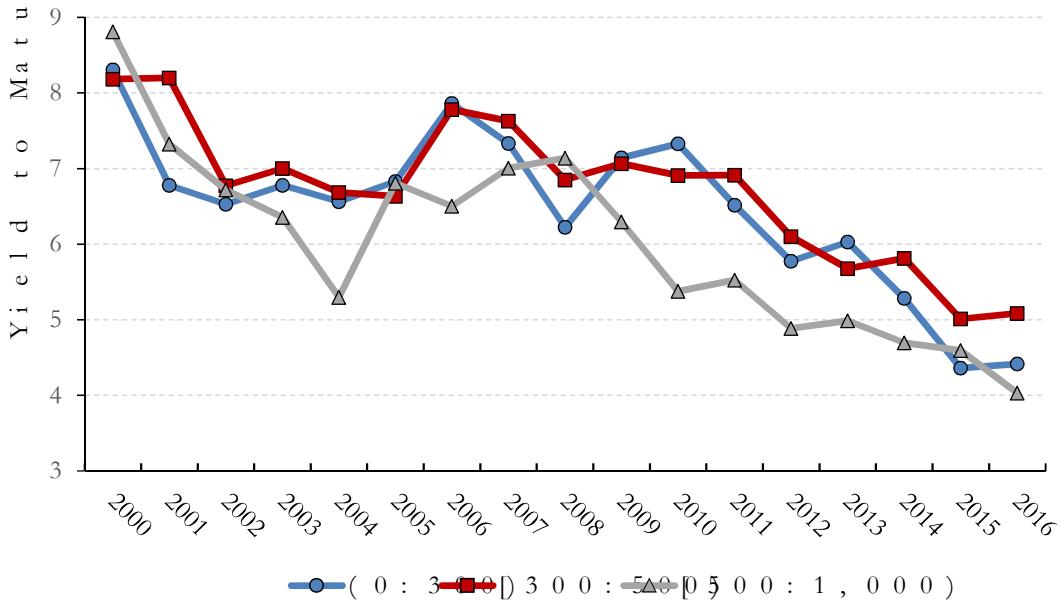


Figure 3

Yield to Maturity of Corporate Bond Issu

This figure shows the average yield to maturity of internati
millions of U.S. dollars issued by firms in emerging market
markets (Panel B) during the pre-2008 (2000-2008) and

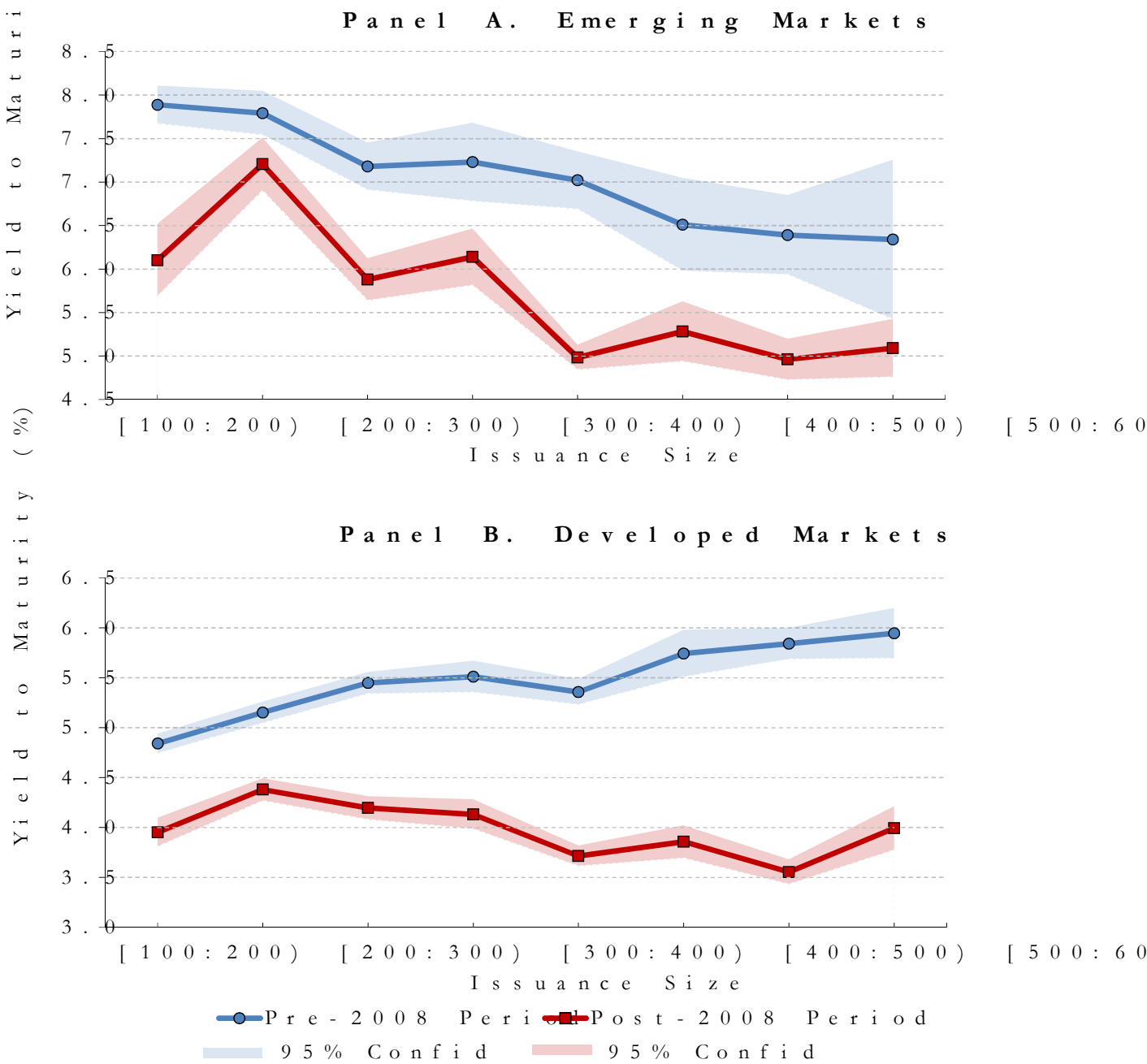
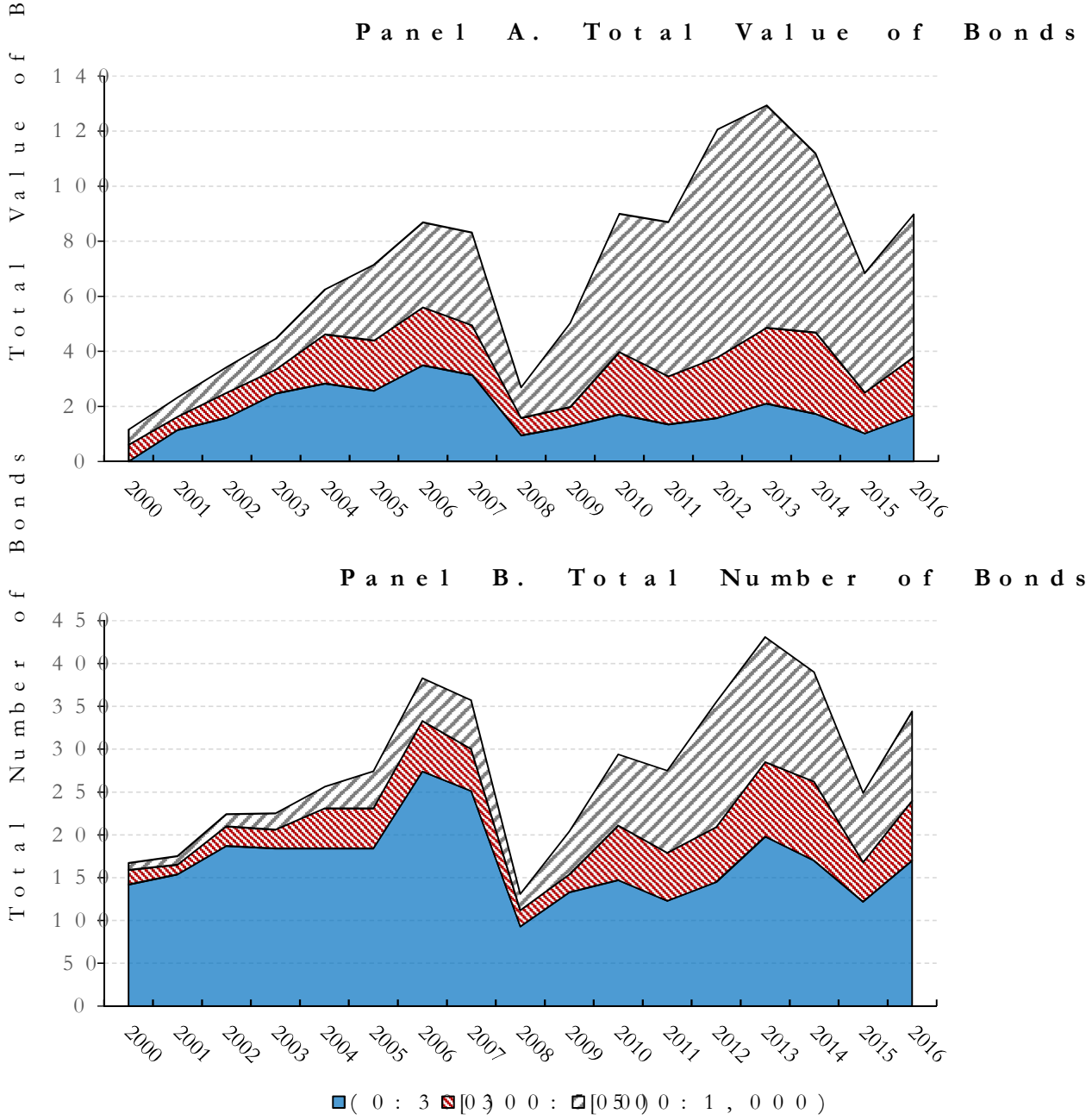


Figure 4

Value and Number of Emerging Markets Cor

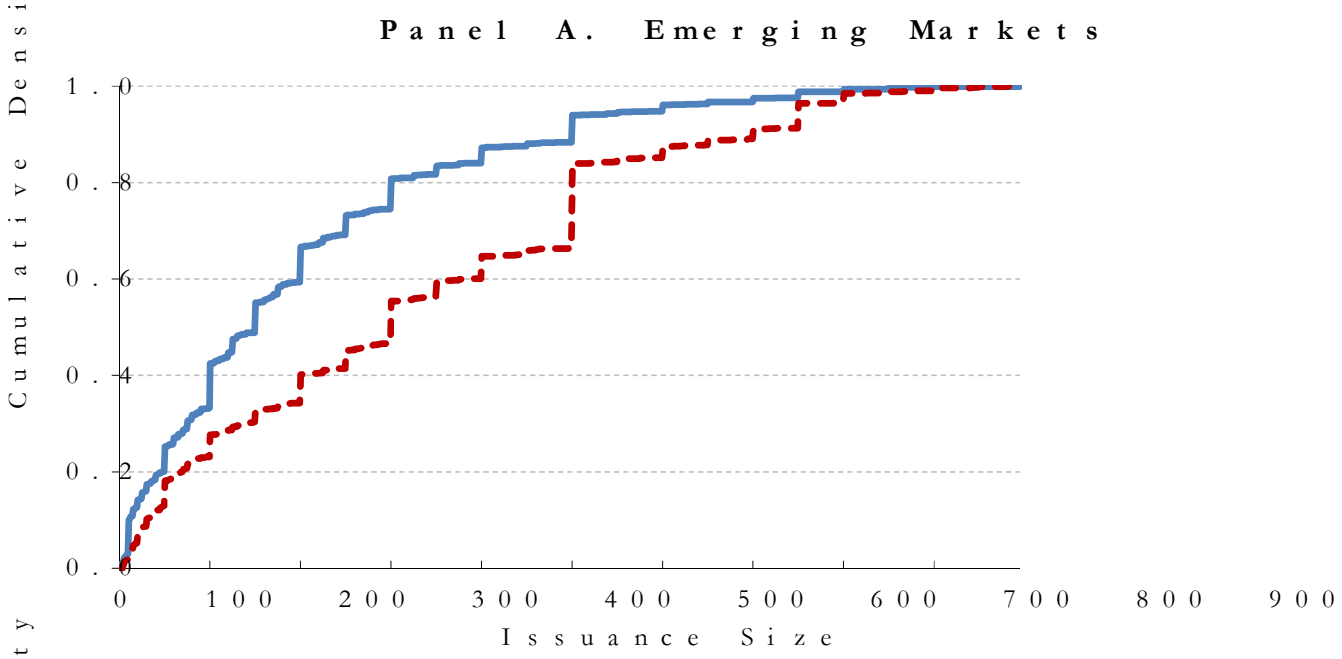
This figure shows the total value (Panel A) and the total numb
bonds issued by firms in emerging markets during 2000-2016.
ion millions of U.S. dollars. The total value of bonds

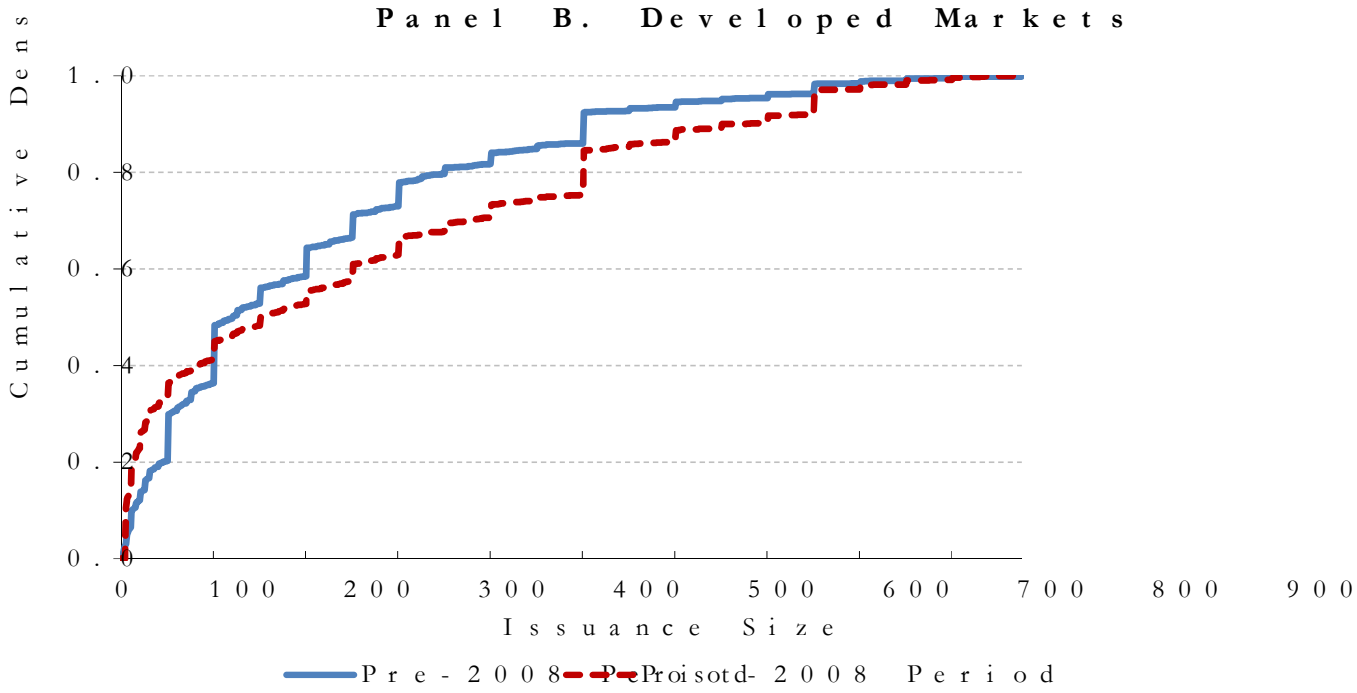


Figu

Cumulative Distribution of Corporate Bond

This figure shows the cumulative distribution of internati
U.S. dollars issued by firms in emerging markets (Panel A) an
B) during the pre-2008 (2000-2008) and post-2008 (2009





Figu

Yield to Maturity and Corporate Bond Issuance

This figure shows the yield to maturity and the proportion of issuances emerging markets and investment grade firms in developed markets during international dollar-denominated bonds with face value equal to $500 mi difference between the average yield to maturity of U.S. dollar-denomi [500:600) and between $400 and $500 million [400:500). The panel also rep 2009-2016 periods. Panel C shows the fraction of the number of internati million relative to all

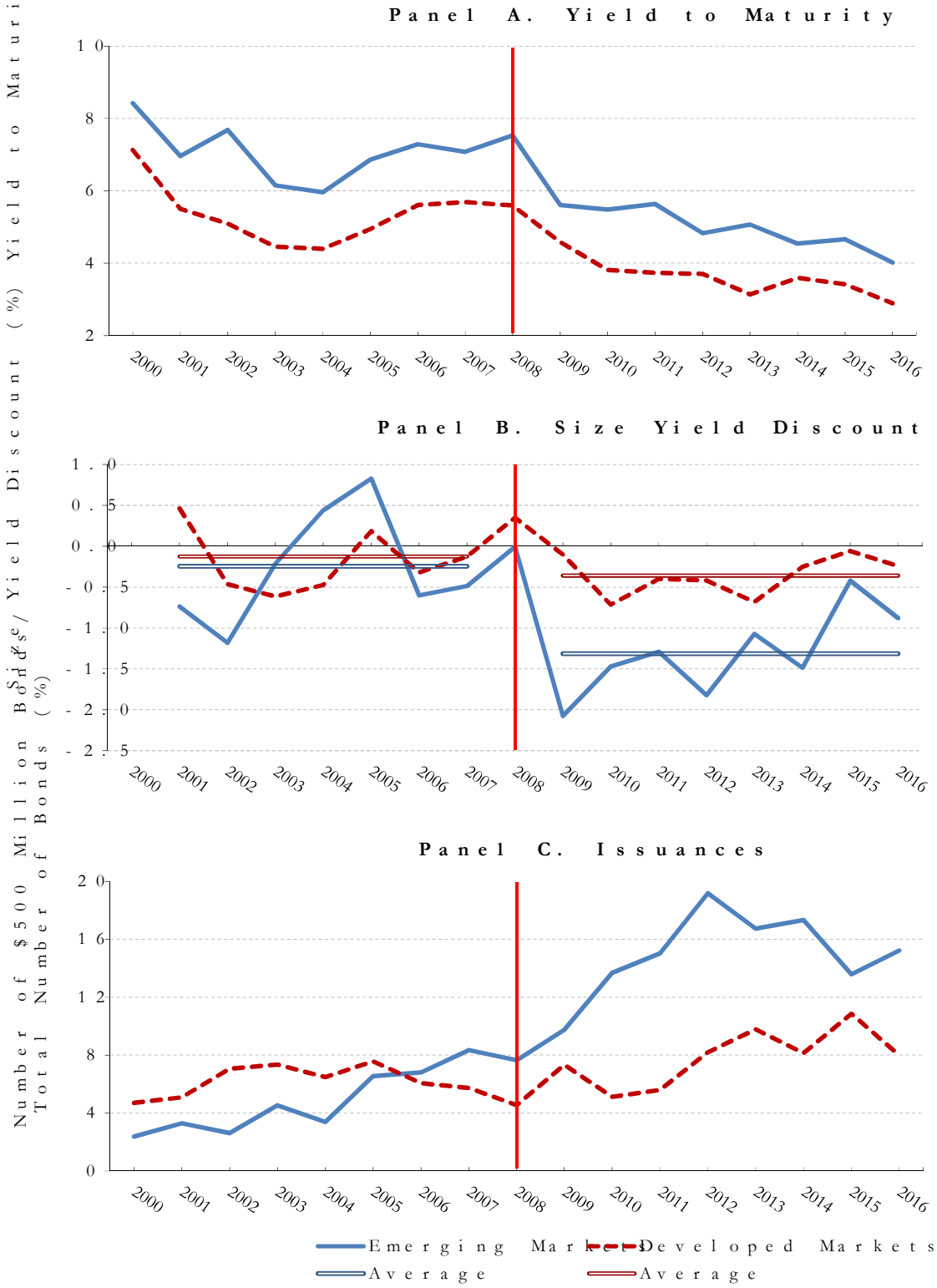


Figure 7

Yield to Maturity and Number of Emerging Ma

This figure shows the average yield to maturity and the fract
different sizes issued by firms in emerging markets during 2
international dollar-denominated bonds of different sizes
Panel A shows the yield to maturity and the fraction of inter
equal to $500 million. Panel B shows the yield to maturity a
bonds with face value between $500 and $600 million [500:60
2003, 2004-2008, and 2009-2016 periods.

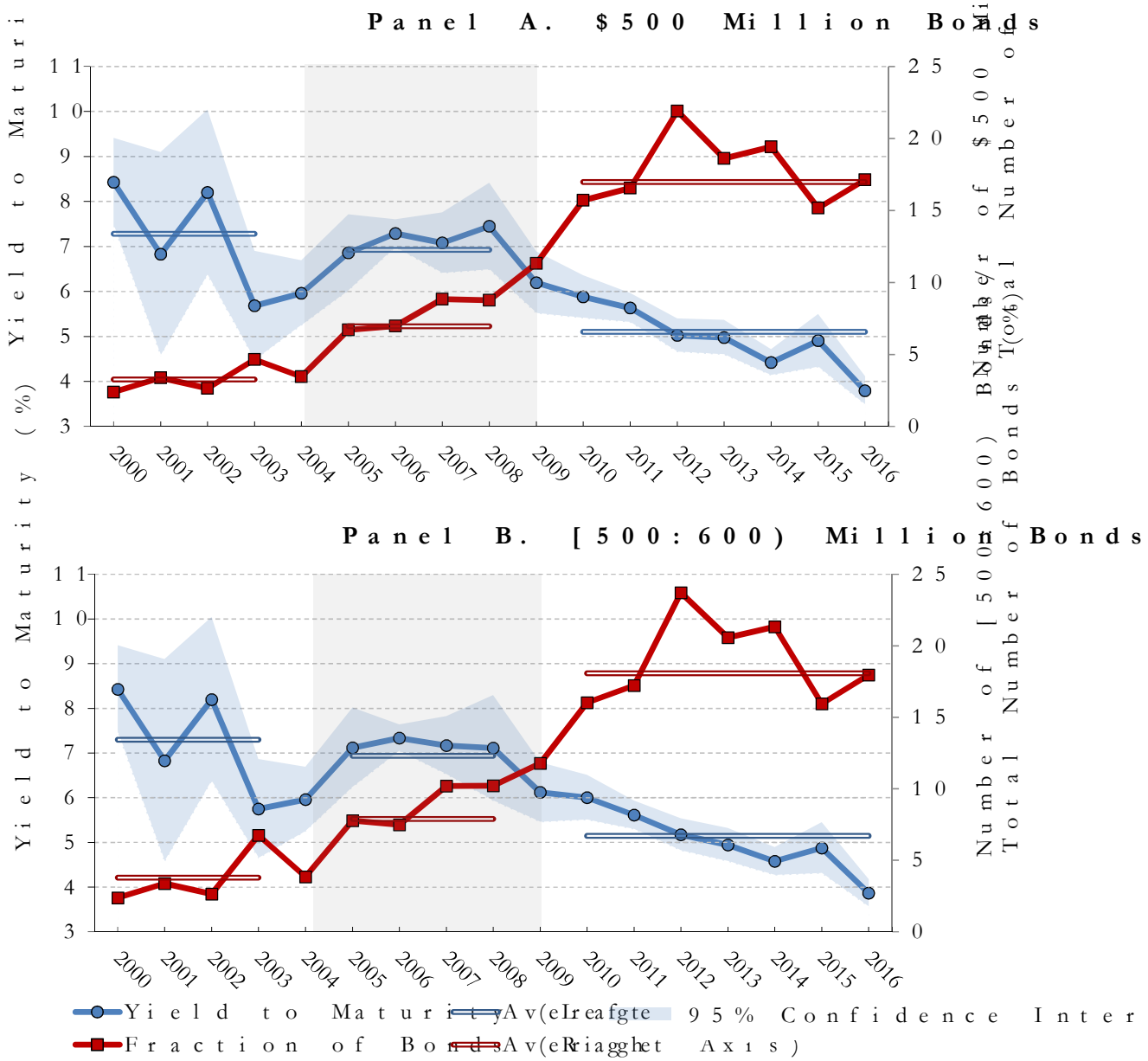
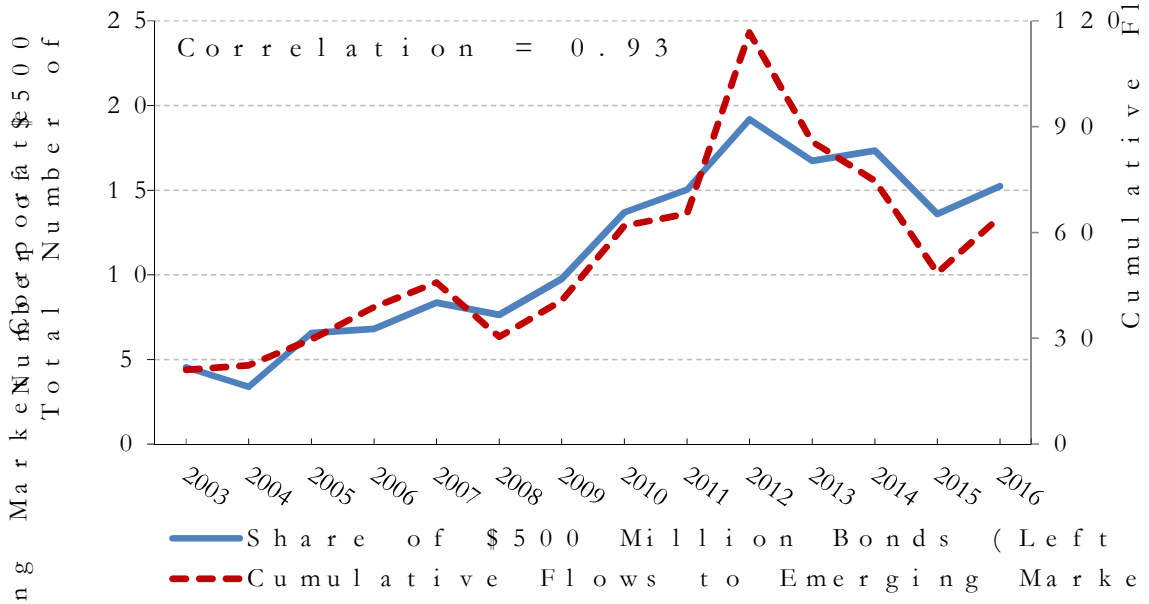


Figure 8

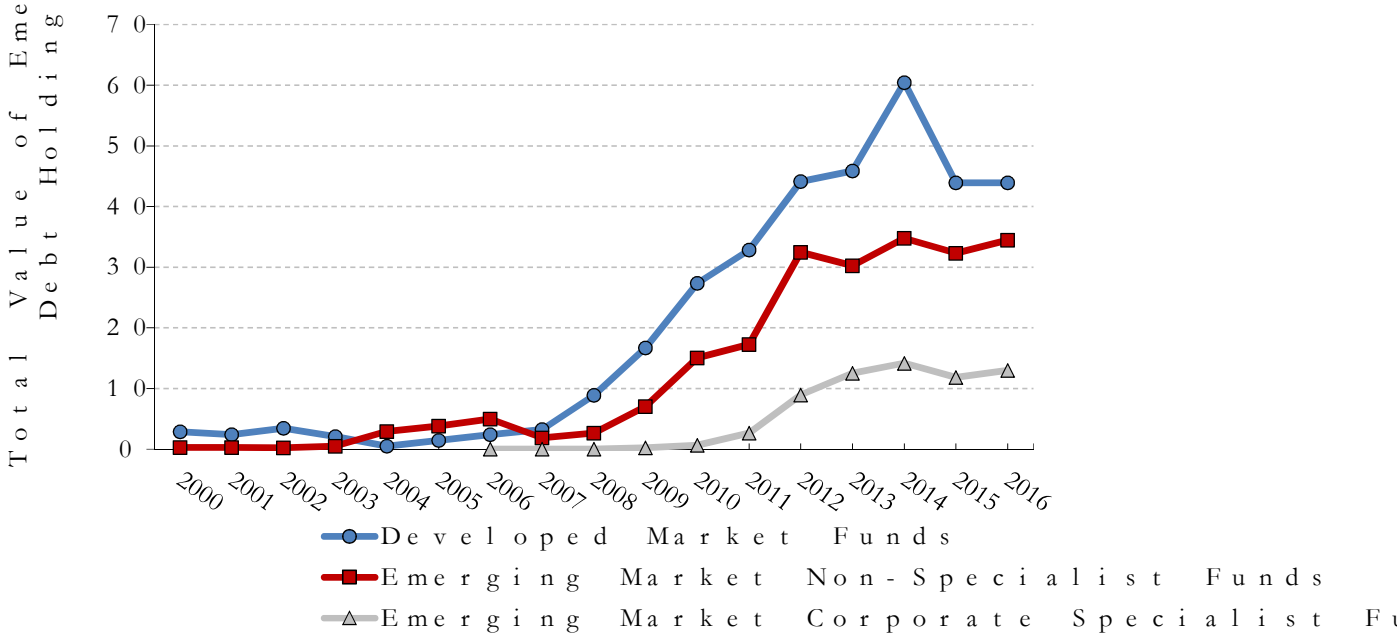
Mutual Fund Investments in Emerging

This figure shows the evolution of mutual fund investments i
cumulative flows into emerging market sovereign and corpor
the fraction of international dollar-denominated bonds wi
The fraction is calculated as the number of international do
$500 million relative to all international dollar-denomina
shows the value of emerging market corporate debt in billio
categories during 2000-2016. Mutual funds are classified
emerging market non-specialist funds (cross-over funds), p
market corporate specialist funds start in 2006.

Panel A. Flows into Emerging Market Debt and



Panel B. Holdings of Emerging Market Corpora



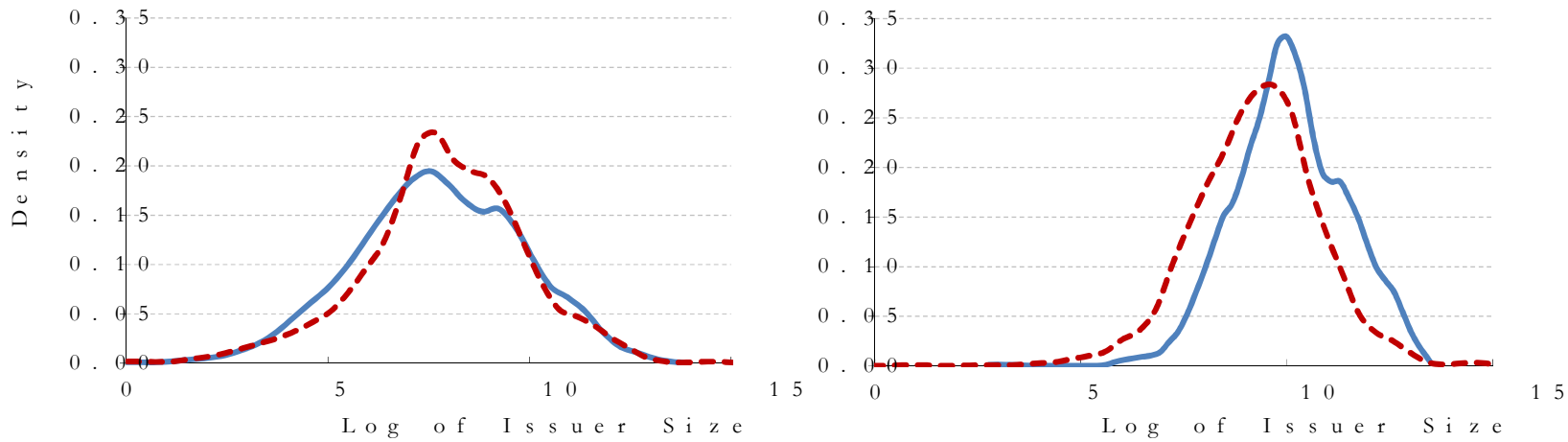
Figu

Size Distribution of Issuers of Different Corporate Bond

This figure shows the firm size distribution of emerging market issuers (Panel A) and inv
bonds of different sizes during the pre-2008 (2000-2008) and post-2008 (2009-2016) per
cumulative distribution of issuers of international dollar-denominated bonds with face
issuers of international dollar-denominated bonds with face value equal to or above $500
certain size at least once during this period. Densities are estimated using th

Panel A. Emerging Markets

Issuers of (0:500) Bonds **Issuers of [500:1**



Panel B. Developed Markets

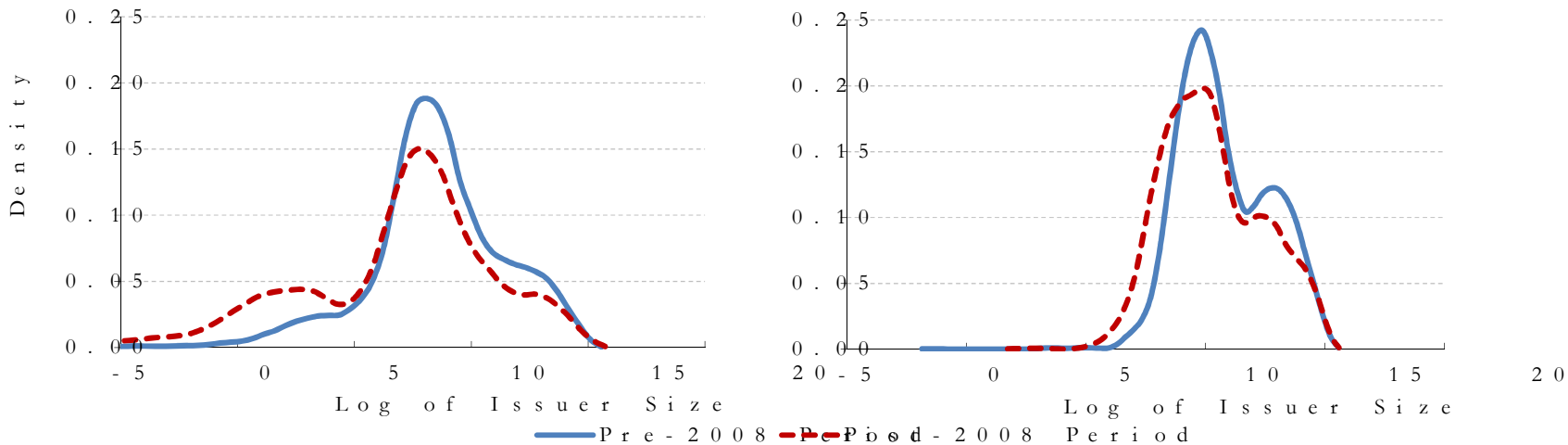
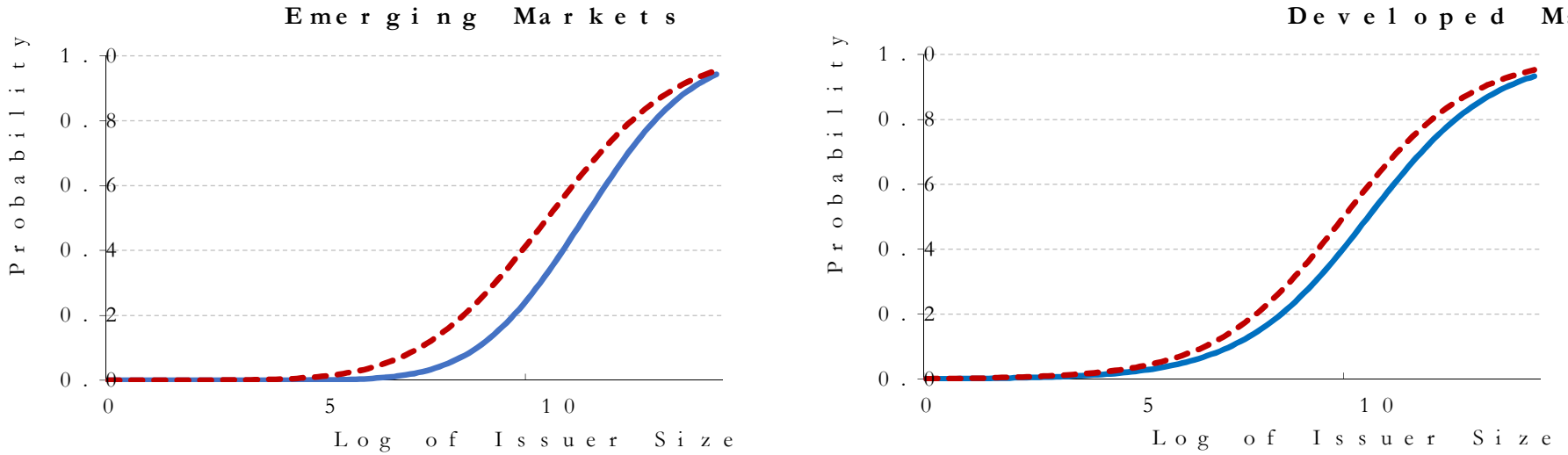


Figure 10

Probability of Issuing Large Corporate Bonds by Fi

This figure shows the probability of issuing an international U.S. dollar-denomina and post-2008 (2009-2016) periods for firms of different sizes. Firm size is measur during 2000-2016. The probabilities are computed from Probit and Logit regressions post-2008 dummy, and the interaction of the pre and post dummy variables with the log reports the probabilities computed using Logit regressions. The left-side graphs i investment grade firms in developed markets.

Panel A. Probit Regressions



Panel B. Logit Regressions

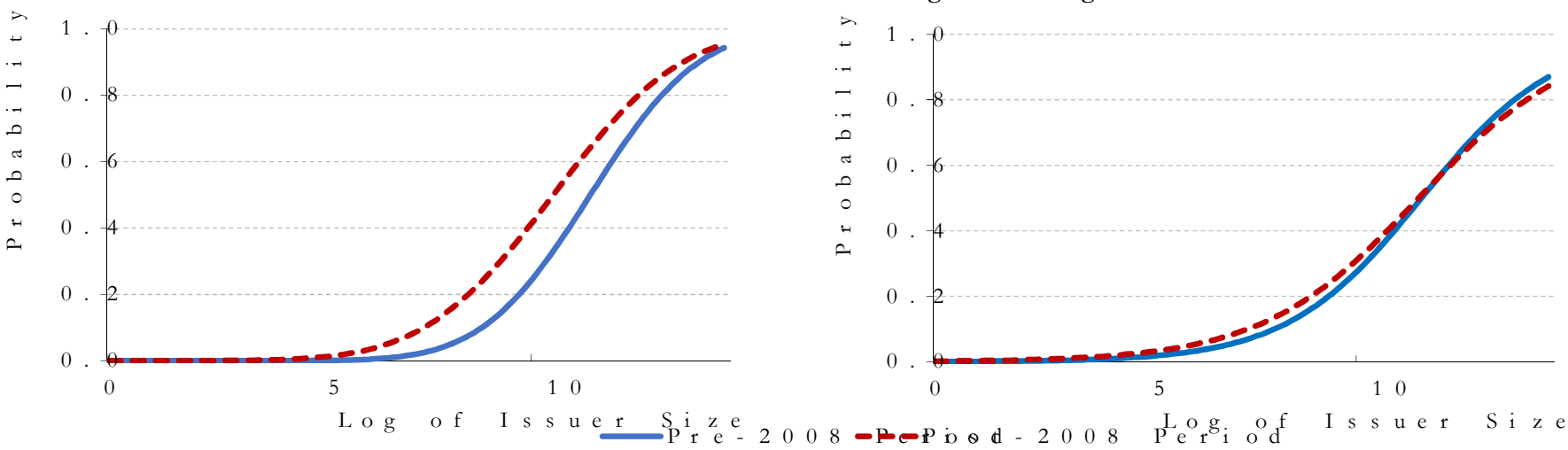
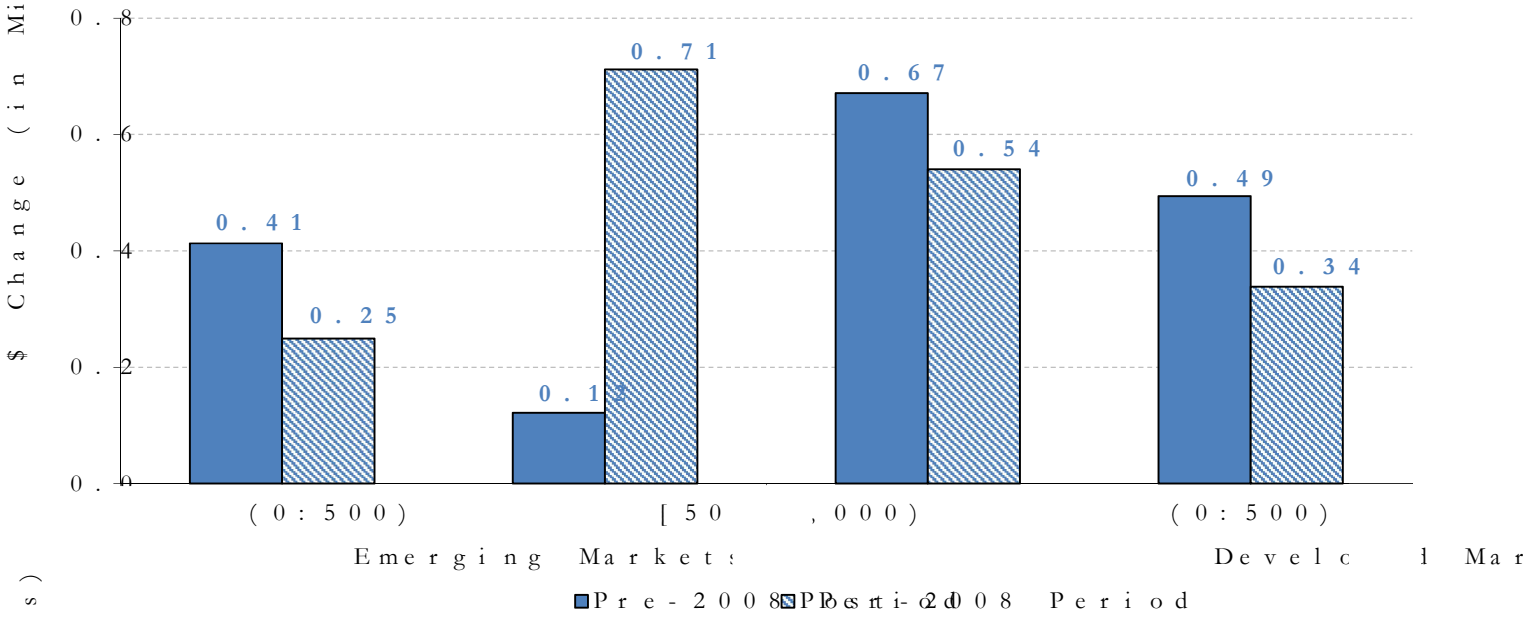


Figure 11
Cash Accumulation from Corporate Bond Is

This figure shows the amount of cash and short-term investments accu
after one year of the issuance. Panel A shows the use of funds for emer
bonds of different sizes during the pre-2008 (2000-2008) and post-2
issuers of bonds with a face value below $500 million (0:500) and equa
bond issuers in emerging markets during 2009-2016, separately for fi
its average assets during 2009-2016 are equal to or greater than the a
the median assets The analysis of both panels follows the Kim and Weis
V0) / Assets) + 1], where V is cash and short-term investments. Indepen
normalized by total assets, in addition to the log of total assets. P
standard deviation of growth of sales. Total assets are measur

Panel A. Emerging Market and Developed Mar



Panel B. High-Asset and Low-Asset Emerging

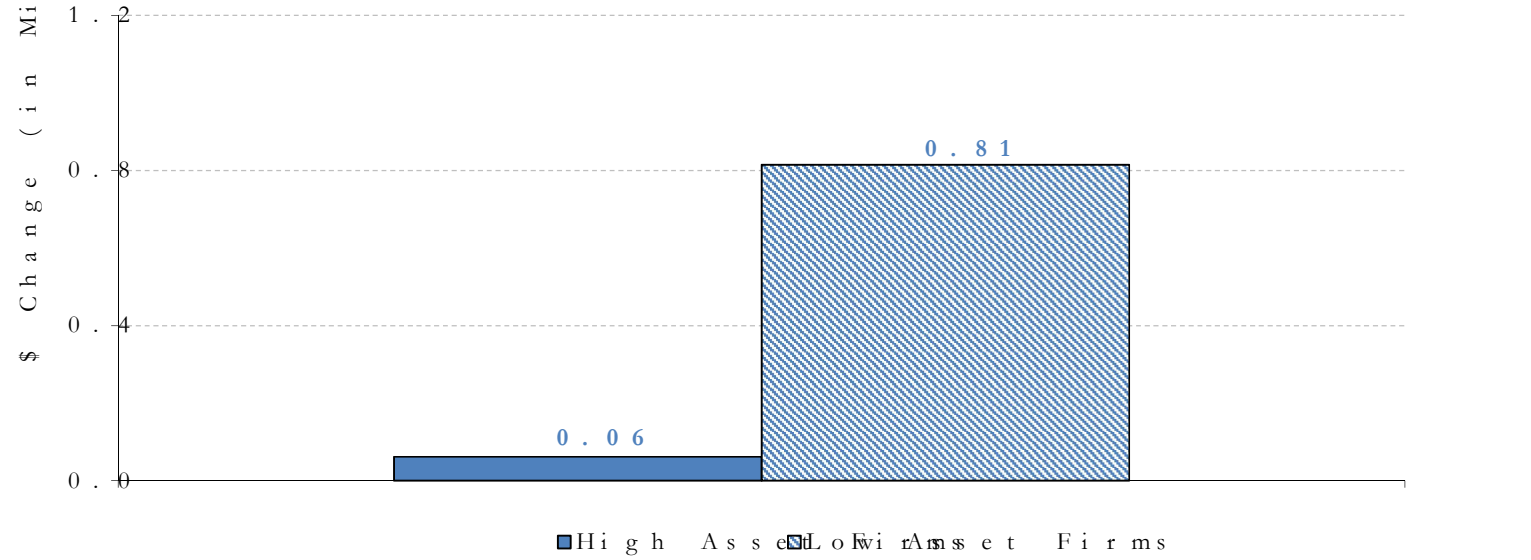


Table 1

Emerging Market Bond Issuances of Dif

This table reports the percentage of international U.S. below $300 million (0:300), between $300 and $500 millio million [500:1,000), issued by firms in emerging markets 2008 (2009-2016) periods. Column 1 displays the percent dollar-denominated bonds of different sizes relative t denominated bonds. The value of each bond is in constant the percentage of the total number of international dol relative to the total number of all international

	(1) Total Value		(2) Total Number of Bonds	
	Pre 2008	Post 2008	Pre 2008	Po
(0:300)	42.86%	16.64%	75.41%	47
[300:500)	23.99%	21.72%	13.41%	1
[500:1,000)	33.15%	61.64%	11.18%	

Table 2

Yield to Maturity and Probability of Issuing Corporate

This table reports mean difference tests for the yield to maturity and the probabil
and $500 million [400:500), and between $500 and $600 million [500:600), for firms
2008 (2000-2008) and post-2008 (2009-2016) periods. Panel A shows the yield to ma
Columns 1-3 show the mean tests and differences (pre and post 2008) for the [400:5(
mean tests and differences (pre and post 2008) for the [500:600) bonds. Column 7 s
country group. Column 8 reports the triple difference, across issuance size, acro
are dropped. *, **, and *** indicate statistical significance at the 10%,

Panel A. Yield to Maturity

	[400:500)			[500:600)			Diff-in-Diff	
	Pre 2008	Post 2008	Diff	Pre 2008	Post 2008	Diff		
	(1)	(2)	(3)=(2)-(1)	(4)	(5)	(6)=(5)-(4)	(7)=(6)-(3)	(8)=EM(7
Emerging Markets	7.189	6.223	-0.966***	7.100	4.922	-2.		
	(0.232)	(0.189)	(0.312)	(0.180)	(0.078)	-0.98	(0.1	8)
Developed Markets	5.534	4.076	-1.458***	5.357	(30.637464)	-1		
	(0.077)	(0.075)	(0.109)	(0.068)	(0.058)	(0.092)		

Panel B. Issuance

	[400:500)			[500:600)			Diff-in-Diff	
	Pre 2008	Post 2008	Diff	Pre 2008	Post 2008	Diff		
	(1)	(2)	(3)=(2)-(1)	(5)	(4)	(6)=(5)-(4)	(7)=(6)-(3)	(8)=EM(7
Emerging Markets	0.043	0.063	0.020***	0.065	0.188	0.1		
	(0.004)	(0.005)	(0.006)	(0.005)	(0.008)	0.0720	(0.0	9)
Developed Markets	0.043	0.047	0.004	0.074	0.1	(0.0013)	0.03	
	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)		

Tabl

Yield to Maturity and Issuance Sizes

This table reports difference-in-difference regressions of the yield to mat
dollars, measuring the relative change after 2008 separately for firms in e
restricted to positive issuance observations during 2000-2016. The full equ
to maturity on the interaction term between the dummy of each bucket size, the
developed market (DM) β_X^{DM} summary. The coefficients in Appendix Table 4 to conserve spac
effects and controls. Bond-firm controls include a dummy indicating whether
foreign-owned, a dummy indicating whether the firm has partial government ow
country and quarter-year levels. The yield to maturity observations in the to
5%, and 1% levels, respectively.

	Associated Coefficients	Dependent Variable: Yield to Maturit			
		(1)	(2)	(3)	(4)
EM*[100:200)*Post 2008	β_{100}^{EM}		-1.755***	-2.205***	
		(0.521)	(0.477)	(0.475)	
EM*[200:300)*Post 2008	β_{200}^{EM}		-0.574***	-1.872***	
		(0.215)	(0.441)	(0.439)	
EM*[300:400)*Post 2008	β_{300}^{EM}		-1.353***	-2.449***	
		(0.247)	(0.442)	(0.438)	
EM*[400:500)*Post 2008	β_{400}^{EM}		-0.966**	-1.776***	
		(0.394)	(0.476)	(0.475)	
EM*[500:600)*Post 2008	β_{500}^{EM}		-2.177***	-2.705***	
		(0.169)	(0.429)	(0.425)	
EM*[600:700)*Post 2008	β_{600}^{EM}		-0.992**	-2.499***	
		(0.484)	(0.569)	(0.567)	
EM*[700:800)*Post 2008	β_{700}^{EM}		-1.524***	-2.799***	
		(0.355)	(0.517)	(0.512)	
EM*[800:900)*Post 2008	β_{800}^{EM}		-1.296**	-1.937**	
		(0.497)	(0.807)	(0.806)	
DM*[100:200)*Post 2008	β_{100}^{DM}		-0.977**	-2.674***	
		(0.412)	(0.401)	(0.401)	
DM*[200:300)*Post 2008	β_{200}^{DM}		-0.845***	-2.735***	
		(0.205)	(0.371)	(0.371)	
DM*[300:400)*Post 2008	β_{300}^{DM}		-1.319***	-2.884***	
		(0.129)	(0.384)	(0.383)	
DM*[400:500)*Post 2008	β_{400}^{DM}		-1.458***	-2.93***	
		(0.154)	(0.342)	(0.342)	
DM*[500:600)*Post 2008	β_{500}^{DM}		-1.681***	-3.102***	
		(0.154)	(0.345)	(0.345)	
DM*[600:700)*Post 2008	β_{600}^{DM}		-1.907***	-3.014***	
		(0.252)	(0.330)	(0.330)	
DM*[700:800)*Post 2008	β_{700}^{DM}		-2.344***	-3.33***	
		(0.150)	(0.365)	(0.365)	
DM*[800:900)*Post 2008	β_{800}^{DM}		-2.048***	-3.212***	
		(0.216)	(0.419)	(0.420)	
Log(Issuance Size)				-0.013	
				(0.148)	
Log(Assets)					-0.18
					(0.038)
Bond-Firm Controls		No	Yes	Yes	Yes
Country FE		No	Yes	Yes	Yes
Industry-Year FE		No	Yes	Yes	Yes
Maturity FE		No	Yes	Yes	Yes
Quarter-Year FE		No	Yes	Yes	Yes
Ratings FE		No	Yes	Yes	Yes
Diff-in-Diff	$\beta_{500}^{EM} - \beta_{400}^{EM}$	-1.211***	-0.929***	-0.929***	
P-Value		0.000	0.005	0.00205	
Triple Diff	$\beta_{500}^{EM} - \beta_{400}^{EM} - (\beta_{500}^{DM} - \beta_{400}^{DM})$	-0.988***	-0.757**	-0.757**	
P-Value		0.003	0.029	0.018	
Number of Observations		77,913	77,913	7,818	3,982
R^2		0.344	0.763	0.763	0.7

Tabl

Probability of Issuing Bonds of Differ

This table reports difference-in-difference regressions of the change
size in millions of U.S. dollars, before and after 2008, for firms in eme
restricted to positive bond issuance observations during 2000-2016. Co
certain size on the interaction of the post-2008 dummy (equal to one for
industry-year, maturity, quarter-year, and rating fixed effects, in a
bond was issued publicly or privately, a dummy indicating whether the f
ownership, and a fixed or flexible coupon dummy. Standard errors are cl
significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Dummy=1 if Issuance Size is						
	Probability of Issuing a Bond of a Ce						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)		
EM*Post 2008	-0.045	-0.103***	-0.007	0.045**	0.012		
	(0.045)	(0.031)	(0.020)	(0.017)	(0.015)	(0	
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Y
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Y
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Y
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes Yes	Yes Yes
Mean Probability	0.159	0.173	0.127	0.091	0.047	0.101	
Number of Countries	69	69	69	69	69	69	69
Number of Observations	19,232	19,232	19,232	19,1293,2232	19,1293,2232		
R^2	0.338	0.150	0.122	0.155	0.133	0.1403.1650	0.1

Tabl

Yield to Maturity and Issuance Sizes: Placebo an

This table reports placebo and robustness tests for the yield to maturity regr which are those with less than five years of maturity or flexible coupon rates. one for 2004-2008 period. Columns 4-5 estimate the regression for the 2004-20 regressions for the yield to maturity on the interaction term between the dumm (DM) dummy. The coefficients β_X^{EM}, β_X^{DM} are omitted to conserve space. Columns 1-5 include d include a dummy indicating whether the bond was issued publicly or privately, a has partial government ownership, and a fixed or flexible coupon dummy. Stan observations in the top and bottom 5% are dropped. *, **, and *** indicate stati

	Dependent Variable: Yield to Maturit				
	Non-Index Bonds				
Associated Coefficients	Sample Period: 2000-2016 (Post Period: 2009-2016)	Sample Period: 2000-2008 (Post Period: 2004-2(0P0o8s)t		Sample Period: 2004-2012 Period: 200	
	(1)	(2)	(3)	(4)	(5)
EM*[100:200)*Post β_{100}^{EM} Post		-2.759**	-0.225	0.230	
	(1.374)	(0.365)	(0.465)	(0.358	
EM*[200:300)*Post β_{200}^{EM} Post		-0.621*	-0.047	-0.298	
	(0.314)	(0.580)	(0.548)	(0.36	
EM*[300:400)*Post β_{300}^{EM} Post		-2.902***	-0.227	-0.337	
	(0.776)	(0.403)	(0.591)	(0.423	
EM*[400:500)*Post β_{400}^{EM} Post		-2.392***	-0.766	-0.204	
	(0.417)	(0.977)	(0.787)	(0.477	
EM*[500:600)*Post β_{500}^{EM} Post		-2.422**	0.122	-0.318	
	(0.971)	(0.596)	(0.687)	(0.218	
EM*[600:700)*Post β_{600}^{EM} Post		-3.525***	-1.249	-1.482	
	(0.926)	(0.840)	(0.896)	(0.594	
EM*[700:800)*Post β_{700}^{EM} Post		-1.173***	-0.052	-1.221**	
	(0.342)	(0.724)	(0.593)	(0.529	
EM*[800:900)*Post β_{800}^{EM} Post		-2.244***	-3.144**	-0.546	
	(0.201)	(1.199)	(1.159)	(0.595	
DM*[100:200)*Post β_{100}^{DM} Post		-2.222***	0.795*	0.729**	
	(0.505)	(0.434)	(0.359)	(0.346	
DM*[200:300)*Post β_{200}^{DM} Post		-1.586***	0.471	0.451	
	(0.541)	(0.342)	(0.396)	(0.221	
DM*[300:400)*Post β_{300}^{DM} Post		-2.327***	0.060	0.564	
	(0.414)	(0.220)	(0.348)	(0.218	
DM*[400:500)*Post β_{400}^{DM} Post		-2.444***	0.406	0.596	
	(0.386)	(0.244)	(0.396)	(0.249	
DM*[500:600)*Post β_{500}^{DM} Post		-2.195***	0.136	0.498	
	(0.251)	(0.262)	(0.339)	(0.178	
DM*[600:700)*Post β_{600}^{DM} Post		-2.965***	0.442	0.990**	
	(0.525)	(0.267)	(0.391)	(0.224	
DM*[700:800)*Post β_{700}^{DM} Post		-4.113***	-0.141	0.738	
	(0.383)	(0.358)	(0.450)	(0.211	
DM*[800:900)*Post β_{800}^{DM} Post		-4.239***	-0.009	0.415	
	(0.510)	(0.467)	(0.588)	(0.307	
Bond-Firm Controls	No	No	Yes	No	Yes
Country FE	No	No	Yes	No	Yes
Industry-Year FE	No	No	Yes	No	Yes
Maturity FE	No	No	Yes	No	Yes
Quarter-Year FE	No	No	Yes	No	Yes
Ratings FE	No	No	Yes	No	Yes
Diff-in β_{500}^{EM} Post $-\beta_{400}^{EM}$ Post	-0.030	0.888	-0.114	-1.447**	
P-Value	0.979	0.248	0.867	0.001	
Triple β_{500}^{EM} Post $-\beta_{400}^{EM}$ Post $-(\beta_{500}^{DM}$ Post $-\beta_{400}^{DM}$ Post$)$	-0.279	1.158	-0.016	-1.136**	
P-Value	0.822	0.164	0.983	0.018	
Number of Observations	1,600	3,599	3,532	3,986	
R^2	0.	0.	0.	0.	0.

Tabl

Probability of Issuing Bonds of Different Sizes:

This table reports placebo and robustness tests for the probability of issui eligible bonds, which are those with less than five years of maturity or fle: with a post dummy equal to one for the 2004-2008 period. Panel C estimates the the 2009-2012 period. Columns 1-9 report the regressions for the bond issua post dummy, and the interaction of the post dummy with the emerging market du and the Post 2008 dummy coefficients are not reported to conserve space. Pan effects, in addition to bond-firm controls. Bond-firm controls include a d indicating whether the firm is foreign-owned, a dummy indicating whether t dummy. Standard errors are clustered at the country and quarter-year level respectively.

Panel A. Non-Index Bonds. Sample Period: 2000-2016 (Po								
	Dependent Variable: Dummy=1 if Issuance=[X:							
	(1)	(2)	(3)	(4)	(6)	(5)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[8
EM*Post 2008	-0.006	-0.033	0.052**	0.031	0.010	-0.01			
	(0.091)	(0.045)	(0.022)	(0.025)	(0.017)	(0.031)			
Mean Probabi10i.t4y90	0.199	0.104	0.056	00.001258	00.002780	0.008			
Number of Countries	67	67	67	67	67	67	67	67	
Number of Observations	9,871	9,871	9,871	9,871	9,871	9,871			
R^2	0.034	0.037	0.0121	0.004	0.000	0.002	0.00		
Panel B. Sample Period: 2000-2008 (Post Period: 20								
	Dependent Variable: Dummy=1 if Issuance=[X:							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[
EM*Post 2003	-0.068	-0.011	0.079**	0.013	0.008	-0.00		
	(0.075)	(0.047)	(0.036)	(0.019)	(0.013)	(0.018)		
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probabi10i.t3y56	0.230	0.147	0.0890.72	0.0430.19	0.028	0.		
Number of Countries	64	64	64	64	64	64	64	64
Number of Observations	9,647	9,647	9,647	9,647	9,647	9,		
R^2	0.273	0.148	0.115	0.175	0.139	0.146	0.125	
Panel C. Sample Period: 2004-2012 (Post Period: 20								
	Dependent Variable: Dummy=1 if Issuance=[X:							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[5		
EM*Post 2008	-0.048	-0.119***	-0.020	0.032	0.008	0.0		
	(0.049)	(0.039)	(0.020)	(0.024)	(0.018)	(0.028)		
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probabi10i.t3y77	0.159	0.127	0.091	0.048	0.095	0.032		
Number of Countries	67	67	67	67	67	67	67	67
Number of Observations	9,894	9,894	9,894	9,894	9,894	9,		
R^2	0.390	0.172	0.147	0.1081167	0.1057149	0.158	0.	

Table 7

Probability of Issuing $500 Million Bon

This table reports the regression of a dummy equal to one
equal to $500 million on the log of one plus the lagged car
markets during 2009-2016. The dummy variable takes the
issuances is below $500 million. The carry trade measure
in the money market in local currency and the U.S. money
variance of the exchange rate during the previous quart
effects. Column 2 includes industry and quarter-year fi
quarter-year fixed effects, in addition to maturity con
years of each bond, measured as the number of years to fina
quarter-year, and rating fixed effects, in addition to m
at the country and quarter-year level. *, **, and *** indi
and 1% levels, respectively.

	Dependent Variable: Dummy=1 if Iss			
	(1)	(2)	(3)	(4)
Log(1 + Lagged Carry Trade)	0.010**	0.018**		
	(0.004)	(0.006)	(0.006)	(0.
Maturity controls	No	No	Yes	Yes
Industry FE	No	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes
Rating FE	No	No	No	Yes
Number of Observations	1,331	1,322	1,28	
R^2	0.043	0.103	0.109	0.173

Table 8

Summary Statistics of Cross-Over Funds and Emerging M

This table reports the total number of funds, their average size, and the portfolio compo
is restricted to fixed income mutual funds. Columns 1, 3, 5-7 consider the full sample of
market corporate debt bond in their portfolio. Column 5 reports the percentage of corpor
total value of the emerging market corporate bond holdings, respectively. The size of t
classified into three categories: developed market funds and emerging market non-speci
of corporate, corporate inflation projected, and undefined bond securities. Cor

	Total Number of Funds		Average Fund Size (Millions of U.S. Dollars)		Average Corporate Debt Holdings		
	All Funds	With Emerging Market Corporate Debt	All Funds	With Emerging Market Corporate Debt	All Corporate Debt	Emerging Market Corporate Debt	Emerging Market Corporate Deb
	(1)	(2)	(3)	(4)	(5)	(6)	
Sample Period: 2000-2016							
Cross-Over Funds							
Developed Market Funds	907	660	1,336,354	955,121			28
Emerging Market Non-Specialist Funds	461	401	76,281	73,039			
Emerging Market Specialist Funds							
Emerging Market Corporate Specialist Funds	98	93	8,821	8,771			
All	1,466	1,154	1,421,456	1,036,931	30.32%		
Post Period: 2009-2016							
Cross-Over Funds							
Developed Market Funds	901	650	2,130,728	1,652,768			3
Emerging Market Non-Specialist Funds	459	397	147,597	141,829			
Emerging Market Specialist Funds							
Emerging Market Corporate Specialist Funds	98	93	12,113	12,04			
All	1,458	1,140	2,290,438	1,806,642	31.68%		

Tabl

Portfolio Composition by Issuance Size of Cross-Over Fu

This table reports the value of emerging market corporate debt of different siz
mutual fund category during 2009-2016. The analysis is restrict
1, 2, and 3 report the percentage of emerging market corporate debt with face val
equal to or above $500 million [500:1,000), respectively. Column 4 reports the
respect to the emerging market corporate specialist funds. Column 5 reports the
respect to the total amount outstanding. Mutual funds are classified into thre
(cross-over funds), plus emerging market specialist funds.

	Total Value of Emerging Market Corporate Debt				
	(0:300)	[300:500)	[500:1,000)	Compared to Emerging Market Specialist Funds	Compared to Outstanding Amount
	(1)	(2)	(3)	(4)	(5)
Cross-Over Funds					
Developed Market Funds		9.46%	12.73%	77.80%	14.
	(0.074)	(0.087)	(0.099)	(0.965)	
Emerging Market Non-Specialist Funds		11.26%	13.87%	74.87%	
	(0.152)	(0.115)	(0.206)	(0.981)	
Emerging Market Specialist Funds					
Emerging Market Corporate Specialist Funds		13.27%	23.92%	62.	
	(0.644)	(0.500)	(0.960)		(3
Total Amount Outstanding	17.42%	21.74%	60.84%	-	
	(2.193)	(0.783)	(2.916)		

Table 10
Probability of Issuing Large Bonds: Prob

This table reports Probit and Logit regressions of the change in bond with face value equal to or above $500 million [500:1,000) i firms in emerging markets and investment grade firms in develop 2008 and post-2008) level. The sample is restricted to firms t regression coefficients for the large bond issuance dummy on the pre and post dummy variables with the log of assets. Assets are co 2 report Probit results. Columns 3 and 4 report Logit results. Pa of issuing large bonds at the 25th, 50th, 75th, and 90th percentile of the size c standard errors are reported. *, **, and *** indicate sta

Panel A. Coefficients

Dependent Variable: [500m:1,000) Issua

	Probit Regression Coefficients			L
	Emerging Markets		Developed Markets	Emer
	(1)	(2)	(3)	(4)
Pre 2008	-5.683***	-4.241***	-10.356***	
	(0.512)	(0.262)	(0.979)	
Post 2008	-4.395***	-3.701***	-7.426***	
	(0.318)	(0.250)	(0.578)	
Pre 2008 * ln(Asset)	0.101***	0.368***	0.921***	
	(0.055)	(0.027)	(0.102)	
Post 2008 * ln(Asset)	0.204***	0.323***	0.711***	
	(0.035)	(0.026)	(0.063)	
Number of Observations	1,068	2,240	1,688	2,

Panel B. Marginal Effects

	Probit Regression			Logit R
	Emerging Markets		Developed Markets	Emer
	(1)	(2)	(3)	(4)
10th Percentile	0.010**	0.001	0.017***	
	(0.004)	(0.001)	(0.006)	
25th Percentile	0.036***	0.018*	0.041***	
	(0.010)	(0.010)	(0.010)	
50th Percentile	0.092***	0.035*	0.091***	
	(0.017)	(0.018)	(0.017)	
75th Percentile	0.157***	0.035	0.162***	
	(0.026)	(0.024)	(0.026)	
90th Percentile	0.171***	0.011	0.180***	
	(0.043)	(0.040)	(0.045)	
95th Percentile	0.156***	-0.008	0.154**	-0.013
	(0.059)	(0.049)	(0.064)	
99th Percentile	0.103	-0.024	0.074	-
	(0.075)	(0.048)	(0.075)	

Tabl

Cash Accumulation from Corporate Bond I

Regression Evidence

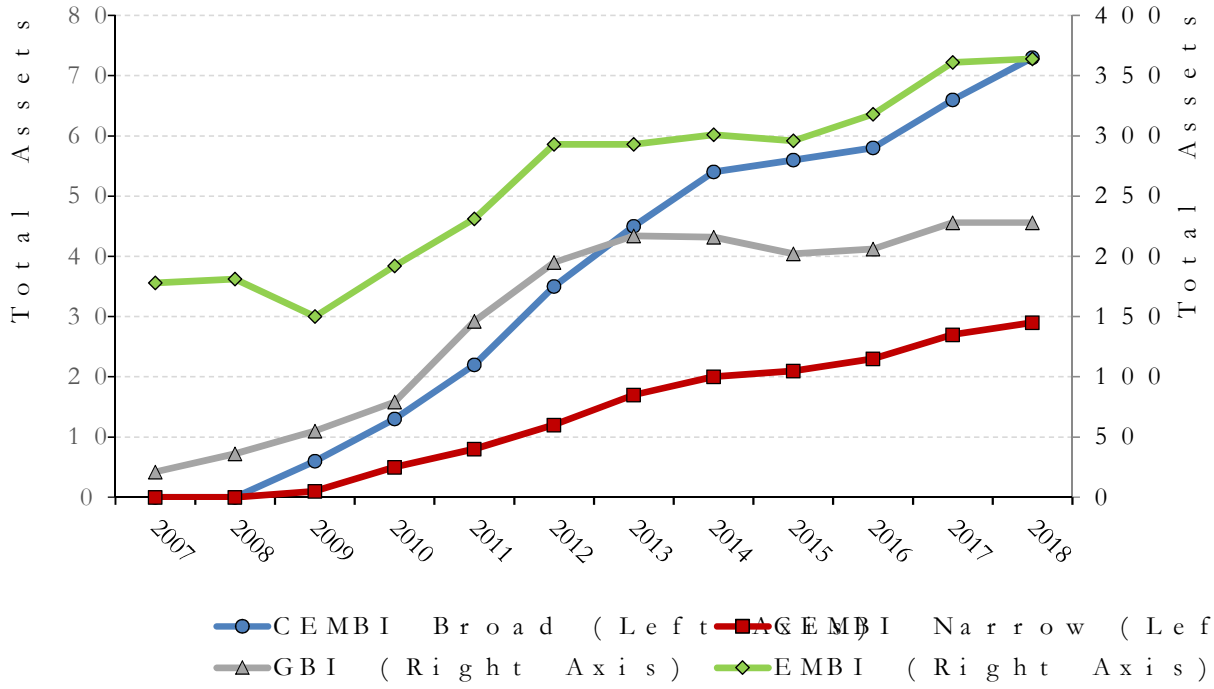
This table reports the coefficients from pooled firm-l
terminvestments on corporate bond proceeds after one y
report the use of funds for issuers of bonds with face val
above $500 million, during the pre-2008 (2000-2008) an
firms in emerging markets and investment grade firms in
analysis follows the specification of Kim and Weisbach (
= log[(V/Assets) + 1], where V is cash and short-termi
variables are bond issuance value and other sources of f
in addition to the log of total assets, interacted with t
or post 2008 dummy. The regressions also control for th
sales and the standard deviation of growth of sales. To
before the issuance. All variables are winsorized at t
statistical significance at the 10%, 5%, and 1% le

	Emerging Markets	Developed Markets
	(1)	(2)
(0:500)*Pre 2008	0.475***	0.7
	(0.110)	(0.169)
(0:500)*Post 2008	-0.391	0.2
	(0.321)	(0.237)
[500:1,000)*Pre 2008	0.196	0.
	(0.121)	(0.177)
[500:1,000)*Post 2008	0.670**	
	(0.326)	(0.206)
Triple $\beta^{Post}_{\geq 500} - \beta^{Pre}_{\geq 500} - (\beta^{Post}_{<500} - \beta^{Pre}_{<500})$	1.339***	-0.076
P-Value	0.003	0.880
Number of Observations	955	1,1
R^2	0.372	0.257

Appendix Figure 1

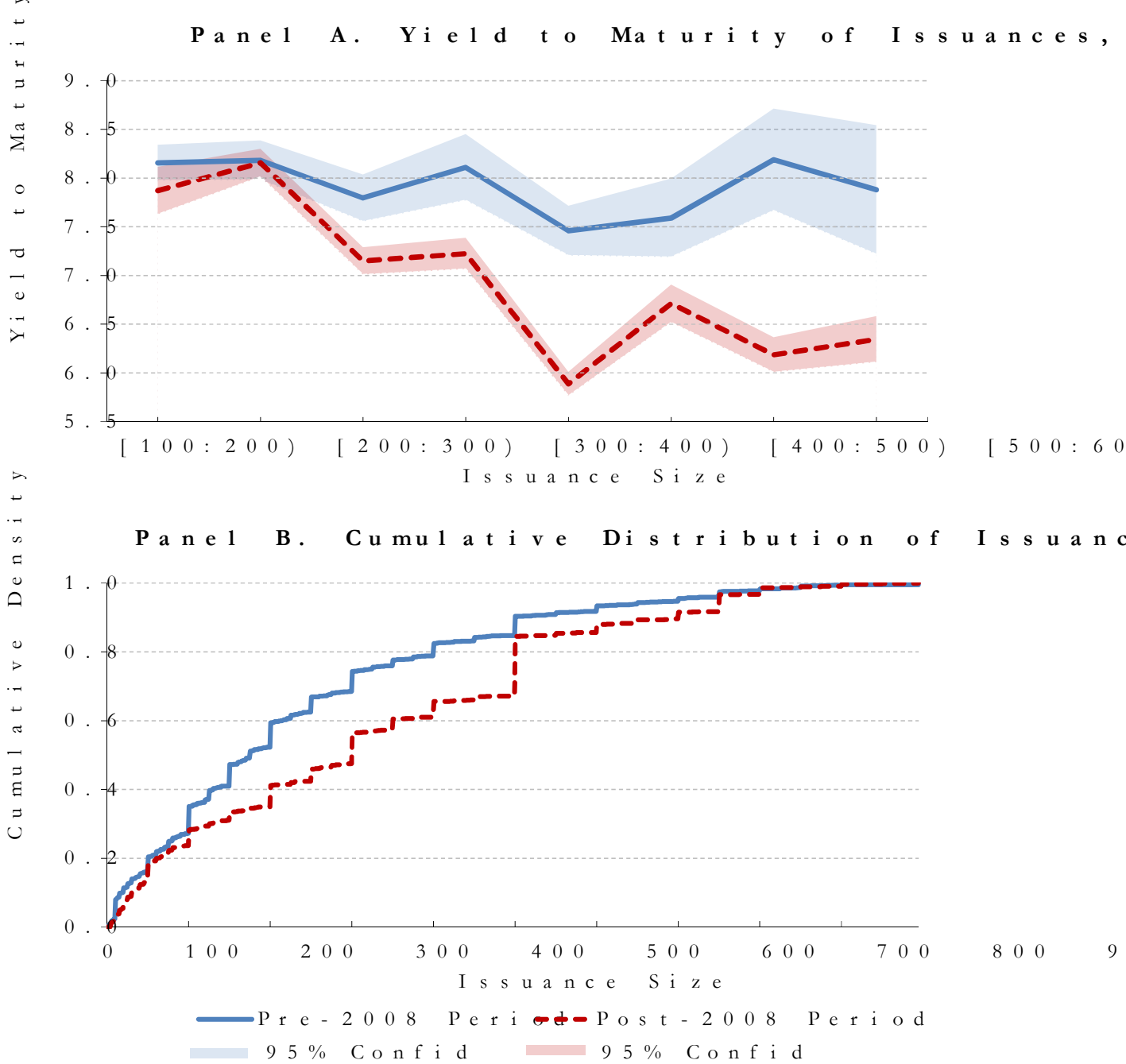
Assets Benchmarked to J.P. Morgan Emergi

This figure shows the evolution of the assets of funds that tra
debt indexes during 2007-2018. Numbers are in billions of U.S.
Index, EMBI stands for Emerging Market Bond Index, and G



Appendix Figure 2
Yield to Maturity and Cumulative Distributi
Including High-Yield Developed Market Bonds

This figure shows the average yield to maturity (Panel A) and
U.S. dollar-denominated bonds of different sizes in millio
and high-yield firms in developed market during the pr



Appendix
List of Countries

This table displays the list of markets classified as

Emerging Markets	Emerging Markets (Cont'd)	Deve
Argentina	Mongolia	Australia
Azerbaijan	Morocco	Austria
Bahrain	Nigeria	Belgium
Brazil	Oman	Canada
Chile	Panama	Denmark
China	Peru	Finland
Colombia	Philippines, The	France
Croatia	Poland	Germany
Czech Republic	Qatar	Greece
Dominican Republic	Russian Federation	Hong
Egypt, Arab Rep.	Saudi Arabia	Iceland
El Salvador	Singapore	Ireland
Guatemala	South Africa	Italy
Hungary	Taiwan, China	Japan
India	Thailand	Luxembourg
Indonesia	Trinidad and Tobago	Netherlan
Israel	Turkey	New Zealand
Jamaica	Ukraine	Norway
Kazakhstan	United Arab Emirates	Portugal
Korea, Rep.	Venezuela, RB	Spain
Kuwait		Sweden
Lebanon		Switzerland
Malaysia		United Kingdom
Mexico		United States

Appendix
CEMBI and EMBI Requirements

This table reports the requirements for bonds to qualify for inc

	CEMBI		EMBIG Diversified
	CEMBI Broad/ Broad Div.		CEMBI / Div (Narrow)
Country/Region	Issuer needs to belong to a coun Asia ex Japan, Latam, Easter	GNI per capita must allow the w Europe (IMC) for East/Afr	
Issuer	Headquartered in an emerging 100% of the issuer's assets 100% secured by assets withi	market (EM) country, or are within EM economies, o n EM economies.	
Liquidity	N/A	N/A	Daily available pricing from vendor.
Instrument Type	All fixed, float Typically amortizers. Defaulted bonds are excluded	All fixed, floaters, amorti loans.	
Minimum Outstanding Face Value	$300 Million Amount	$500 Million	$500 Million
Maturity	Enter when at least five years Exit when less than thirteen	Enter when at least two and maturity. months to maturity.	Exit when less than one yea
Law/Settlement	Local law instruments are not through another institution	eligible; Euroclearable or N/A outside the issuing countr	
Includes Quasi-Soverei	N/A		Yes

Appendix Table 3

Yield to Maturity and Probability of Issuing Bonds of

This table reports mean tests for the yield to maturity and the probability of iss
$500 million [400:500), and between $500 and $550 million [500:550), for firms in
2008 (2000-2008) and post-2008 (2009-2016) periods. Panel A shows the yield to ma
Columns 1-3 show the mean tests and differences (pre and post 2008) for the [400:50
mean tests and differences (pre and post 2008) for the [500:550) bonds. Column 7 s
country group. Column 8 reports the triple difference, across issuance size, acro
are dropped. *, **, and *** indicate statistical significance at the 10%,

Panel A. Yield to Maturity

	[400:500)			[500:550)			Diff-in-Dif	
	Pre 2008	Post 2008	Diff	Pre 2008	Post 2008	Diff		
	(1)	(2)	(3)=(2)-(1)	(4)	(5)	(6)=(5)-(4)	(7)=(6)-(3)	(8)=EM(7
Emerging Markets	7.189	6.223	-0.966***	7.089	4.883	-2		
	(0.232)	(0.189)	(0.312)	(0.188)	(0.079)	1.029	(0.495)	
Developed Markets	5.534	4.076	-1.458***	5.270	3.6	0.42		-1
	(0.077)	(0.075)	(0.109)	(0.073)	(0.061)	(0.098)		

Panel B. Issuance

	[400:500)			[500:550)			Diff-in-Dif	
	Pre 2008	Post 2008	Diff	Pre 2008	Post 2008	Diff		
	(1)	(2)	(3)=(2)-(1)	(5)	(4)	(6)=(5)-(4)	(7)=(6)-(3)	(8)=EM(7
Emerging Markets	0.043	0.063	0.020***	0.060	0.179	0.1		
	(0.004)	(0.005)	(0.006)	(0.005)	(0.007)	0.071	(0.009)	
Developed Markets	0.043	0.047	0.004	0.067	0.0	0.013		0.03
	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)		(0.005)	

Appendix
Yield to Maturit: Pre-2008

This table reports difference-in-difference regressions of the y
sizes in millions of U.S. dollars, measuring the relative change a
firms in developed market. The analysis is restricted to positive
Equation (7) in the text. Columns 1-4 report regressions for the y
bucket size and the emerging market (EM) or β_X^{EMPost} β_X^{DMPost} developed market (DM)
Table 3 to conserve space. Columns 1-4 include different sets of fi
whether the bond was issued publicly or privately, a dummy indicat
firm has partial government ownership, and a fixed or flexible cou
year levels. The yield to maturity observations in the top and bott
10%, 5%, and 1% levels, respectively.

	Associated Coefficients	Dependent Variable: Yield to Mat			
		(1)	(2)	(3)	(4)
EM*[100:200)	β_{100}^{EM}	1.843***	1.871***		1.84
		(0.348)	(0.464)	(0.524)	
EM*[200:300)	β_{200}^{EM}	1.767***	1.662***		1.64
		(0.371)	(0.444)	(0.489)	
EM*[300:400)	β_{300}^{EM}	1.168**	1.434***		1.422
		(0.468)	(0.426)	(0.465)	
EM*[400:500)	β_{400}^{EM}	1.187**	0.986**		0.978
		(0.470)	(0.408)	(0.430)	
EM*[500:600)	β_{500}^{EM}	1.097***	1.127**		1.121
		(0.344)	(0.455)	(0.482)	
EM*[600:700)	β_{600}^{EM}	0.207	0.712		0.709
		(0.490)	(0.516)	(0.521)	
EM*[700:800)	β_{700}^{EM}	0.390	1.030*		1.030*
		(0.394)	(0.576)	(0.578)	
EM*[800:900)	β_{800}^{EM}	0.406	0.489		0.490
		(0.554)	(0.564)	(0.562)	
DM*[100:200)	β_{100}^{DM}	-1.155***	-0.294**		-0.3
		(0.278)	(0.135)	(0.298)	
DM*[200:300)	β_{200}^{DM}	-0.825***	-0.352***		-0.
		(0.200)	(0.124)	(0.216)	
DM*[300:400)	β_{300}^{DM}	-0.519**	-0.244*		-0.25
		(0.201)	(0.146)	(0.204)	
DM*[400:500)	β_{400}^{DM}	-0.468**	-0.292		-0.30
		(0.221)	(0.192)	(0.223)	
DM*[500:600)	β_{500}^{DM}	-0.645***	-0.195*		-0.2
		(0.159)	(0.113)	(0.128)	
DM*[600:700)	β_{600}^{DM}	-0.271	-0.219		-0.223
		(0.170)	(0.202)	(0.206)	
DM*[700:800)	β_{700}^{DM}	-0.155	-0.081		-0.083
		(0.184)	(0.147)	(0.149)	
DM*[800:900)	β_{800}^{DM}	-	-	-	
Log(Issuance Size)				-0.013	
				(0.148)	
Log(Assets)					-0.1
					(0.038)
Bond-Firm Controls		No	Yes	Yes	Yes
Country FE		No	Yes	Yes	Yes
Industry-Year FE		No	Yes	Yes	Yes
Maturity FE		No	Yes	Yes	Yes
Quarter-Year FE		No	Yes	Yes	Yes
Ratings FE		No	Yes	Yes	Yes
Number of Observations			7,939	7,818	7,
R^2		0.344	0.763	0.763	0.

Appendix

Yield to Maturity and Issuance Sizes: Rob
Using $500 Million Issuances instead of [50

This table reports robustness tests for the yield to maturity
replaced by bonds with face value equal to $500 million. The fu
Columns 1 and 2 report regressions for the yield to maturity on
bucket size, the post dummy and the emerging market (EM) or dev
β_X^{EM} and β_X^{DM} are not reported to conserve space. Column 2 includes co
and rating fixed effects (FE), in addition to bond-firm contr
whether the bond was issued publicly or privately, a dummy in
dummy indicating whether the firm has partial government own
Standard errors are clustered at the country and quarter-year
and bottom 5% are dropped. *, **, and *** indicate statistica
respectively.

	Associated Coefficients	Dependent Variable: Yield to M (1)	(2)
EM*[100:200)*Post 2008	β_{100}^{EM} post		-1.755***
		(0.522)	(0.488)
EM*[200:300)*Post 2008	β_{200}^{EM} post		-0.574***
		(0.214)	(0.452)
EM*[300:400)*Post 2008	β_{300}^{EM} post		-1.353***
		(0.247)	(0.457)
EM*[400:500)*Post 2008	β_{400}^{EM} post		-0.966**
		(0.392)	(0.491)
EM*$500*Post 2008	β_{500}^{EM} post	-2.140***	-2.
		(0.199)	(0.440)
EM*[600:700)*Post 2008	β_{600}^{EM} post		-0.992**
		(0.484)	(0.596)
EM*[700:800)*Post 2008	β_{700}^{EM} post		-1.524***
		(0.355)	(0.525)
EM*[800:900)*Post 2008	β_{800}^{EM} post		-1.296**
		(0.499)	(0.820)
DM*[100:200)*Post 2008	β_{100}^{DM} post		-0.977**
		(0.412)	(0.412)
DM*[200:300)*Post 2008	β_{200}^{DM} post		-0.845***
		(0.205)	(0.378)
DM*[300:400)*Post 2008	β_{300}^{DM} post		-1.319***
		(0.128)	(0.395)
DM*[400:500)*Post 2008	β_{400}^{DM} post		-1.458***
		(0.152)	(0.346)
DM*Iss500*Post 2008	β_{500}^{DM} post	-1.694***	-3
		(0.157)	(0.346)
DM*[600:700)*Post 2008	β_{600}^{DM} post		-1.907***
		(0.252)	(0.339)
DM*[700:800)*Post 2008	β_{700}^{DM} post		-2.344***
		(0.150)	(0.370)
DM*[800:900)*Post 2008	β_{800}^{DM} post		-2.048***
		(0.217)	(0.434)
Bond-Firm Controls		No	Yes
Country FE		No	Yes
Industry-Year FE		No	Yes
Maturity FE		No	Yes
Quarter-Year FE		No	Yes
Ratings FE		No	Yes
Diff-in-Diff	β_{500}^{EM} post $-\beta_{400}^{EM}$ post	-1.174***	-0.918***
P-Value		0.000	0.006
Triple-Diff	β_{500}^{EM} post $-\beta_{400}^{EM}$ post $-(\beta_{500}^{DM}$ post $-\beta_{400}^{DM}$ post$)$	-0.938***	-0.723**
P-Value		0.008	0.032
Number of Observations		7,759	7,
R^2		0.347	0.765

Appendix Table 6
Probability of Issuing Bonds of Differen
Using $500 Million Issuances instead of [

This table reports robustness tests for the probability of issuing bon
value equal to $500 million. Columns 1-9 report the regressions for the
the post dummy, and the interaction of the post dummy with the emerging
year, and rating fixed effects (FE), in addition to bond-firm controls.
or privately, a dummy indicating whether the firm is foreign-owned, a du
flexible coupon dummy. Standard errors are clustered at the country an
and 1% levels, respectively.

	Dependent Variable: Dummy=1 if Issuance=[X:X+								
	Probability of Issuing Debt of a Cert								
	(1)	(2)	(3)	(4)	(5)	(7)	(6)	(8)	(9
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)				
EM*Post 2008	-0.04	-0.00	-0.10	-0.05	-0.01	-0.05	-0.00	0.002	0
	(0.045)	(0.031)	(0.021)	(0.017)	(0.015)	(0			
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Y
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Y
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Y
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Y
Mean Probability	0.364	0.175	0.129	0.092	0.034	0.008	0.005	0.000	0
Number of Countries	69	69	69	69	69	69	69	69	
Number of Observations	18,982	18,982	18,982	18,982	18,982	18,982	18,982	18,982	
R^2	0.339	0.151	0.125	0.157	0.137	0.166			

Appendix

Unconditional Probabilities of Issuing a Bond of Di

This table reports difference-in-difference regressions of the change in t
millions of U.S. dollars, pre and post 2008, for firms in emerging market 20 rel
2016 period. The analysis is restricted to positive and zero bond issuance o
bucket size on the interaction of the post 2008 dummy (equal to one for 2009-2
year, maturity, quarter-year, and rating fixed effects (FE), in addition to
issued publicly or privately, a dummy indicating whether the firm is foreig
fixed or flexible coupon dummy. Standard errors are clustered at the country
1% levels, respectively.

	Dependent Variable: Dummy=1 if Issuance=[X: X+10							
	Probability of Issuing Debt of a Certai							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)			
EM*Post 2008	-0.065*	-0.093***	-0.003	0.042***	0.013			
	(0.037)	(0.030)	(0.017)	(0.015)	(0.013)	(0.0		
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.423	0.156	0.115	0.082	0.0427	0.0944		0
Number of Countries	69	69	69	69	69	6699	69	
Number of Observations	21,339	21,339	21,339	21,339	21,339			
R^2	0.249	0.154	0.121	0.147	0.125	0.132		0

Appendix Table 8
Frequency of Bond Issuances

This table reports the mean number of issuances and the
international U.S. dollar-denominated bonds of any s
million (0:300), between $300 and $500 million [300:5
million [500:1,000), by firms in emerging markets and i
markets during 2000-2016. The analysis is restricted t
of bond at least once during the sample period. Panel A
per year as follows: (1) the total number of bonds iss
observation, (2) the mean number of issuances are then
firm is computed. Panel B reports the number of years
average. The values are computed as one over the

Panel A. Number of Issuances per Year		
	Emerging Markets	Developed Mar
Any Bucket Size	0.145	0.293
(0:300)	0.128	0.288
[300:500)	0.086	0.135
[500:1,000)	0.113	0.174

Panel B. Years Between Issuances		
	Emerging Markets	Developed Mar
Any Bucket Size	6.898	3.411
(0:300)	7.837	3.470
[300:500)	11.669	7.389
[500:1,000)	8.854	5.751