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

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Abstract

Emerging market corporations significantly increased their borrowing in international markets since 2008 through large bond issuances. We document a strong clustering of issuances with face value of exactly US$500 million after 2008. This reflects investor willingness to purchase emerging market bonds included in international bond indexes (requiring a minimum face value of US$500 million). Index-eligible bonds allow investors to hold more liquid securities. Firms face a tradeoff: issuing large, index-eligible bonds allows them to borrow at a lower cost at the expense of hoarding cash. Because of this "size yield discount," many companies issued index-eligible bonds, increasing cash holdings.

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1. Introduction

After the 2008 global financial crisis (GFC), emerging market corporations increased substantially their issuance of U.S. dollar-denominated bonds. The dollar credit to non-financial emerging market corporates more than doubled between 2010 and 2018, when this type of credit reached 3.7 trillion U.S. dollars (Bruno and Shin, 2020). This boom in foreign currency borrowing has spurred several policy and academic discussions on the drivers and risks of high dollar debt (Acharya et al., 2015; Chui et al., 2014, 2016; Beltrán et al., 2017; Chang et al., 2017; Alfaro et al., 2019).

In this paper, we document new stylized facts related to the surge in U.S. dollar-denominated issuances after 2008 and study the role of supply and demand for bonds in driving this growth. First, we show that the rise in issuance activity was driven by large bonds, in particular, by bond issuances of exactly $500 (US$500) million. Second, these large bond issuances enjoyed a larger reduction in yields compared with similar bonds of smaller issuance size. Third, the search for yield by institutional investors from developed economies played an important role in explaining the growth of large emerging market corporate bond issuances and their lower yields after 2008.[1] Specifically, liquidity preferences of investors drove the increased demand for more liquid bonds, such as those included in major emerging market benchmark indexes, which require a minimum face value of $500 million. Fourth, the lower yields on large bonds incentivized firms to issue larger bonds than they otherwise would have chosen, raising post-issuance cash holdings.

We begin our analysis by documenting a strong clustering of emerging market bond issuances with a face value of exactly $500 million after 2008 and a discrete jump in the cumulative distribution of issuances at this size threshold. Roughly one of every five

[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), driven by persistently low interest rates on safe assets.

bonds issued in international markets after 2008 had a face value of $500 million. This discontinuity was much more muted in the pre-2008 period and for a control sample of investment grade developed market firms. Firm-level regressions confirm this result, even after controlling for firm fixed effects.

The increase in $500 million bond issuances after 2008 could be driven by an increase in the demand for emerging market securities by international investors, by an increase in the supply of securities by emerging market firms (in response, for example, to new investment opportunities), or a combination of both. The fact that we observe emerging market firms clustering their issuances at exactly $500 million after 2008 suggests the importance of bond investor influence on the change in issuance behavior. One would not expect new investment opportunities that lead to greater funding needs to be clustered at issuance amounts of exactly $500 million. To further shed light on the role of demand side and supply side factors, we analyze the behavior of bond yields.

We document a significant reduction in the yields of $500 million bonds issued by emerging market firms after the GFC, relative to otherwise similar bonds with lower face value. We refer to the difference in yields between bonds large enough to be included in indexes and smaller bonds as the "size yield discount." Not only did this size yield discount widened relative to the period before the GFC, but also this pattern was much more visible for emerging market issuers than for developed market firms. Within-firm estimates using secondary market data for the post-2008 period confirm that yields of bonds issued with face values between $500 and $600 million were lower than those of bonds between $400 and $500 million for emerging market firms, but close to zero for developed market firms. The fact that yields at the $500 million threshold were lower (not higher) than yields of bonds with a lower face value after 2008 suggests that investor demand was important to explain the post-2008 increased issuance of large (index-eligible) bonds.

Institutional investors play a crucial role in the market for international debt securities. These investors face limits in their incentives or ability to undertake risk in unfamiliar asset classes. Thus, the search for yield by broad-based debt institutional investors (those that hold a large portfolio of sovereign and corporate bonds) does not entail an unlimited willingness to invest in any emerging market corporate debt. One way to limit risk is to demand liquid emerging market instruments. Bonds included in market indexes are held by a wider range of investors than other bonds and are bought and sold more frequently, which means they have greater liquidity.[2] The two most relevant benchmark indexes for emerging market bond investors are the J.P. Morgan EMBI Global Diversified Index and the J.P. Morgan CEMBI Narrow Diversified Index, both of which include only bonds with face value equal to or greater than $500.[3]

We provide evidence from institutional investors' holding of bonds to show that it was the liquidity advantage of index eligibility that was most important in explaining increased preference for large bonds. Index-eligible bond holdings were mainly purchased by mutual funds focusing on developed market securities, not by funds specializing in emerging market debt. The funds that focused on developed market securities, which we label "cross-over" institutional investors, significantly increased their holdings of emerging market corporate debt after the GFC. Such funds were less familiar with emerging market

[2] These securities allow asset managers to more easily deal with fund injections and withdrawals with minimal price impact and low transaction costs. An additional motivation for buying index-eligible bonds applies to the more narrowly focused emerging market specialist funds that track emerging market indexes. Bonds included in an index define the benchmark of market performance, which means that holding those bonds limits the manager's risk of underperforming the benchmark. Several studies document that institutional investors do not deviate too much from their respective indexes (Cremers and Petajisto, 2009; Cremers et al., 2016; Raddatz et al., 2017; Converse et al., 2018).

[3] The EMBI, introduced in 1999, stands for Emerging Market Bond Index. The CEMBI, created in 2007, stands for Corporate Emerging Market Bond Index. Both indexes include bonds based on certain security attributes, notably the amount of outstanding debt. The CEMBI uses the $500 million inclusion criteria previously used by the EMBI. A broader index (the CEMBI Broad) also exists, which includes corporate debt with face value equal to or greater than $300 million. Even without the creation of the CEMBI indexes, large bonds were probably destined to be more attractive after 2008, owing to their inherently greater liquidity. However, the creation of the CEMBI indexes might have helped solidify the market for large bonds by putting them explicitly in an index that most investors follow, providing a clear point of reference for buyers and sellers, and thereby accentuating the liquidity advantage of those bonds.

corporate debt prior to the GFC and, in general, tend to be much larger than emerging market specialist funds. After 2008, cross-over funds invested significantly more of their portfolio in bonds with face value equal to or above $500 million, relative to funds that specialize in emerging market securities. Using fund flows data, we construct a measure of demand pressure for emerging market large bonds by different types of funds. This demand pressure, especially from cross-over funds, is negatively and significantly correlated with the size yield discount.

Our results above suggest that 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, which has low returns. Our evidence shows that the post-2008 increase in the size yield discount seemed to have moved the trade-off in favor of issuing $500 million bonds. Firms chose to issue larger bonds to fund their projects by reaching the $500 million threshold. Firms in countries with higher expected carry trade (our proxy for return on cash) issued more $500 million bonds, providing further evidence that firms responded to a trade-off when deciding to issue large bonds in amounts exceeding their funding needs.

If the post-2008 change in investor demand for bonds drove the increased high-face value issuances, then the firms most likely to take advantage of the cost saving from issuing large bonds should be those large enough to be able to make immediate use of the proceeds from a large bond issuance.[4] We show that, in fact, firms with small asset size did not issue large bonds either before or after 2008. Moreover, medium-sized firms saw the largest increase in the probability of issuing large bonds after 2008. These two findings are consistent with investor appetite for large bonds driving changes in bond issuances, as

[4] Theoretically, one can think of sufficiently large firms as those that include both "medium-sized" firms with investment opportunities that are close to $500 million and "large" firms with investment opportunities above $500 million. However, in practice, we do not observe those firms. So, for the empirical analysis we focus on firms in our sample that are different according to their assets.

there is no obvious reason why changes in financing needs should have become suddenly different across firm size categories after 2008.

Lastly, we estimate how firms used issuance proceeds, distinguishing between the behavior of relatively large and medium-sized firms that issued large bonds. We show that emerging market firms that issued bonds above $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. The increased holding of cash was greater for medium-sized firms that issued large bonds than for large firms that issued large bonds. This is consistent with medium-sized firms "stretching" to issue more debt than necessary to fund their investments to take advantage of the size yield discount.

Our paper contributes to at least three different literatures. First, we contribute to a growing literature studying how the low interest rate environment after the GFC encouraged U.S. dollar-denominated corporate bond issuance around the world at the expense of other forms of financing, such as bank borrowing (Shin, 2014; Becker and Ivashina, 2015; Carabarín et al., 2015; McCauley et al., 2015; Lo Duca et al., 2016; Avdjiev et al., 2018; Huang et al., 2018).[5] We show that the search for yield by institutional investors interacted with institutional arrangements prompting investors to seek large, index-eligible bonds. The market structure for international debt securities produced a rising incentive for emerging market firms to issue less expensive $500 million bonds after the GFC. While liquidity demand could explain substantial violations of covered interest parity in

[5] A closely related literature studies the behavior of bond funds and how they affect financial conditions for firms (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., 2020), and how low international interest rates induced more banking sector inflows and lower domestic borrowing costs (Di Giovanni et al., 2019; Kalemli-Ozcan, 2019).

government security markets (Jiang et al. 2018, 2019), we show that a similar effect operates with respect to index-eligible corporate bonds.

Second, by showing that index-eligible bonds have substantially lower yields and attract more issuances, 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.[6] Our contribution is to show that the use of index-eligible bonds by institutional investors has important effects on firms' financial decisions and financing costs. Our evidence provides support for 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).[7] Our paper extends to the global sphere the evidence that a higher demand from passive investors increases firms' propensity to issue bonds in the United States (Dathan and Davydenko, 2018).[8]

Third, our paper is related to the literature analyzing the factors influencing firms' leverage and cash holdings choices, with particular emphasis on the increase in corporate cash holdings (Bates et al., 2009; Falato et al., 2013; Begenau and Palazzo, 2017; Bruno and Shin, 2017). Firms that switch from bank financing to bond financing might increase their holdings of cash for precautionary savings (Xiao, 2018). In this paper, we find that the structure of the corporate bond market can create additional incentives for "over borrowing" by firms that end up holding more cash than needed for investment.

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[6] See, among others, Harris and Gurel (1986), Shleifer (1986), Chen et al. (2004), Barberis et al. (2005), Greenwood (2005), Hau et al. (2010), Wurgler (2011), Claessens and Yafeh (2013), Chang et al. (2015), Raddatz et al. (2017), and Pandolfi and Williams (2019).

[7] 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).

[8] 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.

The rest of the paper is organized as follows. Section 2 provides an analytical 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 and reports preliminary evidence. Section 4 presents our formal regression results on bond issuance and yields. Section 5 examines the role of cross-over 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. Analytical Framework

Our analytical framework describes important aspects of the demand and supply sides of the bond market, providing specific hypotheses we test in our empirical work. First, we discuss incentives for institutional investors to hold index-eligible bonds. Second, we discuss the implications for firms of issuing index-eligible bonds. To illustrate these points in more detail, we present a simple model in Appendix 1. Here, we focus on explaining the intuition of the model.

2.1. The Size Yield Discount as a Response to a Demand Increase

We hypothesize that a surge in investor demand for high-yield U.S. dollar-denominated emerging market debt results in a large increase in the proportion of bonds managed by asset managers with relatively little experience 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 by 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.[9]

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.[10] 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 follows.

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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[9] 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.

[10] 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.*

There is a large literature discussing the advantages of index inclusion for debt securities and the effects of index inclusion on bond prices. The existence of market benchmarks mitigates search frictions (Duffie et al., 2017), which are particularly relevant in over-the-counter markets for corporate debt. Benchmark indexes also improve price transparency and increase liquidity for the included securities that participants are willing to hold and trade. Inclusion in an index produces a higher price because asset managers face a strong incentive to hold securities that are included in the benchmark, generating a "benchmark inclusion subsidy" (Kashyap et al., 2018). The higher the risk of the investment, the greater the benchmark inclusion subsidy. 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. Implications for Issuers: A Simple Model of Bond Issuance

In the simple model presented in Appendix 1, we assume there is a continuum of emerging market firms, each with an investment opportunity of a predetermined scale that needs to be financed. If firms issue more than their financing need, they hold the difference in cash, which is costly because cash earns a low rate of return. There is a corporate debt index

that includes only bonds of face value equal to or above $500 million. We assume there is a yield discount for index-eligible debt, such that the interest rate of bonds equal to or above $500 million is lower than the interest rate of bonds below $500 million.

Firms of sufficiently large size (financing needs above or equal to $500 million) do not have a choice to make; they simply issue a bond equal to their financing need size and enjoy the lower financing cost. On the contrary, other firms (with financing needs below $500 million) face a trade-off. They can issue an amount equal to their financing need or stretch, which implies issuing $500 million and holding the excess in cash. The model implies a critical value of firm size above which firms issue $500 million in debt.[11] We model an increase in demand for emerging market corporate debt as an exogenous increase in the size yield discount, in line with Hypothesis 1. The increase in the size yield discount reduces the critical value of firm size above which firms issue $500 million. Intuitively, as the yield reduction benefit of issuing bonds of $500 million 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.*[12]

According to the model, the critical firm size value is a decreasing function of the return on cash. The intuition is that a higher return on cash makes the strategy of issuing a bond larger than the financing need and investing the remaining in cash more attractive. This comparative static implication 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.*

[11] Appendix Figure 1, Panel A plots the cumulative distribution of issuance size. The cumulative distribution is flat between the critical firm size value and $500 million, because no firm issues in this size interval. There is then a discrete jump in the distribution at $500 million, driven by the mass of medium-sized firms that find it optimal to stretch and issue $500 million. This figure is the theoretical counterpart of Figure 2.

[12] We illustrate Hypothesis 2 in Appendix Figure 1, Panel B. The discrete jump of the cumulative distribution at $500 million becomes larger, as more firms with financing needs below $500 million stretch to issue $500 million with the increased size yield discount.

The model also has several cross-sectional predictions. First, by construction, only firms with scale above the critical firm size value find it convenient to stretch and issue a $500 million bond.

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

In addition, a rise in the size yield discount makes some firms that previously had a financing need that was too small to warrant an issuance of $500 million to switch to that type of issuance. This comparative static is concentrated in medium-sized firms (those with investment opportunities in the neighborhood of the critical firm value size). Firms with investment opportunities that are either greater than, or far smaller than, the prior critical value size, should not respond to the increase in the size yield discount. 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.*

An increase in the size yield discount has no effect on the cash holdings of sufficiently large firms. In contrast, medium-sized firms that prior to the increase in the size yield discount would have chosen to issue an amount equal to their financing need, respond to the increase in the size yield discount by choosing to issue $500 million in debt and accumulate the difference in cash. Thus, within the group of firms that choose to issue $500 million in bonds, firms of relatively smaller size (medium-sized firms) will increase their cash holdings more than relatively large issuers. We summarize this as follows.

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

3. Data and Preliminary Evidence

3.1. Data Sources

We use data from different sources. The data on bond issuances come from the Refinitiv's 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 was 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 are the ones that caused the main concern in the literature and the ones 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 U.S. 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.[13] Importantly, investment grade developed market firms should serve as a reasonable comparison group because the major indexes that track investment

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

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 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).[14] 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 19,822 issuances from 4,961 firms. In additional analysis, we employ secondary market data on bond yields from Datastream to calculate a within-firm measure of the size yield discount for firms. The secondary market bond yields sample includes 2,667,006 observations from 1,729 firms, which allows us to compute 69,029 observations of the within-firm size yield discount measure for 86 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. These 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] 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).

3.2. Preliminary Findings on Issuance and Yields Behavior

We begin by studying how shifts in the search for yield after the GFC affected corporate bond issuance behavior and yields (Figure 1, Panels A, B). The value of international U.S. dollar-denominated bond issuances by emerging market firms increased sharply after 2008 (Figure 1, Panel A). Between 2008 and 2013, the value of those bond issuances increased by 380%. 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% (Appendix Table 2). This is an important new finding, consistent with Hypothesis 2. After 2008, not only did total emerging market corporate bond issuances increased, there was also a noticeable compositional shift from small issuances to large issuances.[15]

To study this compositional change in more detail, we show the cumulative distribution of emerging market international U.S. dollar-denominated corporate bond issuances by size (Figure 2, Panel A). 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 U.S. 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 (Appendix Figure 1). We observe a smaller increase for issuances of $300 million after 2008, consistent with the index inclusion cutoff of the CEMBI Broad.[16]

[15] Appendix Figure 2 shows the same results for the number, instead of the value, of bond issuances. Similar to the evidence on the total value, the number of bonds issued above $500 million represented 11% of the total number of bonds between 2000 and 2008, while their share increased to 33% after 2008.

[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 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 2 and Appendix Table 3.

For investment grade firms issuing international U.S. dollar-denominated bonds in developed economies, we observe a smaller jump in the distribution at $500 million, and one that is more similar before and after 2008 (Figure 2, Panel B). 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.[17]

The fact that we observe emerging market firms clustering their issuances at exactly $500 million after 2008 points to the importance of the investor demand-side influences. It is unlikely that new investment opportunities leading to greater financing needs are clustered exactly at $500 million. In addition, an increase in firms' desire for more funds in each capital raising activity should have led to higher yields, not to lower ones. However, we observe that yields for all issuance sizes declined after the GFC, and that the effect is particularly pronounced for bonds with face value equal to or above $500 million (Figure 1, Panel B).

We also collapse the pre- and post-2008 periods and compare the average yield to maturity of bonds of different issuance size for the two time periods (Figure 3, Panel A). We observe that, on average, yield to maturity decreases with issuance size for emerging market firms. More importantly, consistent with Hypothesis 1, after 2008 we observe a sharp decline in the yield when moving to issuance sizes between $500 and $600 million

[17] Results using yields and issuances for high-yield developed country issuers are very similar to those for emerging market firms (Appendix Figure 3). 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 U.S. dollar-denominated debt from developed market firms, with a minimum issue size of $500 million.

[500:600) (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 investor demand for bonds of issuance size equal to or above $500 million.[18,19] For investment grade corporate issuers in developed markets, yields for issuances at the $500 million threshold also declined after 2008 (Figure 3, Panel B). However, that decline was not significantly larger than the one observed for the pre-2008 period, suggesting a much larger relative post-crisis effect on yields for emerging market firms.

We report the statistical significance of the differences in means for issuances and yields, before and after 2008, for emerging economy issuers and investment grade developed market issuers (Table 1). The fraction of emerging market bonds issued in the [500:600) range increased by 12 percentage points after 2008, from 6.5% to 18.9%. The same change for developed market bonds was smaller, equal to 3.2 percentage points. The difference between both differences is 8.8 percentage points, and highly significant.[20] We also find similar results for the size yield discount, which we define as the difference between the yields of bonds in the [500:600) and [400:500) range. The reduction in the size yield discount after 2008 for emerging market bonds was 91.5 percentage points larger than for developed market bonds.

[18] We also see 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. However, compared to the pre-2008 period, yields for $500 million emerging market corporate bonds declined after 2008 by relatively more.
[19] Another notable feature 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.
[20] Appendix Table 4 reports similar results using narrower bins.

4. Search for Yield and Corporate Bond Issuances and Yields

We use regressions to formally estimate how issuances and yields 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 issuance size and yields. Because bond issuances take place at discrete amounts, generally in multiples of $100 million, we cannot conduct a regression discontinuity design around the $500 million eligibility threshold. Instead, we focus on differences of issuances and yields between different size bins.

4.1 Regression Specification

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

$$Issuance_{[X:X+100)_{it}} = \theta_c + \theta_{jy} + \theta_{qy} + \beta(Post * D_{EM}) + Z_{it} + \varepsilon_{it}, \quad (1)$$

where the dependent variable is a dummy variable that indicates whether a bond issued by firm i, at time t belongs to the size bin [X:X+100), where $X \in \{100, 200, \ldots, 900\}$ million dollars.[21] D_{EM} is a dummy variable equal to one for emerging market firms, and zero otherwise. *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. In some specifications, we also include firm fixed effects. Z_{it} is a vector of time-invariant bond controls for the bond issued by firm i at time t, including the maturity and the rating of the bond.[22] We cluster the standard errors in all regressions by country and quarter-year. We are interested in coefficient β of Equation (1), which measures the change in the

[21] The small number of bond issuances equal or larger than one billion dollars are excluded from our sample to permit a more parsimonious specification.

[22] We also control for 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.

probability of issuing a bond of a certain size, before and after 2008, for emerging market firms relative to the same change for developed market firms.

For bond yields, we estimate the following difference-in-differences specification:

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

$$+ \sum_{Z=EM,DM} \sum_{X=100,\ldots,900} \beta_X^{Z,Post} \left(D_{[X:X+100)_{it}} * D_Z * Post \right) + \quad (2)$$

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

$Yield_{it}$ 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 belongs to the size bin [X:X+100) and D_Z is a dummy variable that indicates whether a firm belongs to the country group $Z \in \{EM, DM\}$.

We are interested in the estimation of coefficients $\beta_X^{Z,Post}$ of Equation (2). These coefficients indicate, for each group (emerging market issuers or developed market issuers), how the yield of bond of size [X:X+100) changed in the post-2008 period relative to the pre-2008 period. More specifically, we focus on the change in the size yield discount for emerging markets, ($\beta_{500}^{EM,Post}$ - $\beta_{400}^{EM,Post}$), and compare it with the change in the size yield discount for developed market firms, ($\beta_{500}^{DM,Post}$ - $M_{400}^{DM,Post}$).

Before the formal regression analysis, we present the evolution of the number of bond issuances of size equal to $500 million, relative to the total number of issuances, for emerging and developed market issuers over 2000-2016 (Figure 4, Panel A). 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.[23] We also show the evolution of the average yield to maturity for $500 million bond issuances for both type of issuers (Figure 4, Panel B). We observe a similar pattern in yields for both types of firms until 2008, but after that year we observe a sharp decline in the yields of $500 million bonds that is more prominent for emerging market firms. In addition, we plot the size yield discount, calculated as the difference between the average yield of [500:600) and [400:500) bonds (Figure 4, Panel C). 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.

This evidence illustrates both the drop in the size yield discount at the $500 million threshold and the increase in the volume of $500 million issuances after 2008.[24] In contrast, 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.

4.2 Main Regression Results

With respect to issuance quantities, we estimate Equation (1) using the issuance indicator for bonds in different size bins as the dependent variable.[25] The coefficient of the

[23] 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 2004-2008 when we control for observable characteristics, as shown in Section 4.3.

[24] Appendix Figure 4 plots the issuances and yields in the same figure, to observe more easily at the joint behavior of issuances and yields.

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

interaction term is positive and statistically significant for issuances of size between $500 and $600 million (Table 2, Panel A). This means that after 2008 emerging market bond issuers were 8.4 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 bond of $500 million before 2008, which was 10.2%. The results remain unchanged when including firm fixed effects, which control for all time-invariant firm characteristics and capture variations in issuance behavior within firms (Table 2, Panel B).

The issuance of [300:400) bonds also increased after 2008. This result is consistent with an increase of the size yield discount for [300:400) relative to [200:300) after 2008. On average, the effects for the $300 million issuances and yield to maturity are smaller than the ones for the [500:600) bonds, so we focus mostly on the latter. Nonetheless, the effects in [300:400) bonds are interesting because they are consistent with the other benchmark index, the CEMBI Broad, having a threshold at $300 million.[26,27]

We interpret the change in issuances 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. If we replace the [500:600) million size bins with the exact $500 million values, our results for issuances remain unchanged (Appendix Table 6). This finding

[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 2 shows estimates of Equation (1) for a sample of strictly positive issuance observations. In Appendix Table 5, we re-estimate the equation for a sample containing all observations (including those with no issuances) and the results remain unchanged.

indicates that our main results are driven by the changes in the issuances of bonds with issuance size of exactly $500 million. The same applies for the yield results.

We report the results of estimating Equation (2) for yields in Table 3. To make the table more readable, we report only the coefficients for $\beta_X^{EM,Post}$ and $\beta_X^{DM,Post}$.[28] We compare the size yield discount for emerging market issuers after 2008 with the size yield discount for developed economy issuers after 2008, relative to the pre-2008 values. The change in the size yield discount for emerging market firms ($\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}$) is 109 basis points, which is statistically different from zero. When we compare this with the size yield discount change of developed market firms $(\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}) - (\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post})$, the difference-in-differences estimate is 86 basis points (Table 3, Column 1). In the specification with controls and fixed effects, the size yield discount change for emerging market firms is 89 basis points (Table 3, Column 2). When compared to the size yield change discount of developed market firms, this number is 71 basis points. Using bond issuances of exactly $500 million instead of the [500:600) million bin generates similar size yield discounts (Appendix Table 8). We obtain very similar results when we control for the log of issuance size (Table 3, Column 3). Additionally, we control for the log of assets of the firm issuing a bond (Table 3, Column 4). Because we do not have assets for all the firms, our sample size drops considerably but the main results are very similar.[29]

We also run the regressions adding firm fixed effects to the specification (Table 3, Column 5), where the coefficients become identified from within-firm variation across time. The change in the size yield discount after 2008 for emerging market firms drops to 41 basis points, leading to difference-in-differences change of 37 basis points. These values indicate that unobserved firm heterogeneity, resulting from the incompleteness of our

[28] In Appendix Table 7, we report all the estimated coefficients for the pre-2008 period.
[29] Results are very similar when we use spreads over the maturity-relevant U.S. treasuries, rather than yields, as the dependent variable.

control variables, could be driving the previous results. However, the effect is no longer precisely estimated. The regression with firm fixed effects does not have much statistical power because bond issuances by emerging market firms are sporadic, so there are very few firms that issued multiple times in our sample.

4.3 Using Secondary Market Yields to Estimate the Size Yield Discount

As an alternative way of controlling for unobserved firm heterogeneity, we examine secondary market yields. Here, we can conduct a test with more statistical power because we have significantly more observations over time of yields for bonds of different sizes issued by the same firm. Moreover, secondary market data allow us to compare yields for bonds of the same firms during the same days; primary market data allow us to compare bond yield only during their issuance date. Although the secondary market data are available only for the 2012-2016 period, the sample of bonds for which we have secondary market yields is representative of the whole sample of bonds (Appendix Figure 5). We observe a very similar pattern for secondary market yields to that displayed in Figure 3, which is computed with primary market yields.

Using the secondary market data, we compute the within-firm size yield discount for all firms that issue at least one bond in the adjacent [400:500) and [500:600) bins during the period 2012-2016. Data availability permits only an analysis of a simple difference at the $500 million threshold (within the post-2008 period), rather than a difference-in-differences analysis across the two periods. Exploiting within-firm variation across issuance size, we compute the median of the size yield discount across the two adjacent size bins for emerging and developed market firms separately (Table 4). These calculations produce a size yield discount estimate for emerging market firms in the post-2008 period that is 19 basis points, and for developed market firms a size yield discount that is around zero basis points. The difference between both groups is statistically different from zero.

This size yield discount estimate is smaller than the estimates we obtain from the primary market data, and is more consistent with the existing literature on arbitrage in international financial markets.[30] The smaller discount from secondary market data could reflect either bias in the primary market estimates resulting from omitted variables (which is addressed by the within-firm comparison), a bias coming from comparing yields of bonds issued at different points in time (firms might choose to issue large bonds when their yields are particularly low), or a selection bias with respect to the characteristics of firms for which we observe secondary market data for multiple bonds. Although the exact magnitude of the post-2008 yield discount associated with index-eligible bonds might not be estimated precisely, the overall evidence indicates that after 2008 emerging market firms could obtain cheaper financing from index-eligible bonds, and that the interest savings clearly were significant enough to drive substantial changes in issuance behavior.

4.4. Placebo and Robustness Tests

We provide a placebo test of whether our results might be driven by index-eligibility, or alternatively by some other factor that is coincidentally correlated with the index-eligibility threshold. We re-estimate Equations (1) and (2) 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 (Table 5, Panel A) and yields (Table 6, Column 1) at the $500 million threshold. Indeed, we observe no significant increase in $500 million issuances for these

[30] Violations of covered interest parity are around 24 basis points, of a similar order of magnitude to the effects of index eligibility estimated here (Du et al., 2018). Sovereigns and government agencies issue international bonds in different currencies to exploit covered and uncovered interest rate parity differentials of between 4 and 18 basis points (McBrady and Schill, 2007). During the GFC, the magnitude of violations of covered interest parity increased substantially, reflecting an increase in liquidity premia for certain debts (Jiang et al., 2018, 2019).

bonds and no significant change in the size yield discount. This test supports the hypothesis that the increase in issuances and decrease in yields after 2008 for bonds of size between $500 and $600 million reflects 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 issuances (Table 5, Panel B) and for yields (Table 6, Columns 2 and 3). 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. Also, there is no large size yield discount associated with the increase in large bond issuance that occurs in the years just prior to 2008.

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. We observe a slight increase in the probability of issuing [500:600) bonds for emerging market firms relative to developed market firms in this shorter post period (Table 5, Panel C). The findings regarding the post-2008 period size yield discount are very similar to our main estimation (Table 6, Column 5).

4.5. Carry Trade Influences

Our analytical 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, we remove the country fixed effects to test if we can explain cross-country differences in emerging market corporate debt issuance by exploiting the cross-country variation in carry trade incentives (Table 7). For this test, we concentrate in 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.[31]

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.[32] 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 U.S. 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).

[31] 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).

[32] 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 hypothesize that the increase in investor interest in emerging market corporates due to the search for yield raised the value of holding large emerging market bonds that are part of indexes. We show that non-specialist investors in corporate emerging market debt have driven the surge in the demand for emerging market corporate debt. That is, they invested more in index-eligible bonds than specialist funds. These non-specialist investors include old and new emerging market sovereign bond funds and developed economy corporate bond funds. We label these investors as cross-over investors because they are crossing over from other asset classes into the emerging market corporate debt asset class.

5.1 Search for Yield and Cross-Over Mutual Funds

To test the cross-over corollary from Section 2, we use data on different funds' holdings of emerging market corporate bonds. We show evidence connecting investor interest with changes in the composition of emerging market corporate bond issuance. We plot the cumulative flows into mutual funds that invest in emerging market sovereign and corporate debt from 2003 to 2016 and the number of $500 million bonds issued by emerging market firms, as a fraction of all bonds issued by these firms (Figure 5, Panel A). 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 exclusively in sovereign emerging market bonds and those that invest simultaneously in both corporate and sovereign emerging market bonds), and developed market funds

(Appendix 3). Most of the funds in each category hold at least one emerging market corporate bond in their portfolio.

Our data for 2000-2016 contain 1,408 funds, with an average fund size of $1,500 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%, 15%, and 59% of the debt portfolios of developed market, emerging market non-specialist, and emerging market corporate specialist funds, respectively.

In terms of their investments in the emerging market corporate debt market, cross-over funds invested, on average, $26 billion in emerging market corporate bonds during 2000-2016 (Table 8, Column 7).[33] In contrast, emerging market corporate specialists invested $5.3 billion. Although developed market funds held a low fraction of emerging market securities in their portfolios (as a fraction of their total holdings), the fact that these 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.

Our first piece of evidence regarding the cross-over corollary is related to changes in behavior post-2008. We plot changes over time in the total holdings in U.S. dollars of emerging market corporate debt securities by the different types of funds (Figure 5, Panel B). Since 2008, the importance of cross-over funds in their holdings of emerging market corporate debt grew substantially, investing more in these securities than emerging market corporate specialist funds. Thus, 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.

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

To show our second piece of evidence related to the cross-over corollary, we compute for each type of fund the total amount of U.S. dollar-denominated corporate emerging market bonds (issued in international markets) held in the portfolio. Then, we calculate the percentage of that amount held in each of the following three categories: (0:300) bonds, [300:500) bonds, and [500:1,000) bonds. 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 (Table 9).

The evidence lends support to the cross-over corollary. Cross-over funds invest relatively more in bonds with face value equal to or above $500 million. We observe that funds have 73%, 73%, and 61% 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 international U.S. dollar-denominated corporate emerging market bonds (Table 9, Column 5).[34] 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 bond issuances.

[34] 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 SDC Platinum during 2009-2016.

5.2 Evidence from Fund Flows Demand Pressure

In our final test of the cross-over corollary, we relate the demand pressure for large bonds from the different types of funds to the size yield discount. For that, we compute a monthly-level demand pressure measure similar to that in Jotikashira et al. (2012):

$$Demand\ Pressure_{It}^{[500:600)} = \frac{\sum_{i \in I} w_{it-1}^{[500:600)} F_{it}}{AO_t^{[500:600)}}, \quad (3)$$

where $Demand\ Pressure_{It}^{[500:600)}$ is our demand pressure measure for emerging market bonds of size [500:600) by fund type I at month t. The fund type is either a developed market, emerging market non-specialist, or an emerging market corporate specialist. $w_{it-1}^{[500:600)}$ denotes the weight in the portfolio of [500:600) bonds for a specific fund $i \in I$ at time t-1. F_{it} are the fund flows (injections net of redemptions). We normalize the weighted fund flows by $AO_t^{[500:600)}$, the outstanding amount of emerging market bonds of size [500:600).

We correlate the fund flow demand pressure measure with the size yield discount measure calculated from secondary market data, which is available at the monthly level. Demand pressure is more correlated with the size yield discount for cross-over funds than for emerging market specialist funds (Appendix Figure 6). This suggests that cross-over funds are a more important source of demand for index-eligible bonds.

We also conduct a time-series regression of the size yield discount onto the fund flow demand pressure measure for the different types of funds (Table 10). The demand pressure for all funds is negatively associated with the size yield discount (Table 10, Column 1), that is, a greater demand from institutional investors is related to a wider size yield discount. When we separate the demand pressure into the different types of funds, we find that only cross-over funds demand is negatively and significantly associated with the size yield discount (Table 10, Columns 2 to 4). Within the cross-over funds, the

developed market funds' demand pressure (Table 10, Column 2) seems to explain more of the size yield discount than the demand from what we label as cross-over funds.

The results suggest that changes in cross-over funds are likely to have a stronger effect on emerging market large bonds than changes in specialist funds. Their greater influence is the result of both their significantly larger size and their heavier loading on $500 million bonds. 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

In this section, we analyze firm-level differences in issuance behavior to provide additional evidence on the role of changes in bond investor demand in driving our previous results. We report the evidence in two 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. But because investment opportunity size is not observable, we use asset size as a proxy, assuming a positive correlation between the two.[35]

[35] 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, rise as asset size increases, and decline at very large asset size.

6.1. Bond Issuance Differences and Firm Size

We first test 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 smaller 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. We find evidence consistent with this prediction: the size distribution of firms issuing [500:600) bonds shifted to the left after 2008 (Figure 6).

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

$$D_{it} = \beta_1 Pre + \beta_2 Post + \beta_3 (Pre*Size_{it}) + \beta_4 (Post*Size_{it}) + \varepsilon_{it}\,, \qquad (4)$$

where D_{it} is a dummy variable equal to one if a firm issued a bond with face value equal to or above $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.

Both interaction terms (β_3 and β_4) are positive and highly significant (Table 11, Panel A). This indicates that larger firms were more likely to issue larger bonds, 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. 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 (Table 11, Panel B). Namely, we observe the greatest change in the probability of issuing large bonds for medium-sized emerging market firms. The marginal effects reported for those firms are large and statistically

significant in emerging markets, but small and insignificant in developed economies. Appendix Figure 7 plots the probability of issuing large bonds 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

We then investigate the uses of funds by emerging market firms issuing large, index-eligible bonds. We focus on differences in the uses of funds by relatively smaller (medium-sized) firms 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:

$$Cash_{ict} = a_c + a_t + \beta log\left[1 + \left(\frac{Issuance}{Assets}\right)_{ict}\right] + \gamma[Other\ Sources]_{ict} + Z_{ict} + \varepsilon_{ict}\,, \qquad (5)$$

where $Cash=log\left[1+\frac{V_n-V_0}{Assets}\right]$. 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 $n=1$.[36] 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.

We report the results of estimating Equation (5) 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.[37] We report the dollar effects, breaking down our sample into different categories.[38] We find that emerging market firms issuing [500:1,000) bonds tended to hold more cash after a bond issuance in post-2008 period relative to the pre-2008 period (Figure 7, Panel A). 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 (5) 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 below

[36] 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.

[37] 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.

[38] 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 6.9 years (Appendix Table 9).

$500 million. Firms that issue these smaller bonds held 0.41 (0.25) million dollars per million dollars issued in before (after) 2008. For developed market firms, estimates decline from 0.50 to 0.34 between both periods.

To formally test the differences in the coefficients, 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 [500:1,000) 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 (Table 12, Column 1). This pattern is not visible for developed market firms (Table 12, 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. Thus, 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) (Figure 7, Panel B). During this period, relatively smaller (medium-sized) firms issuing large bonds tended to hold much more cash than large firms issuing large bonds, consistent with our prediction.

7. Conclusions

The Global Financial Crisis 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 large increase in the proportion of issuance of large, index-eligible corporate debt, and a sizeable increase in the yield discount associated with those bonds. For firms, the financial rewards of issuing index-eligible debt after 2008 were significant enough to substantially alter their bond issuance and cash retention behavior. 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 smaller (medium-sized) firms issuing large bonds after 2008, how did the combination of U.S. 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 crowded in or crowded out productive investments?

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Appendix 1. A Simple Model of Bond Issuances

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.[39] Profits under each alternative (issuing X or issuing 500) are given by:

$$\Pi^{X}= XR - XY, \tag{6}$$

[39] 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 $X' \in (X,500)$.

$$\Pi^{500} = XR - 500(Y\text{-}D) + (500\text{-}X)Y^{*}. \tag{7}$$

A firm will decide to issue 500 instead of X if and only if $\Pi^{500} > \Pi^{X}$, which implies:[40]

$$\frac{Y}{Y\text{-}D} + \frac{Y^{*}(500\text{-}X)}{X(Y\text{-}D)} > \frac{500}{X} . \tag{8}$$

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

$$\widehat{X} = \frac{500(Y\text{-}D\text{-}Y^{*})}{(Y\text{-}Y^{*})} . \tag{9}$$

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

$$I = \begin{cases} X & \text{if} \quad X < \widehat{X} \\ 500 & \text{if} \quad \widehat{X} \le X < 500. \\ X & \text{if} \quad X \ge 500 \end{cases} \tag{10}$$

Firms in the size interval $[\widehat{X}{:}500)$, 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):

$$G(I) = \begin{cases} F(I) & \text{if} \quad X < \widehat{X} \\ F(\widehat{X}) & \text{if} \quad \widehat{X} \le X < 500 \\ F(I) & \text{if} \quad X \ge 500 \end{cases} . \tag{11}$$

The cumulative distribution is flat between $[\widehat{X}{:}500)$ as no firm issues in this size interval (Appendix Figure 1, Panel A). But there is a discrete jump in the distribution at 500, driven by the mass of medium-sized firms that find it optimal to stretch to issue 500.

[40] 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.

We model an increase in demand for emerging market corporate debt as an exogenous increase in the size yield discount D.

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.*

Because $\widehat{X}$ 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. As the yield reduction benefit of issuing bonds of 500 increases, firms become more attracted to issue them.

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 Appendix 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.

$\widehat{X}$ 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 is derived from Equation (9), stating that the critical value $\widehat{X}$ is lower for higher values of Y^*.

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 $\widehat{X}$ 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 bond issuances 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 $\widehat{X}$.

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 $\widehat{X}$). Firms with investment opportunities that are either greater than, or far smaller than, the prior value of $\widehat{X}$, should not respond to the increase in D by increasing their bond issuance size.

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.

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

Appendix 2. 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 8 presents the assets under management of funds that track their performance against J.P. Morgan indexes divided by family type. Appendix Table 3 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 3. 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 subdivided 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.

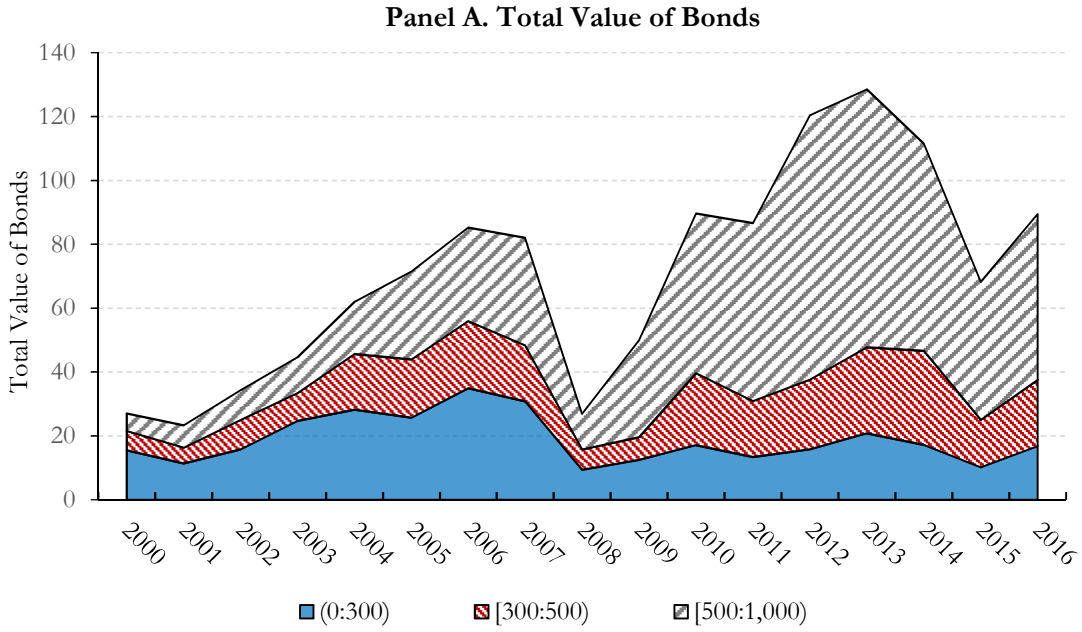
Emerging market funds are subdivided into corporate and non-specialist funds, using the Morningstar variable "primary prospectus benchmark." This variable indicates which index or group of indexes a fund is benchmarked against. If an emerging market fund is solely benchmarked against a corporate (sovereign) 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.

Figure 1
Total Value and Yield to Maturity of Emerging Market Corporate Bond Issuances

This figure shows the total value (Panel A) and the yield to maturity (Panel B) of international U.S. dollar-denominated bonds issued by firms in emerging markets during 2000-2016. The figure shows the total value of bonds in billions of 2011 U.S. dollars and the average yield to maturity of bonds issued 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), respectively.



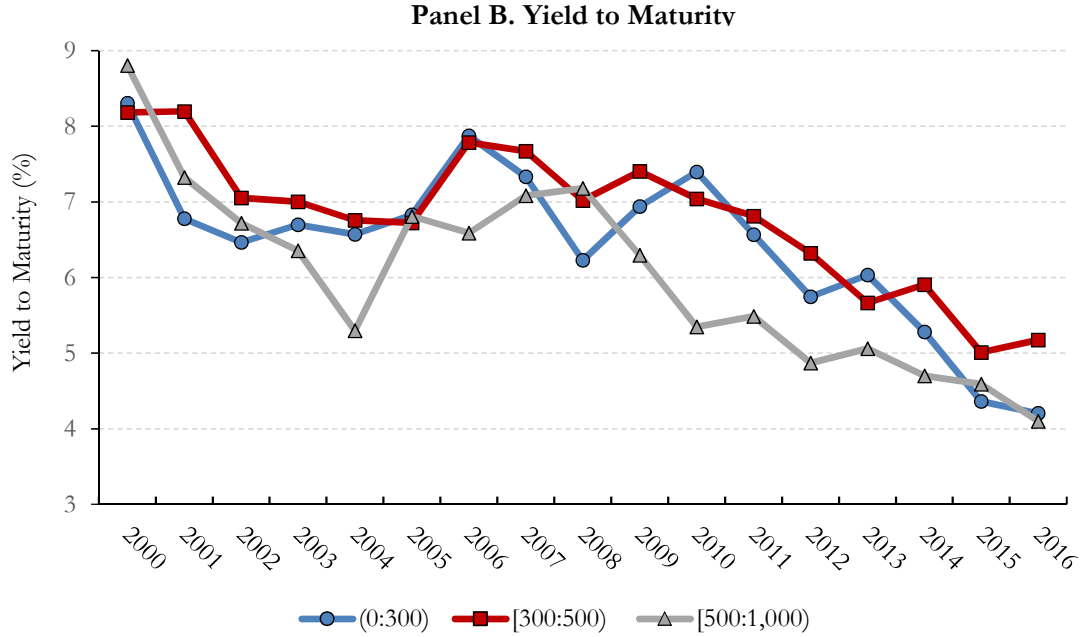
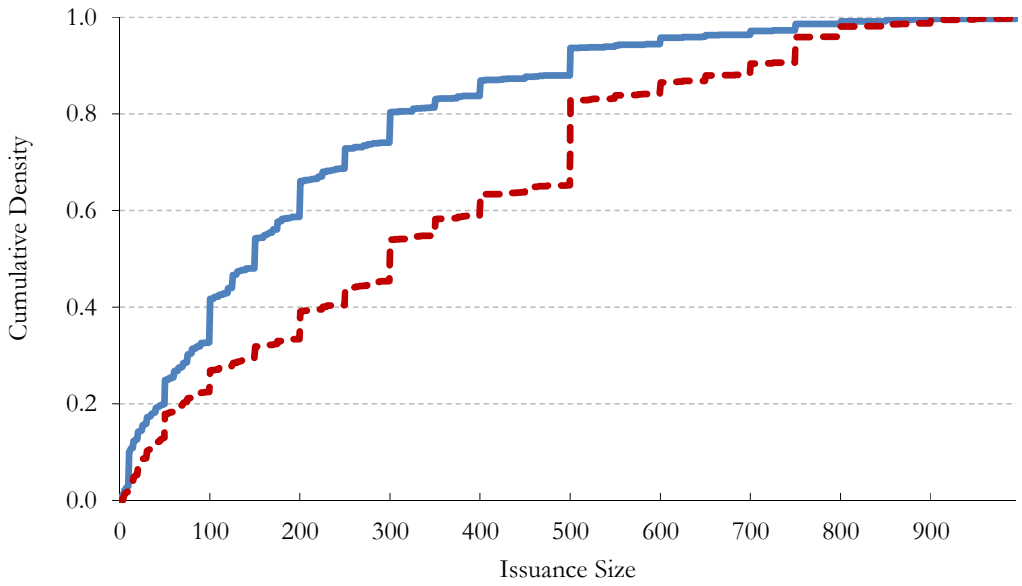


Figure 2
Cumulative Distribution of Corporate Bond Issuance Size, Pre and Post 2008

This figure shows the cumulative distribution of international U.S. dollar-denominated bonds of different sizes issued by firms in emerging markets (Panel A) and investment grade firms in developed markets (Panel B) during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Issuance size is in millions of U.S. dollars.

Panel A. Emerging Markets



Panel B. Developed Markets

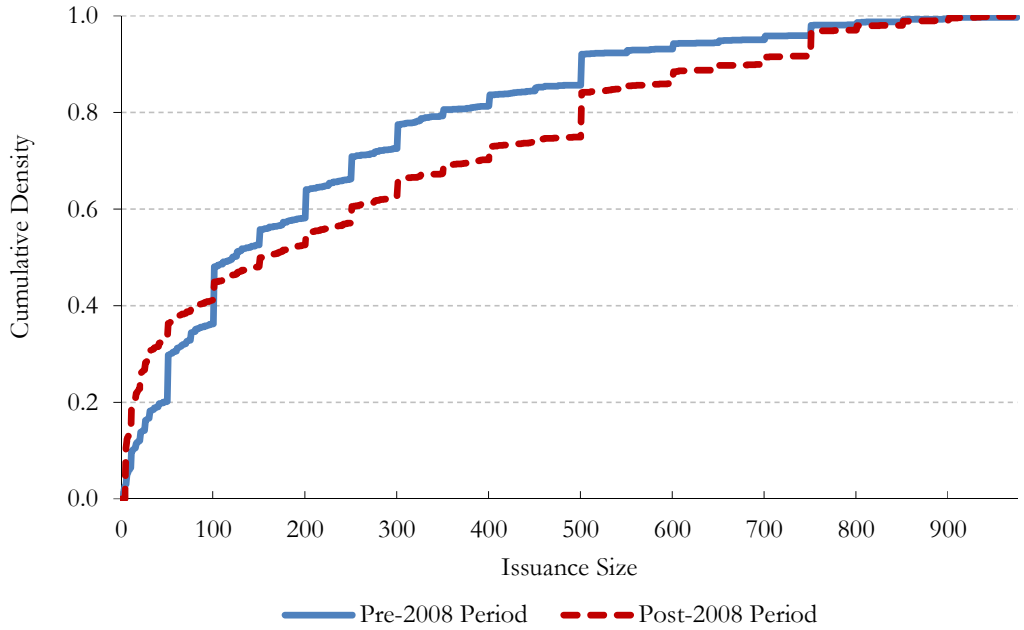


Figure 3
Yield to Maturity of Corporate Bond Issuances, Pre and Post 2008

This figure shows the average yield to maturity of international U.S. dollar-denominated bonds of different sizes issued by firms in emerging markets (Panel A) and investment grade firms in developed markets (Panel B) during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Issuance size is in millions of U.S. dollars.

Figure 4
Corporate Bond Issuances and Yield to Maturity of $500 Million

This figure shows the proportion of issuances and the yield to maturity of international U.S. dollar-denominated bonds issued by firms in emerging markets and investment grade firms in developed markets during 2000-2016. Panel A shows the fraction of the number of international U.S. dollar-denominated bonds with face value equal to $500 million relative to all international U.S. dollar-denominated bonds. Panel B shows the average yield to maturity of international U.S. dollar-denominated bonds with face value equal to $500 million. Panel C shows the size yield discount, defined here as the difference between the average yield to maturity of U.S. dollar-denominated bonds with face value between $500 and $600 million [500:600) and between $400 and $500 million [400:500). The panel also reports averages of the size yield discount for 2001-2008 and 2009-2016.

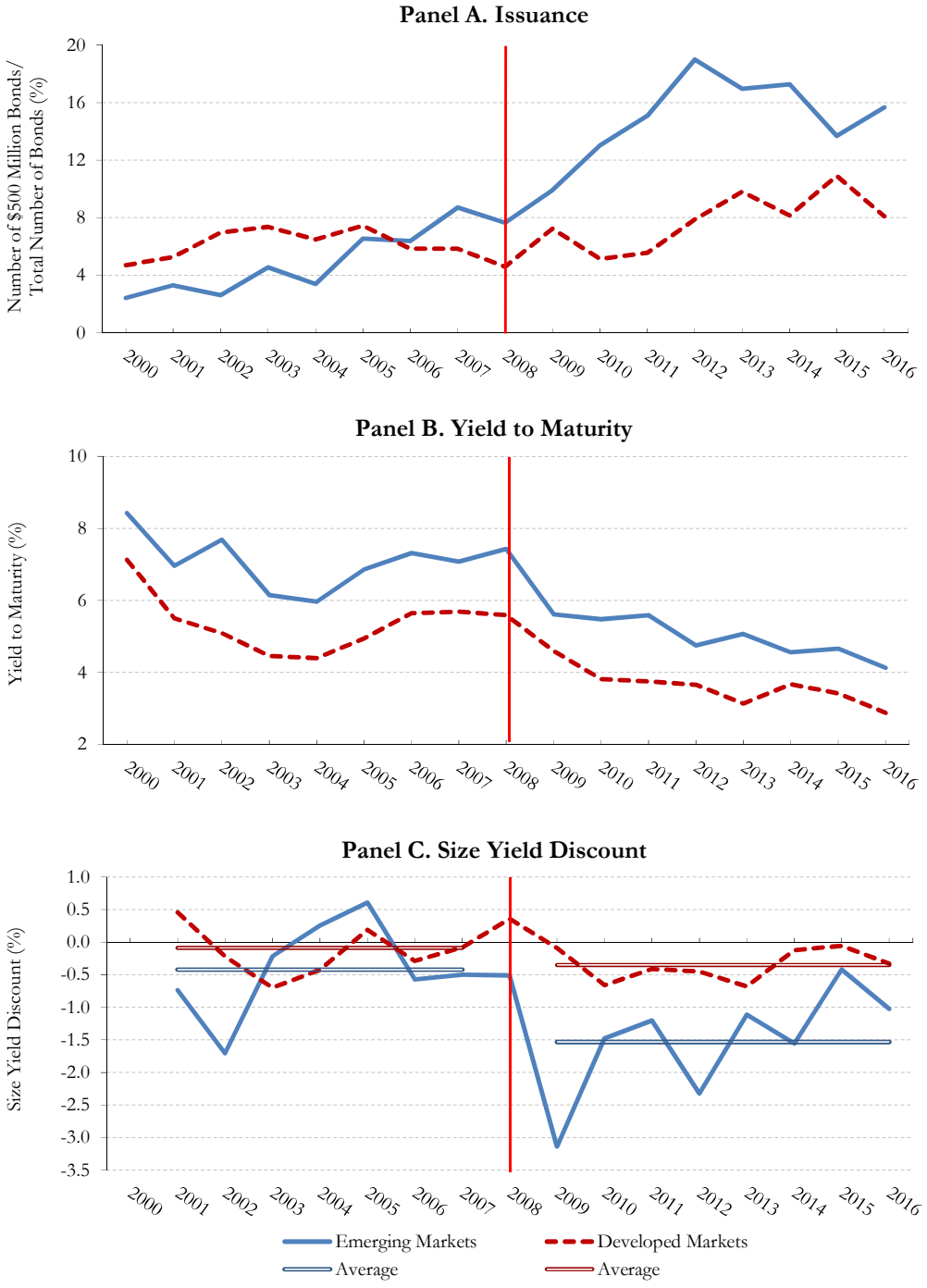
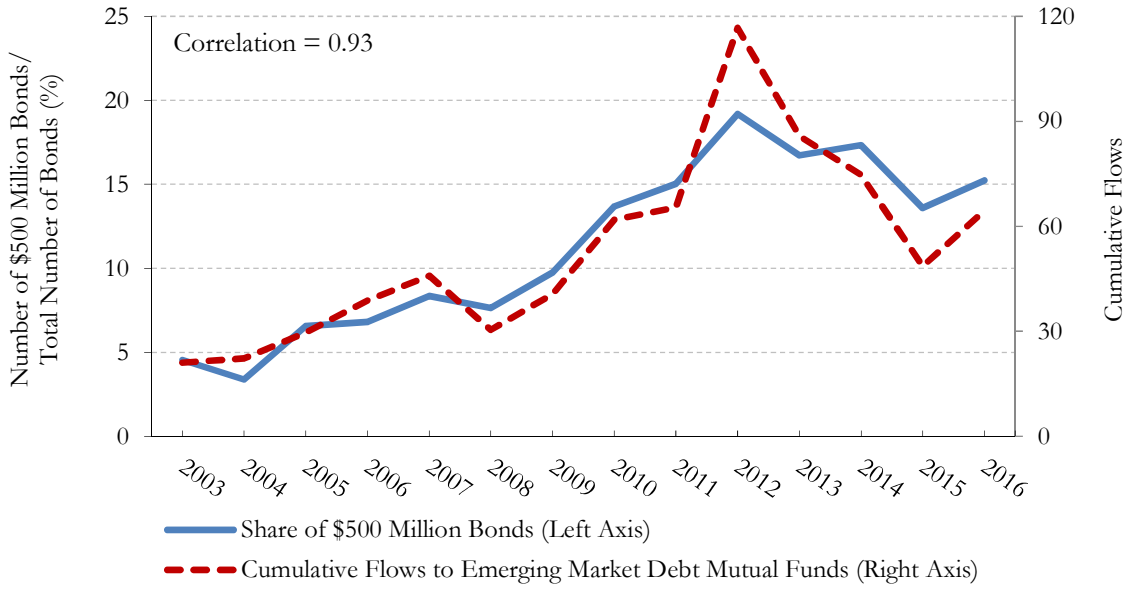


Figure 5
Mutual Fund Investments in Emerging Markets

This figure shows the evolution of mutual fund investments in emerging market corporate debt. Panel A shows the cumulative flows into emerging market sovereign and corporate debt mutual funds in billions of U.S. dollars and the fraction of international U.S. dollar-denominated bonds with face value equal to $500 million during 2003-2016. The fraction is calculated as the number of U.S. international dollar-denominated bonds issued with face value equal to $500 million relative to all international U.S. dollar-denominated bonds issued by firms in emerging markets. Panel B shows the value of emerging market corporate debt in billions of U.S. dollars held by different mutual fund categories during 2000-2016. Mutual funds are classified into three categories: developed market funds and emerging market non-specialist funds (cross-over funds), plus emerging market corporate specialist funds. Data for emerging market corporate specialist funds starts in 2006.

Panel A. Flows into Emerging Market Debt and Share of $500 Million Bonds



Panel B. Holdings of Emerging Market Corporate Debt by Mutual Funds

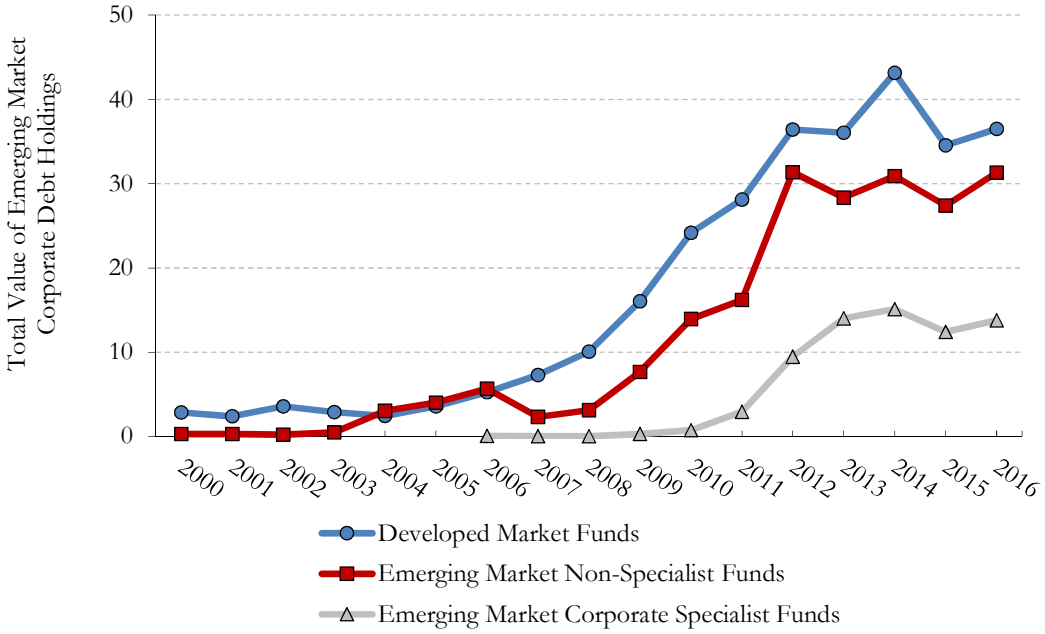


Figure 6
Size Distribution of Issuers of Different Corporate Bond Issuance Sizes, Pre and Post 2008

This figure shows the firm size distribution of emerging market issuers (Panel A) and investment grade developed market issuers (Panel B) of international U.S. dollar-denominated bonds of different sizes during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Firm size is measured by the log of total assets. The left-side graphs show the cumulative distribution of issuers of international U.S. dollar-denominated bonds with face value below $500 million (0:500). The right-side graphs show the cumulative distribution of issuers of international U.S. dollar-denominated bonds with face value equal to or above $500 million [500:1,000). Issuers in each period are defined as firms that issued bonds of a certain size at least once during the period. Densities are estimated using the Epanechnikov kernel function.

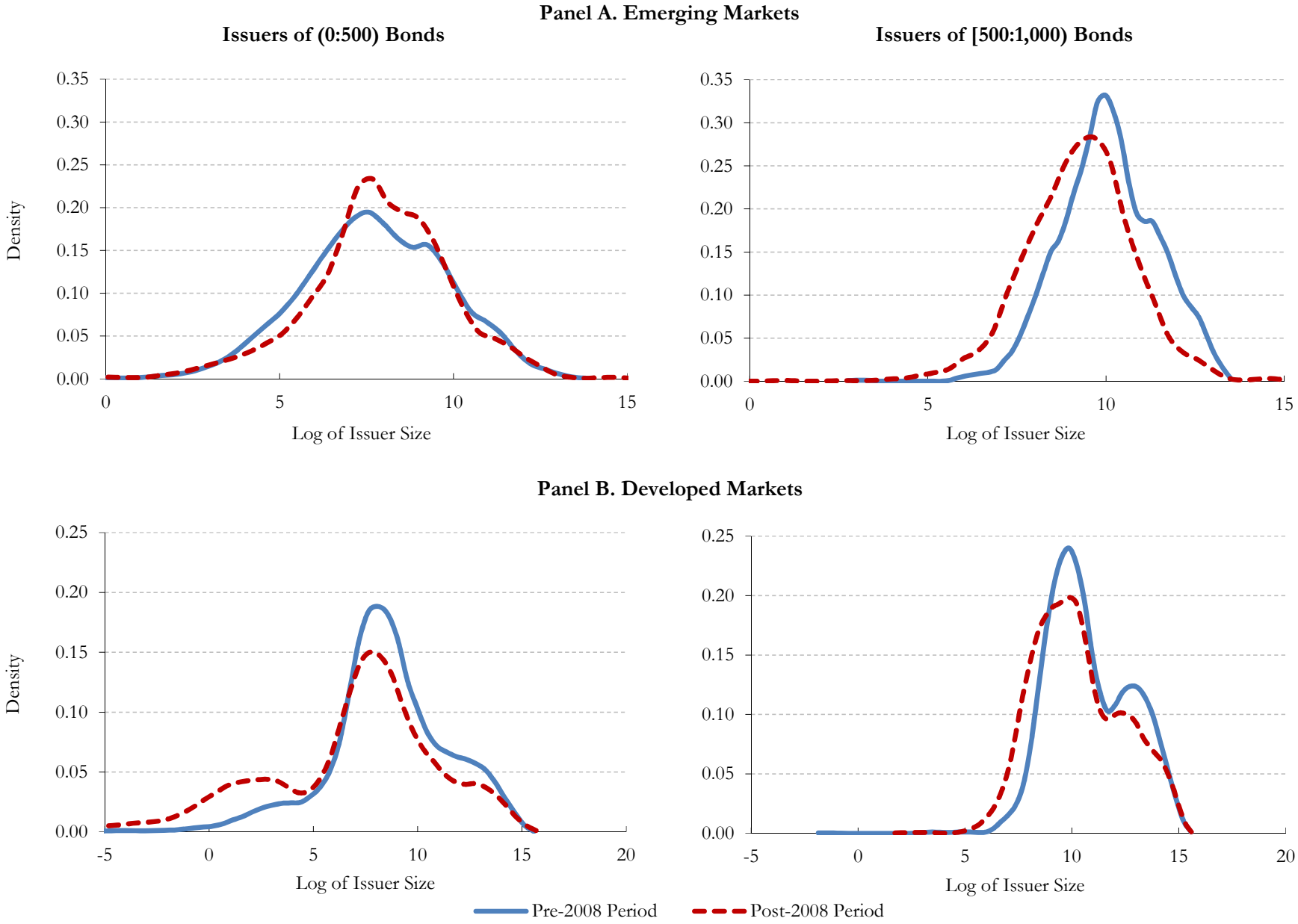
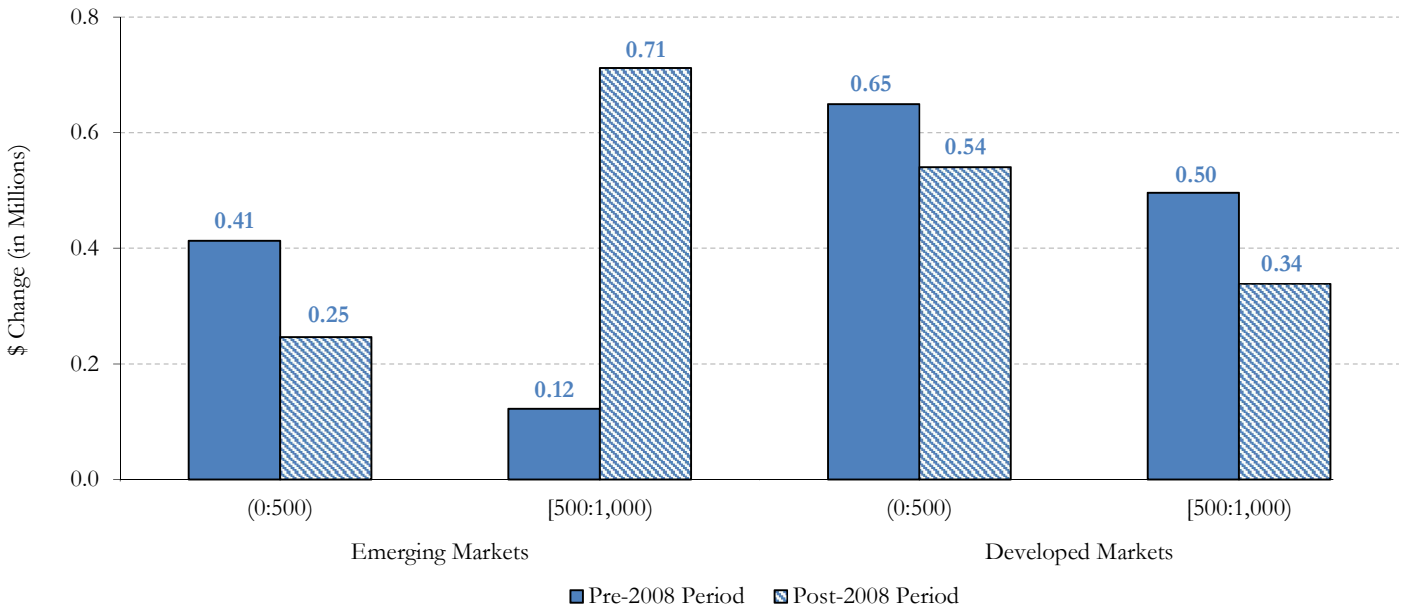


Figure 7
Cash Accumulation from Corporate Bond Issuance Proceeds

This figure shows the amount of cash and short-term investments accumulated for every million U.S. dollar raised from a corporate bond issuance after one year of the issuance. Panel A shows the use of funds for emerging market issuers and investment grade developed market issuers of bonds of different sizes during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. The graph shows the dollar effect separately for issuers of bonds with a face value below $500 million (0:500) and equal to or above $500 million [500:1,000). Panel B shows the use of funds for bond issuers in emerging markets during 2009-2016, separately for firms with high assets and low assets. A firm is classified as a high-asset firm if its average assets during 2009-2016 are equal to or greater than the assets of the median firm in the same country. Low-asset firms are those below the median assets. The analysis of both panels follows the Kim and Weisbach (2008) specification. The dependent variable is $Cash = \log[((V_n - V_0)/Assets) + 1]$, where V is cash and short-term investments. Independent variables are bond issuance value and other sources of funds, both normalized by total assets, in addition to the log of total assets. Panel A also controls for the contemporaneous growth rate of sales and the standard deviation of sales growth. Total assets are measured the year before the issuance. All variables are winsorized at the 1% level.

Panel A. Emerging Market and Developed Market Issuers



Panel B. High-Asset and Low-Asset Emerging Market Issuers

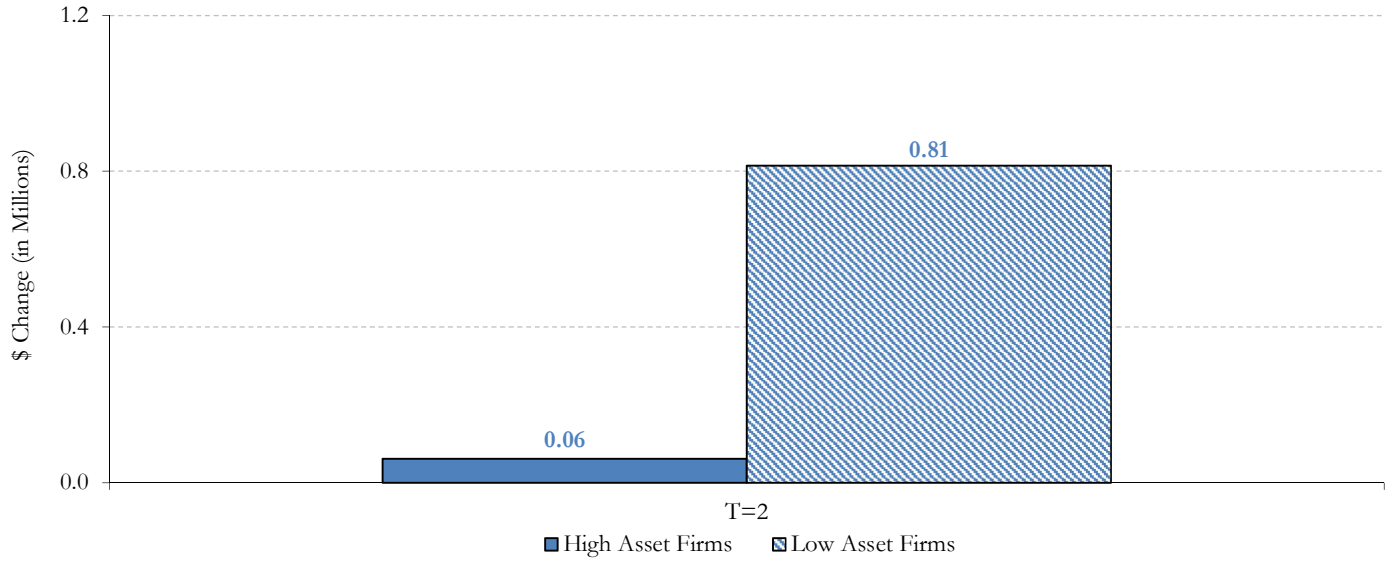


Table 1
Changes in Probability of Issuing Large Bonds and Size Yield Discount

This table reports mean difference tests for the probability of issuing and size yield discount of international U.S. dollar-denominated bond for firms in emerging markets and investment grade firms in developed markets during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Panel A reports the percentage of issued bonds with face value between $500 and $600 million [500:600). Panel B reports the size yield discount, defined here as the difference between the yield to maturity of [500:600) bonds and that of bonds between $400 and $500 million [400:500). Column 3 shows the mean tests and differences across time, separately for emerging and developed markets. Column 8 reports the difference-in-difference across time and country group. The yield to maturity observations in the top and bottom 5% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Issuance

	Pre 2008	Post 2008	**Diff**	**Diff-in-Diff**
	(1)	(2)	(3)=(2)-(1)	(4)=EM(3)-DM(3)
Emerging Markets	0.060	0.180	0.120 ***	
	(0.005)	(0.007)	(0.009)	0.088 ***
Developed Markets	0.067	0.100	0.032 ***	(0.010)
	(0.003)	(0.004)	(0.005)	

Panel B. Size Yield Discount

	Pre 2008	Post 2008	**Diff**	**Diff-in-Diff**
	(1)	(2)	(3)=(2)-(1)	(4)=EM(3)-DM(3)
Emerging Markets	-0.323	-1.470 ***	-1.147 ***	
	(0.303)	(0.177)	(0.344)	-0.915 ***
Developed Markets	-0.238 **	-0.471 ***	-0.232	(0.332)
	(0.109)	(0.100)	(0.150)	

Table 2
Probability of Issuing Bonds of Different Sizes

This table reports difference-in-difference regressions of the change in the probability of issuing an international U.S. dollar-denominated bond of a certain size before and after 2008 for firms in emerging markets, relative to investment grade firms in developed markets. Issuance size is in millions of U.S. dollars. The analysis is restricted to positive bond issuance observations during 2000-2016. Columns 1-9 report the regressions of a dummy equal to one if a firm issued a bond of a certain size on the interaction of the post-2008 dummy (equal to 1 for 2009-2016) with the emerging market (EM) dummy. Regressions in Panel A include country, industry-year, maturity, quarter-year, and rating fixed effects, in addition to bond-firm controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Regressions in Panel B include firm and quarter-year fixed effects. Standard errors are clustered at the country and quarter-year levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Dependent Variable: Dummy=1 if Issuance Size=[X:X+100)

	Probability of Issuing a Bond of a Certain Size								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[800:900)
EM*Post 2008	-0.049	-0.103 ***	-0.009	0.044 **	0.013	0.084 ***	0.002	0.002	0.013
	(0.044)	(0.031)	(0.021)	(0.017)	(0.015)	(0.023)	(0.009)	(0.012)	(0.009)
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.358	0.172	0.126	0.091	0.047	0.102	0.030	0.050	0.017
Number of Countries	69	69	69	69	69	69	69	69	69
Number of Observations	19,114	19,114	19,114	19,114	19,114	19,114	19,114	19,114	19,114
R^2	0.341	0.151	0.124	0.155	0.134	0.163	0.131	0.144	0.143

Panel B. Within Firm Analysis

	Probability of Issuing a Bond of a Certain Size								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[800:900)
EM*Post 2008	-0.014	-0.054	-0.036 *	0.008	-0.027 *	0.086 ***	0.011	0.027	-0.003
	(0.038)	(0.043)	(0.019)	(0.026)	(0.016)	(0.027)	(0.017)	(0.020)	(0.008)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.358	0.172	0.126	0.091	0.047	0.102	0.030	0.050	0.017
Number of Countries	69	69	69	69	69	69	69	69	69
Number of Observations	17,162	17,162	17,162	17,162	17,162	17,162	17,162	17,162	17,162
R^2	0.560	0.340	0.342	0.363	0.392	0.356	0.354	0.325	0.383

Table 3
Yield to Maturity and Issuance Sizes

This table reports difference-in-difference regressions of the yield to maturity of international U.S. dollar-denominated bonds of different sizes, measuring the relative change after 2008 for firms in emerging markets and investment grade firms in developed markets separately. Issuance size is in millions of U.S. dollars. The analysis is restricted to positive issuance observations during 2000-2016. The full equation estimated is Equation (2) in the text. Columns 1-5 report regressions for the yield to maturity on the interaction term between the dummy of each bucket size, the post-2008 dummy (equal to 1 for 2009-2016), and the emerging market (EM) or developed market (DM) dummy. The coefficients β_X^{EM} and β_X^{DM} are reported in Appendix Table 7 to conserve space. Columns 1-4 include different sets of fixed effects and controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. The yield to maturity observations in the top and bottom 5% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Associated Coefficients	Dependent Variable: Yield to Maturity				
		(1)	(2)	(3)	(4)	(5)
EM*[100:200)*Post 2008	$\beta_{100}^{EM,Post}$	-1.773 ***	-2.319 ***	-2.314 ***	-2.267 ***	-5.227 ***
		(0.548)	(0.452)	(0.450)	(0.582)	(0.513)
EM*[200:300)*Post 2008	$\beta_{200}^{EM,Post}$	-0.479 **	-1.843 ***	-1.84 ***	-2.534 ***	-5.089 ***
		(0.217)	(0.425)	(0.423)	(0.582)	(0.580)
EM*[300:400)*Post 2008	$\beta_{300}^{EM,Post}$	-1.331 ***	-2.462 ***	-2.457 ***	-2.829 ***	-5.381 ***
		(0.251)	(0.443)	(0.439)	(0.517)	(0.482)
EM*[400:500)*Post 2008	$\beta_{400}^{EM,Post}$	-1.05 **	-1.833 ***	-1.829 ***	-2.361 ***	-5.304 ***
		(0.413)	(0.467)	(0.467)	(0.482)	(0.555)
EM*[500:600)*Post 2008	$\beta_{500}^{EM,Post}$	-2.142 ***	-2.722 ***	-2.717 ***	-3.355 ***	-5.714 ***
		(0.182)	(0.433)	(0.428)	(0.478)	(0.641)
EM*[600:700)*Post 2008	$\beta_{600}^{EM,Post}$	-1.004 **	-2.485 ***	-2.482 ***	-3.134 ***	-5.668 ***
		(0.482)	(0.582)	(0.580)	(0.660)	(0.569)
EM*[700:800)*Post 2008	$\beta_{700}^{EM,Post}$	-1.737 ***	-2.943 ***	-2.938 ***	-3.143 ***	-5.309 ***
		(0.346)	(0.493)	(0.489)	(0.730)	(0.682)
EM*[800:900)*Post 2008	$\beta_{800}^{EM,Post}$	-1.304 **	-2.087 **	-2.082 **	-2.934 ***	-6.16 ***
		(0.498)	(0.814)	(0.813)	(0.775)	(1.013)
DM*[100:200)*Post 2008	$\beta_{100}^{DM,Post}$	-0.969 **	-2.733 ***	-2.735 ***	-2.788 ***	-5.021 ***
		(0.420)	(0.392)	(0.392)	(0.301)	(0.385)
DM*[200:300)*Post 2008	$\beta_{200}^{DM,Post}$	-0.824 ***	-2.76 ***	-2.757 ***	-2.803 ***	-5.174 ***
		(0.213)	(0.366)	(0.366)	(0.350)	(0.371)
DM*[300:400)*Post 2008	$\beta_{300}^{DM,Post}$	-1.299 ***	-2.932 ***	-2.929 ***	-3.05 ***	-5.295 ***
		(0.128)	(0.378)	(0.378)	(0.363)	(0.406)
DM*[400:500)*Post 2008	$\beta_{400}^{DM,Post}$	-1.442 ***	-2.951 ***	-2.946 ***	-3.159 ***	-5.553 ***
		(0.142)	(0.344)	(0.344)	(0.315)	(0.477)
DM*[500:600)*Post 2008	$\beta_{500}^{DM,Post}$	-1.674 ***	-3.133 ***	-3.129 ***	-3.316 ***	-5.592 ***
		(0.151)	(0.333)	(0.334)	(0.250)	(0.430)
DM*[600:700)*Post 2008	$\beta_{600}^{DM,Post}$	-1.834 ***	-3.023 ***	-3.018 ***	-3.382 ***	-5.678 ***
		(0.234)	(0.315)	(0.315)	(0.350)	(0.538)
DM*[700:800)*Post 2008	$\beta_{700}^{DM,Post}$	-2.316 ***	-3.399 ***	-3.396 ***	-3.459 ***	-5.922 ***
		(0.152)	(0.355)	(0.355)	(0.277)	(0.433)
DM*[800:900)*Post 2008	$\beta_{800}^{DM,Post}$	-1.937 ***	-3.168 ***	-3.165 ***	-3.282 ***	-5.655 ***
		(0.210)	(0.415)	(0.415)	(0.361)	(0.415)
Log(Issuance Size)				0.058		
				(0.152)		
Log(Assets)					-0.191 ***	
					(0.039)	
Bond-Firm Controls		No	Yes	Yes	Yes	No
Country FE		No	Yes	Yes	Yes	No
Firm FE		No	No	No	No	Yes
Industry-Year FE		No	Yes	Yes	Yes	No
Maturity FE		No	Yes	Yes	Yes	No
Quarter-Year FE		No	Yes	Yes	Yes	Yes
Ratings FE		No	Yes	Yes	Yes	No
Diff Size Yield Discount EM	$\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}$	-1.092 ***	-0.889 ***	-0.888 ***	-0.994 ***	-0.410
P-Value		0.000	0.016	0.015	0.018	0.227
Diff Size Yield Discount DM	$\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post}$	-0.232 **	-0.182	-0.183	-0.157	-0.039
P-Value		0.039	0.156	0.166	0.387	0.849
Diff-in-Diff SYD EM-DM	$\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post} - (\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post})$	-0.860 ***	-0.707 **	-0.705 **	-0.837 **	-0.371
P-Value		0.013	0.060	0.059	0.081	0.354
Number of Observations		7,907	7,785	7,785	3,974	7,907
R^2		0.349	0.765	0.765	0.778	0.885

Table 4
Size Yield Discount within Firms using Secondary Market Data

This figure shows the secondary market size yield discount within firms in emerging markets (Column 1) and within investment grade firms in developed markets (Column 2) during 2011-2016. The size yield discount is the difference between the secondary market yield to maturity of bonds with face value between $500 and $600 million [500:600) and that of bonds between $400 and $500 million [400:500) issued by the same firm, using the median yield per firm, bond size, and day. Column 3 reports the difference in medians of the size yield discount between emerging and developed market firms. Secondary market yield to maturity observations below zero and at the top 10% (1%) are dropped for emerging (developed) markets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Emerging Markets	Developed Markets	Diff
	(1)	(2)	(3)=(1)-(2)
Size Yield Discount	-0.193 ***	0.022 *	-0.214 ***
	(0.018)	(0.011)	(0.022)
Number of Firms	30	56	
Number of Observations	20,982	48,047	

Table 5
Probability of Issuing Bonds of Different Sizes: Placebo and Robustness Tests

This table reports placebo and robustness tests for the probability of issuing bonds regressions in Table 2. Panel A reports a placebo test using non-index-eligible bonds, which are those with less than five years of maturity or flexible coupon rates. Panel B estimates the regressions for 2000-2008, with a post dummy equal to one for 2004-2008. Panel C estimates the regressions for 2004-2012, with a post dummy equal to one for 2009-2012. Columns 1-9 report the regressions for the bond issuance dummy of each bucket size on the emerging market (EM) dummy, the post dummy, and the interaction of the post dummy with the emerging market dummy. Panel A does not include fixed effects (FE), and the EM dummy and the Post 2008 dummy coefficients are not reported to conserve space. Panels B and C include country, industry-year, maturity, quarter-year, and rating fixed effects, in addition to bond-firm controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Non-Index Bonds. Sample Period: 2000-2016 (Post Period: 2009-2016)

	Dependent Variable: Dummy=1 if Issuance Size=[X:X+100)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[800:900)
EM*Post 2008	-0.003	-0.031	0.046 **	0.027	0.009	-0.019	-0.002	-0.033 **	0.004
	(0.093)	(0.045)	(0.022)	(0.026)	(0.017)	(0.032)	(0.009)	(0.016)	(0.011)
Mean Probability	0.488	0.197	0.103	0.057	0.028	0.071	0.015	0.029	0.009
Number of Countries	67	67	67.00	67.00	67	67	67	67	67
Number of Observations	9,816	9,816	9,816	9,816	9,816	9,816	9,816	9,816	9,816
R^2	0.034	0.037	0.013	0.003	0.000	0.002	0.001	0.007	0.000

Panel B. Sample Period: 2000-2008 (Post Period: 2004-2008)

	Dependent Variable: Dummy=1 if Issuance Size=[X:X+100)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[800:900)
EM*Post 2003	-0.068	-0.013	0.083 **	0.017	0.004	-0.001	0.006	-0.020 *	-0.004
	(0.074)	(0.046)	(0.038)	(0.019)	(0.012)	(0.018)	(0.009)	(0.012)	(0.009)
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.355	0.228	0.146	0.090	0.043	0.072	0.020	0.029	0.011
Number of Countries	64	64	64	64	64	64	64	64	64
Number of Observations	9,596	9,596	9,596	9,596	9,596	9,596	9,596	9,596	9,596
R^2	0.275	0.148	0.117	0.176	0.139	0.146	0.125	0.149	0.156

Panel C. Sample Period: 2004-2012 (Post Period: 2009-2012)

	Dependent Variable: Dummy=1 if Issuance=[X:X+100)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[800:900)
EM*Post 2008	-0.048	-0.119 ***	-0.020	0.032	0.008	0.097 ***	0.010	0.022	0.013
	(0.049)	(0.039)	(0.020)	(0.024)	(0.018)	(0.028)	(0.009)	(0.015)	(0.013)
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.377	0.159	0.127	0.091	0.048	0.095	0.032	0.050	0.015
Number of Countries	67	67	67	67	67	67	67	67	67
Number of Observations	9,894	9,894	9,894	9,894	9,894	9,894	9,894	9,894	9,894
R^2	0.390	0.172	0.147	0.181	0.157	0.167	0.149	0.158	0.166

Table 6
Yield to Maturity and Issuance Sizes: Placebo and Robustness Tests

This table reports placebo and robustness tests for the yield to maturity regressions in Table 3. Column 1 reports a placebo test using a sample of non-index-eligible bonds, which are those with less than five years of maturity or flexible coupon rates. Columns 2-3 estimate the regression for 2000-2008 with a post dummy equal to one for 2004-2008. Columns 4-5 estimate the regression for 2004-2012 with a post dummy equal to one for 2009-2012. Columns 1-5 report regressions for the yield to maturity on the interaction term between the dummy of each bucket size, the post dummy, and the emerging market (EM) or developed market (DM) dummy. The coefficients β_X^{EM} and β_X^{DM} are not reported to conserve space. Columns 1-5 include different sets of fixed effects and controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. The yield to maturity observations in the top and bottom 5% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		Dependent Variable: Yield to Maturity				
	Associated Coefficients	**Non-Index Bonds Sample Period: 2000-2016 (Post Period: 2009-2016)**	**Sample Period: 2000-2008 (Post Period: 2004-2008)**		**Sample Period: 2004-2012 (Post Period: 2009-2012)**	
		(1)	(2)	(3)	(4)	(5)
EM*[100:200)*Post	$\beta_{100}^{EM,Post}$	-2.815 **	-0.161	0.374	-0.506	-2.506 ***
		(1.358)	(0.367)	(0.413)	(0.370)	(0.482)
EM*[200:300)*Post	$\beta_{200}^{EM,Post}$	-0.439 *	0.07	-0.087	0.090	-2.407 ***
		(0.262)	(0.574)	(0.528)	(0.363)	(0.611)
EM*[300:400)*Post	$\beta_{300}^{EM,Post}$	-2.972 ***	-0.208	-0.213	-0.191	-2.554 ***
		(0.664)	(0.416)	(0.568)	(0.410)	(0.522)
EM*[400:500)*Post	$\beta_{400}^{EM,Post}$	-2.748 ***	-0.760	-0.175	-0.087	-2.040 ***
		(0.505)	(0.966)	(0.816)	(0.440)	(0.584)
EM*[500:600)*Post	$\beta_{500}^{EM,Post}$	-2.31 **	0.101	-0.183	-1.58 ***	-3.103 ***
		(0.919)	(0.580)	(0.659)	(0.244)	(0.435)
EM*[600:700)*Post	$\beta_{600}^{EM,Post}$	-3.362 ***	-1.249	-1.403	-0.200	-2.741 ***
		(0.914)	(0.839)	(0.881)	(0.597)	(0.511)
EM*[700:800)*Post	$\beta_{700}^{EM,Post}$	-1.172 ***	-0.414	-1.010 *	-1.208 **	-3.227 ***
		(0.349)	(0.696)	(0.572)	(0.515)	(0.547)
EM*[800:900)*Post	$\beta_{800}^{EM,Post}$	-2.244 ***	-3.144 **	-0.461	-0.45	-2.742 ***
		(0.183)	(1.164)	(1.116)	(0.645)	(0.686)
DM*[100:200)*Post	$\beta_{100}^{DM,Post}$	-2.231 ***	0.838 *	0.83 **	-0.702 *	-3.551 ***
		(0.509)	(0.439)	(0.314)	(0.371)	(0.389)
DM*[200:300)*Post	$\beta_{200}^{DM,Post}$	-1.457 **	0.488	0.536	-0.573 **	-3.471 ***
		(0.582)	(0.345)	(0.359)	(0.232)	(0.340)
DM*[300:400)*Post	$\beta_{300}^{DM,Post}$	-2.384 ***	0.040	0.661 **	-0.751 ***	-3.662 ***
		(0.435)	(0.215)	(0.309)	(0.215)	(0.355)
DM*[400:500)*Post	$\beta_{400}^{DM,Post}$	-2.398 ***	0.401	0.663 *	-0.908 ***	-3.689 ***
		(0.371)	(0.247)	(0.368)	(0.270)	(0.385)
DM*[500:600)*Post	$\beta_{500}^{DM,Post}$	-2.164 ***	0.118	0.588 *	-1.232 ***	-4.019 ***
		(0.238)	(0.255)	(0.303)	(0.179)	(0.381)
DM*[600:700)*Post	$\beta_{600}^{DM,Post}$	-2.922 ***	0.467 *	1.060 **	-1.484 ***	-4.012 ***
		(0.481)	(0.261)	(0.403)	(0.212)	(0.439)
DM*[700:800)*Post	$\beta_{700}^{DM,Post}$	-4.089 ***	-0.164	0.835 **	-1.638 ***	-4.279 ***
		(0.388)	(0.381)	(0.410)	(0.214)	(0.379)
DM*[800:900)*Post	$\beta_{800}^{DM,Post}$	-3.835 ***	0.007	0.506	-1.337 ***	-3.762 ***
		(0.536)	(0.396)	(0.520)	(0.275)	(0.359)
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 Size Yield Discount EM	$\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}$	0.438	0.861	-0.008	-1.493 ***	-1.063 **
P-Value		0.695	0.265	0.991	0.000	0.014
Diff Size Yield Discount DM	$\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post}$	0.234	-0.283	-0.075	-0.324	-0.330 *
P-Value		0.441	0.150	0.730	0.129	0.064
Diff-in-Diff SYD EM-DM	$\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post} - (\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post})$	0.511 ***	0.767	0.037	-1.632 ***	-1.112 *
P-Value		0.866	0.176	0.932	0.007	0.078
Number of Observations		1,595	3,593	3,525	3,958	3,892
R^2		0.479	0.327	0.820	0.370	0.739

Table 7
Probability of Issuing $500 Million Bonds and the Carry Trade

This table reports the regression of a dummy equal to one if a firm issued a bond with a face value equal to $500 million on the log of one plus the lagged carry trade measure for firms in emerging markets during 2009-2016. The dummy variable takes the value of zero if the face value of the issuance is below $500 million. The carry trade measure is the difference between the interest rate in the money market in local currency and the U.S. money market rate, divided by the annual variance of the exchange rate during the previous two quarters. Column 1 includes quarter-year fixed effects. Column 2 includes industry and quarter-year fixed effects. Column 3 includes industry and quarter-year fixed effects, in addition to maturity controls. Maturity controls use the maturity in years of each bond, measured as the number of years to final maturity. Column 4 includes industry, quarter-year, and rating fixed effects, in addition to maturity controls. Standard errors are clustered at the country and quarter-year level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Dummy=1 if Issuance Size=$500			
	(1)	(2)	(3)	(4)
Log(1 + Lagged Carry Trade)	0.019 ***	0.049 ***	0.053 ***	0.089 ***
	(0.005)	(0.013)	(0.013)	(0.015)
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	1,303	1,294	1,262	1,259
R^2	0.042	0.102	0.109	0.174

Table 8
Summary Statistics of Cross-Over Funds and Emerging Market Specialist Funds

This table reports the total number of funds, their average size, and the portfolio composition of each mutual fund category during 2000-2016 and 2009-2016. The sample is restricted to fixed income mutual funds. Columns 1, 3, and 5-7 consider the full sample of fixed income funds. Columns 2 and 4 restrict the sample to funds with at least one emerging market corporate debt bond in their portfolio. Column 5 reports the percentage of corporate debt over total debt for each fund category. Columns 6 and 7 report the percentage and the total value of the emerging market corporate bond holdings, respectively. The size of the funds and the value of corporate debt is expressed in million U.S. dollars. Mutual funds are classified into three categories: developed market funds and emerging market non-specialist funds (cross-over funds), plus emerging market corporate specialist funds. Corporate debt is composed of corporate, corporate inflation projected, and undefined bond securities. Corporate debt is considered emerging market corporate debt when it is issued by an emerging market firm.

	Total Number of Funds		**Average Fund Size** (Millions of U.S. Dollars)		**Average Corporate Debt Holdings**		Emerging Market Corporate Debt
	All Funds	With Emerging Market Corporate Debt	All Funds	With Emerging Market Corporate Debt	All Corporate Debt	Emerging Market Corporate Debt	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)=(3)*(6)
Sample Period: 2000-2016							
Cross-Over Funds							
Developed Market Funds	904	653	1,409,060	1,034,222	31.64%	1.01%	14,165
Emerging Market Non-Specialist Funds	411	384	82,255	76,607	33.49%	14.56%	11,973
Emerging Market Specialist Funds							
Emerging Market Corporate Specialist Funds	93	93	8,872	8,865	84.43%	59.30%	5,261
All	1,408	1,130	1,500,187	1,119,695	32.27%	2.38%	35,747
Post Period: 2009-2016							
Cross-Over Funds							
Developed Market Funds	898	641	2,225,292	1,726,006	33.34%	1.41%	31,439
Emerging Market Non-Specialist Funds	408	381	156,327	146,800	22.85%	14.51%	22,689
Emerging Market Specialist Funds							
Emerging Market Corporate Specialist Funds	93	93	12,179	12,170	92.01%	66.61%	8,112
All	1,399	1,115	2,393,798	1,884,977	32.99%	2.67%	63,831

Table 9
Portfolio Composition by Issuance Size of Cross-Over Funds and Emerging Market Specialist Funds

This table reports the value of emerging market corporate debt of different sizes, expressed as a percentage of the value of all corporate bonds held by each mutual fund category during 2009-2016. The analysis is restricted to fixed income funds and to international U.S. dollar-denominated corporate bonds. Columns 1, 2, and 3 report the percentage of emerging market corporate debt 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), respectively. Column 4 reports the differences in means tests for [500:1,000) bonds for each type of fund with respect to the emerging market corporate specialist funds. Column 5 reports the difference in the fraction of [500:1,000) bonds for each category of funds with respect to the total amount outstanding. Mutual funds are classified into three categories: developed market funds and emerging market non-specialist funds (cross-over funds), plus emerging market corporate specialist funds.

	Total Value of Emerging Market Corporate Debt			**Differences for [500:1.000)**	
	(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	10.10 %	17.36 %	72.54 %	11.742 ***	11.701 ***
	(0.068)	(0.056)	(0.075)	(0.557)	(2.917)
Emerging Market Non-Specialist Funds	10.43 %	16.30 %	73.27 %	12.473 ***	12.432 ***
	(0.134)	(0.149)	(0.210)	(0.591)	(2.924)
Emerging Market Specialist Funds					
Emerging Market Corporate Specialist Funds	14.13 %	25.07 %	60.80 %	-	0.041
	(0.576)	(0.500)	(0.550)		(2.970)
Total Amount Outstanding	17.42 %	21.74 %	60.84 %		-
	(2.193)	(0.783)	(2.916)		

Table 10
Fund Flow Demand Pressure and Size Yield Discount

This table reports regressions of the size yield discount of international U.S. dollar-denominated bonds with face value between $500 and $600 million [500:600) issued by firms in emerging markets on the measure of demand pressure into these bonds by different types of funds during 2011-2016. The size yield discount is the difference between the secondary market yield to maturity of [500:600) bonds by firms in emerging markets and that of bonds between $400 and $500 million [400:500), using the median yield per bond size and month. The demand pressure measure is constructed as the aggregate by type of fund of the monthly change in assets per fund, adjusted by portfolio returns, multiplied by the share of emerging market [500:600) bonds in the previous year's portfolio. Demand pressure is expressed as a share of the amount outstanding of [500:600) bonds issued by firms in emerging markets. Secondary market yield to maturity observations below zero and at the top 10% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Size Yield Discount of [500:600) Bonds			
	(1)	(2)	(3)	(4)
Aggregate All Funds	-0.428 **			
	(0.211)			
Cross-Over Funds				
Developed Market Funds		-2.857 ***		
		(0.971)		
Emerging Market Non-Specialist Funds			-0.776 **	
			(0.380)	
Emerging Market Corporate Specialist Funds				-0.411
				(0.536)
Number of Observations	72	72	72	72
R^2	0.045	0.100	0.045	0.005

Table 11
Probability of Issuing Large Bonds: Probit and Logit Regressions

This table reports Probit and Logit regressions of the change in the probability of issuing an international U.S. dollar-denominated bond with face value equal to or above $500 million [500:1,000) in the pre-2008 (2000-2008) and post-2008 (2009-2016) periods, for firms in emerging markets and investment grade firms in developed markets. The data are aggregated at the firm and period level. The sample is restricted to firms that issued at least one bond during 2000-2016. Panel A reports regression coefficients for the large bond issuance dummy on the pre-2008 dummy, the post-2008 dummy, and the interaction of the pre and post dummy variables with the log of assets. Assets are computed as the mean value per firm and period. Columns 1 and 2 report Probit results. Columns 3 and 4 report Logit results. Panel B reports the marginal effects for the increase in the probability of issuing large bonds after 2008 for firms in the 10th, 25th, 50th, 75th, 90th, 95th, and 99th percentiles of the size distribution. Robust standard errors are reported. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Coefficients

	Dependent Variable: Dummy=1 if Issuance Size=[500:1,000)			
	Probit Regression Coefficients		Logit Regression Coefficient	
	Emerging Markets	Developed Markets	Emerging Markets	Developed Markets
	(1)	(2)	(3)	(4)
Pre 2008	-5.683 ***	-4.232 ***	-10.356 ***	-7.246 ***
	(0.512)	(0.26)	(0.979)	(0.475)
Post 2008	-4.395 ***	-3.701 ***	-7.426 ***	-6.218 ***
	(0.318)	(0.25)	(0.578)	(0.437)
Pre 2008 * ln(Assets)	0.501 ***	0.366 ***	0.921 ***	0.628 ***
	(0.055)	(0.03)	(0.102)	(0.048)
Post 2008 * ln(Assets)	0.420 ***	0.323 ***	0.711 ***	0.544 ***
	(0.035)	(0.03)	(0.063)	(0.044)
Number of Observations	1,688	2,240	1,688	2,240

Panel B. Marginal Effects

	Probit Regression		Logit Regression	
	Emerging Markets	Developed Markets	Emerging Markets	Developed Markets
	(1)	(2)	(3)	(4)
10th Percentile	0.010 **	0.001	0.017 ***	0.003
	(0.004)	(0.001)	(0.006)	(0.002)
25th Percentile	0.036 ***	0.018 *	0.041 ***	0.019 *
	(0.010)	(0.010)	(0.010)	(0.011)
50th Percentile	0.092 ***	0.035 *	0.091 ***	0.035 **
	(0.017)	(0.018)	(0.017)	(0.017)
75th Percentile	0.157 ***	0.035	0.162 ***	0.038
	(0.026)	(0.024)	(0.026)	(0.024)
90th Percentile	0.171 ***	0.011	0.180 ***	0.010
	(0.043)	(0.040)	(0.045)	(0.043)
95th Percentile	0.156 ***	-0.008	0.154 **	-0.013
	(0.059)	(0.049)	(0.064)	(0.051)
99th Percentile	0.103	-0.024	0.074	-0.028
	(0.075)	(0.048)	(0.075)	(0.044)

Table 12
Cash Accumulation from Corporate Bond Issuance Proceeds: Regression Evidence

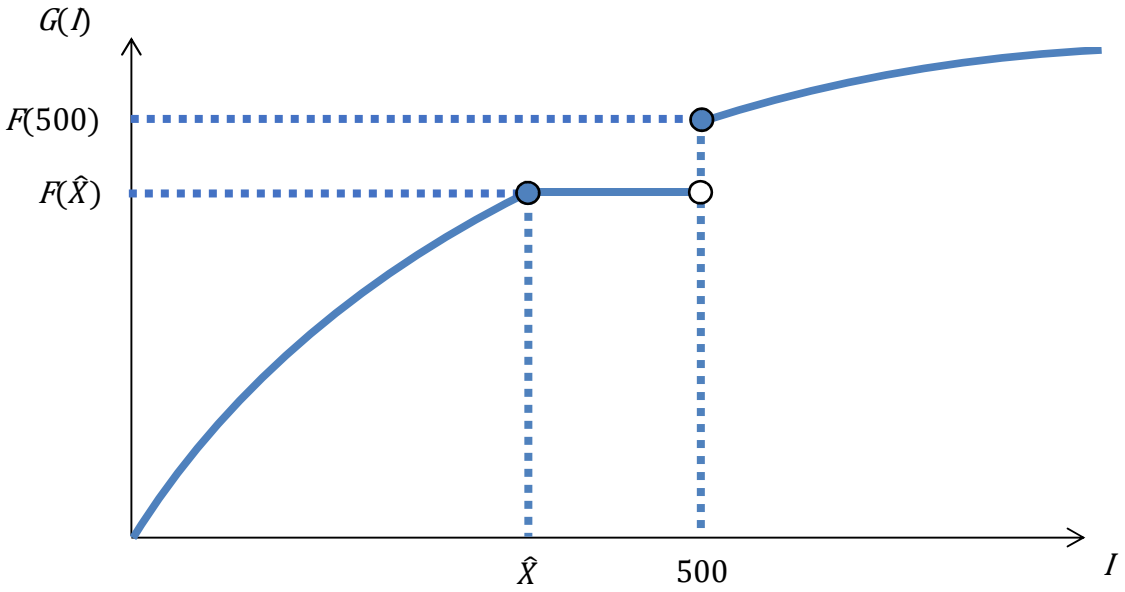
This table reports the coefficients from pooled firm-level panel regressions of cash and short-term investments on corporate bond proceeds after one year of the issuance. Columns 1 and 2 report the use of funds for issuers of bonds with face value below $500 million (0:500) and equal to or above $500 million [500:1,000), during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods, for firms in emerging markets and investment grade firms in developed markets, respectively. The analysis follows the Kim and Weisbach (2008) specification. The dependent variable is Cash = log[(V_n - V_0)/Assets) + 1], where V is cash and short-term investments. Independent variables are bond issuance value and other sources of funds, both normalized by total assets, in addition to the log of total assets, interacted with the dummy of each bucket size and the pre or post 2008 dummy. The regressions also control for the contemporaneous growth rate of sales and the standard deviation of growth of sales. Total assets are measured the year just before the issuance. All variables are winsorized at the 1% level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Emerging Markets	**Developed Markets**
	(1)	(2)
(0:500)*Pre 2008	0.476 ***	0.679 ***
	(0.110)	(0.168)
(0:500)*Post 2008	-0.393	0.366
	(0.322)	(0.228)
[500:1,000)*Pre 2008	0.193	0.525 ***
	(0.121)	(0.177)
[500:1,000)*Post 2008	0.671 **	0.023
	(0.325)	(0.207)
Triple Diff $\beta^{Post}_{\geq 500} - \beta^{Pre}_{\geq 500} - (\beta^{Post}_{<500} - \beta^{Pre}_{<500})$	1.347 ***	-0.189
P-Value	0.003	0.705
Number of Observations	954	1,192
R^2	0.372	0.255

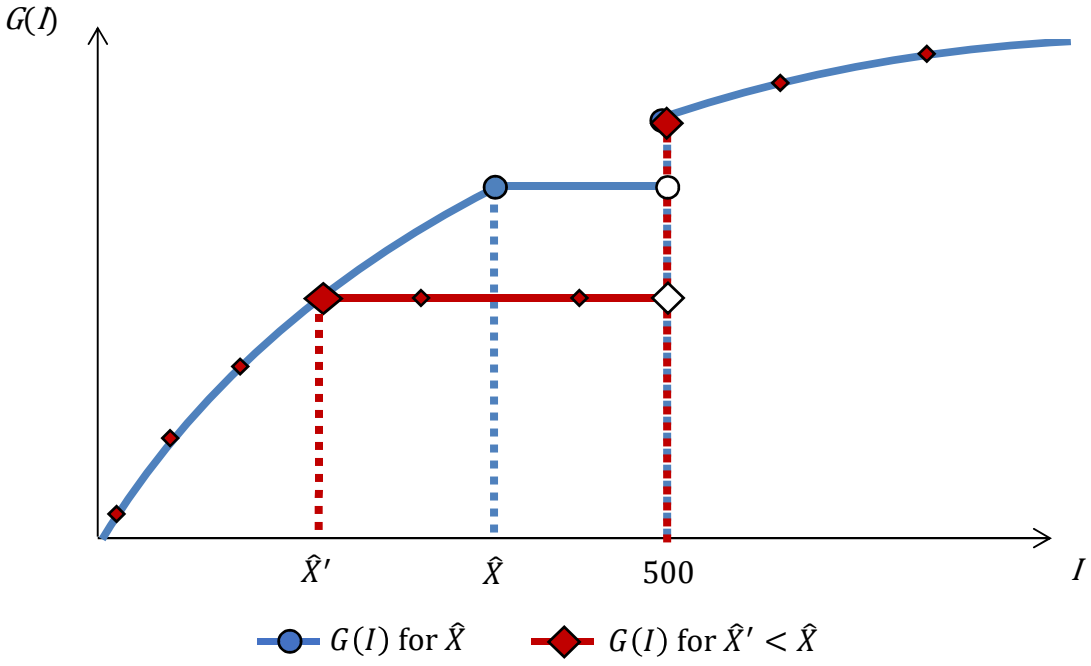
Appendix Figure 1
Model-Based Cumulative Distribution of Corporate Bond Issuance Size

This figure plots the model-based cumulative distribution of issuance size. I denotes issuance size, $G(I)$ denotes the cumulative distribution of issuance size, and X denotes firm size (which represents the size of the firm's investment opportunity). Firms of size below $\hat{X}$ issue X, firms in the size interval $[\hat{X}{:}500)$ issue 500, and firms of size greater or equal than 500 issue X. Because of the opportunity cost of cash, there are no bond issuances of size $[\hat{X}{:}500)$. Panel A plots the cumulative distribution of issuance size for a given $\hat{X}$. Panel B shows how the cumulative distribution of issuance size changes when the size yield discount (D) increases (which decreases $\hat{X}$).

Panel A. Cumulative Distribution of Issuance Size

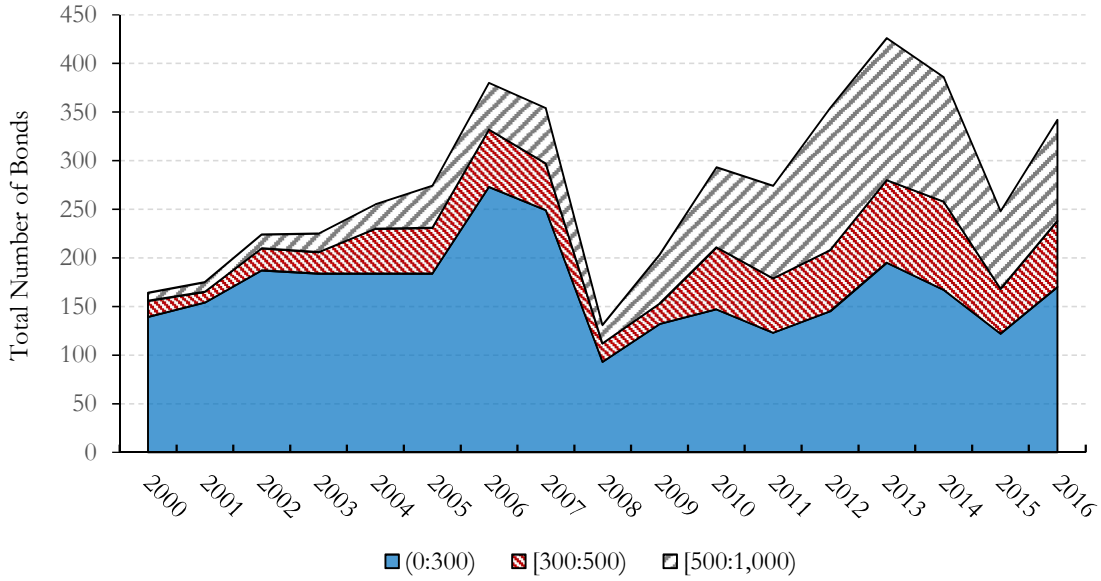


Panel B. Effect of an Increase in the Size Yield Discount (D)



Appendix Figure 2
Number of Emerging Markets Corporate Bond Issuances

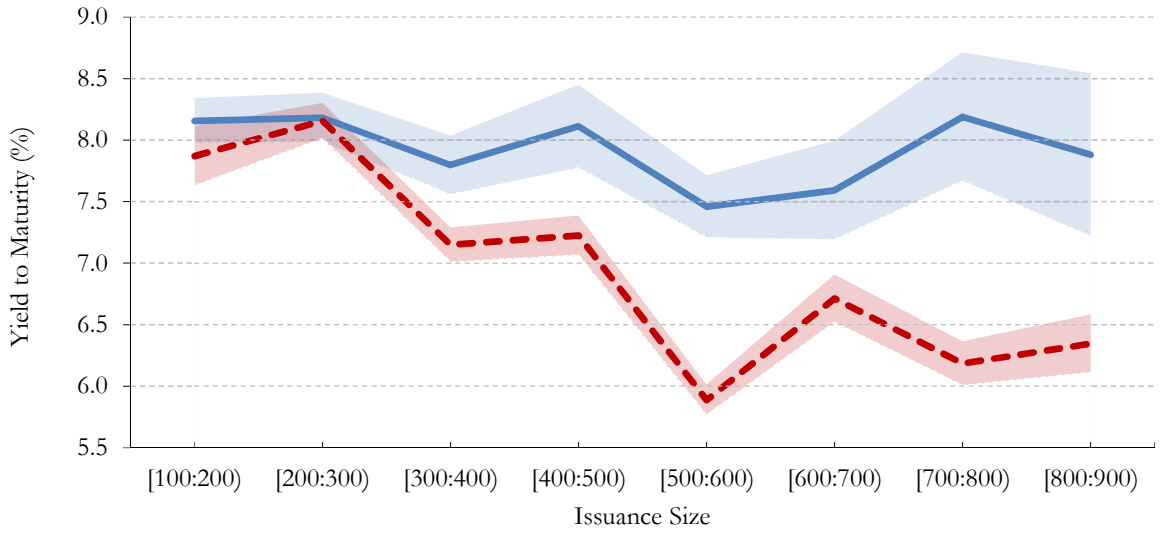
This figure shows the total number of international U.S. dollar-denominated bonds issued by firms in emerging markets during 2000-2016. The figure shows the total value of issuances of bonds with face values below $300 million (0:300), between $300 and $500 million [300:500), and equal to or above $500 million [500:1,000), respectively.



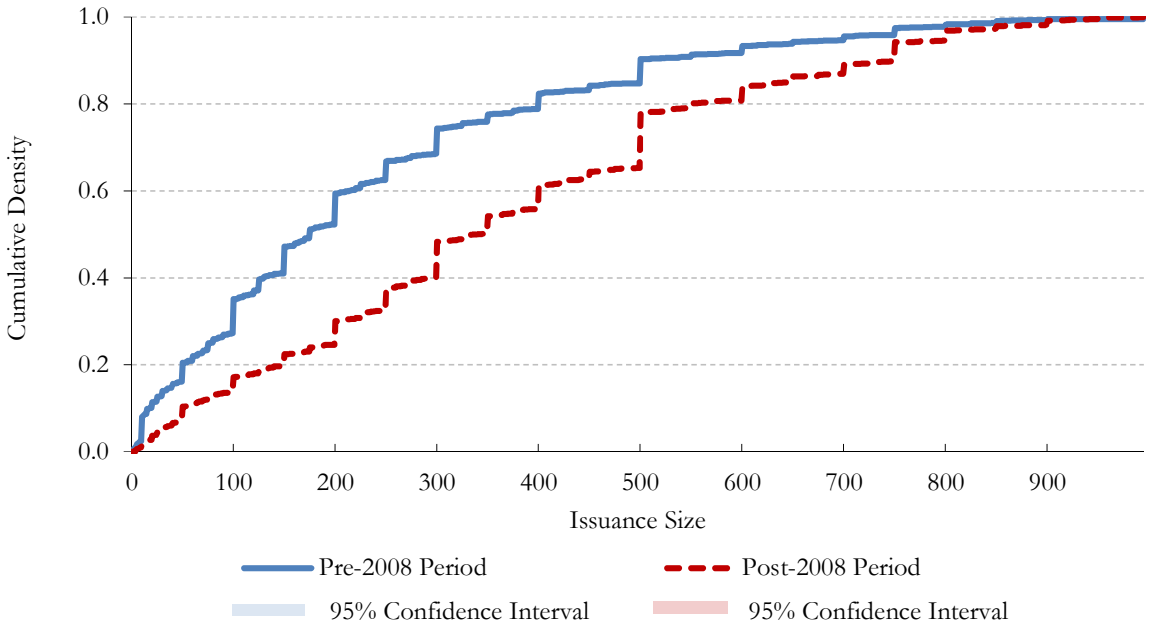
Appendix Figure 3
Yield to Maturity and Cumulative Distribution of Issuances, Pre and Post 2008
Including High-Yield Developed Market Bonds in the Emerging Market Sample

This figure shows the average yield to maturity (Panel A) and the cumulative distribution (Panel B) of international U.S. dollar-denominated bonds of different sizes issued by firms in emerging markets and high-yield firms in developed market during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Issuance size is in millions of U.S. dollars.

Panel A. Yield to Maturity of Issuances, Pre and Post 2008

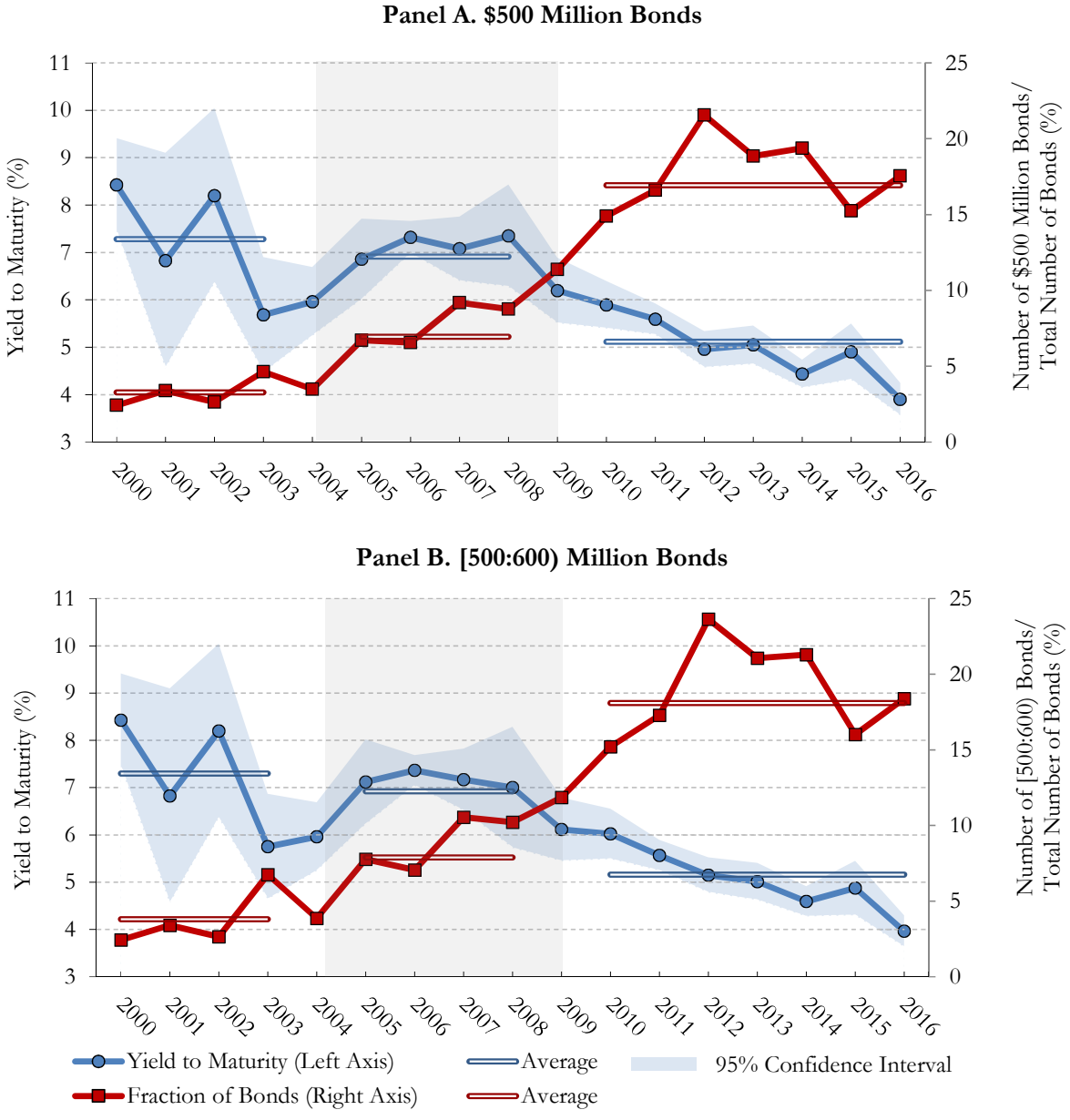


Panel B. Cumulative Distribution of Issuance Size, Pre and Post 2008



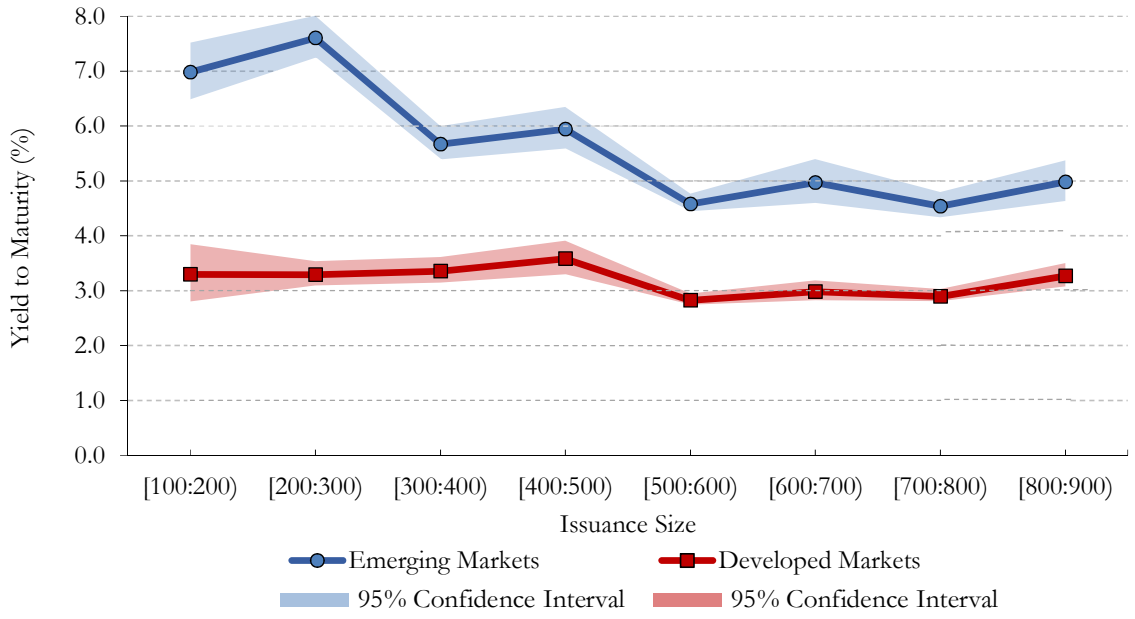
Appendix Figure 4
Yield to Maturity and Number of Emerging Market Corporate Bond Issuances

This figure shows the average yield to maturity and the fraction of international U.S. dollar-denominated bonds of different sizes issued by firms in emerging markets during 2000-2016. The fraction is calculated as the number of international U.S dollar-denominated bonds of different sizes relative to all international dollar-denominated bonds. Panel A shows the yield to maturity and the fraction of international U.S. dollar-denominated bonds with face value equal to $500 million. Panel B shows the yield to maturity and the fraction of international U.S. dollar-denominated bonds with face value between $500 and $600 million [500:600). The figure also reports averages for 2000-2003, 2004-2008, and 2009-2016.



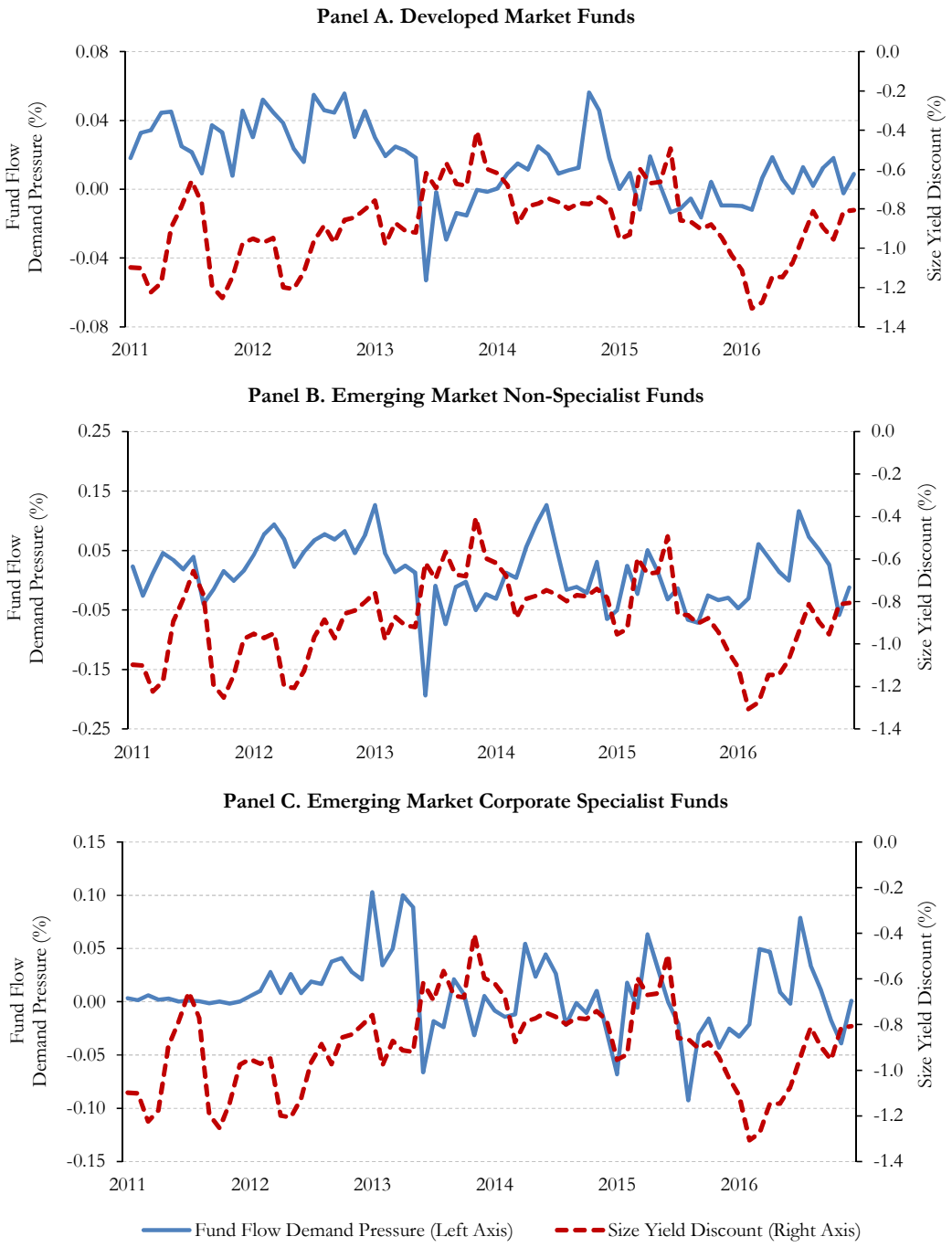
Appendix Figure 5
Secondary Market Yield to Maturity

This figure shows the average secondary market yield to maturity of international U.S. dollar-denominated bonds of different sizes issued by firms in emerging markets and investment grade firms in developed markets during 2011-2016. Secondary market yield to maturity observations below zero and at the top 10% (1%) are dropped for emerging (developed) markets. Issuance size is in millions of U.S. dollars.



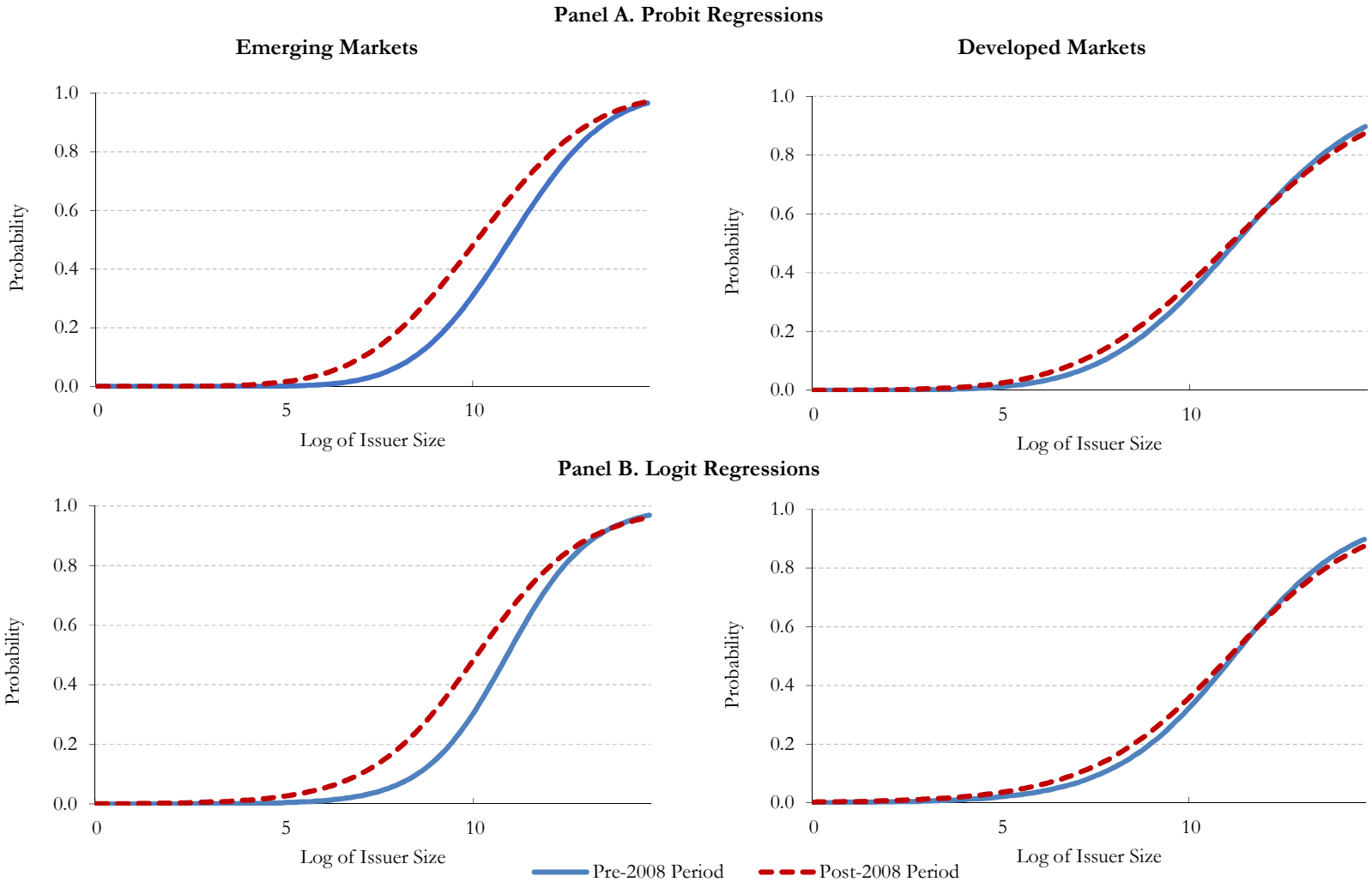
Appendix Figure 6
Fund Flow Demand Pressure and Secondary Market Size Yield Discount

This figure shows monthly-level demand pressure for international U.S. dollar-denominated bonds with face value between $500 and $600 million [500:600) issued by firms in emerging markets from different types of funds and the size yield discount of these bonds during 2011-2016. Panel A shows demand pressure from developed market funds. Panel B shows demand pressure from emerging market non-specialist funds. Panel C shows demand pressure from emerging market corporate specialist funds. The sample is restricted to fixed income mutual funds. The demand pressure measure is constructed as the aggregate by type of fund of the monthly change in assets per fund, adjusted by portfolio returns, multiplied by the share of emerging market [500:600) bonds in the previous year's portfolio. Demand pressure is expressed as a share of the amount outstanding of [500:600) bonds issued by firms in emerging markets. The size yield discount is the difference between the secondary market yield to maturity of [500:600) bonds by firms in emerging markets and that of bonds between $400 and $500 million [400:500), using the median yield per bond size and month. Secondary market yield to maturity observations below zero and at the top 10% are dropped.



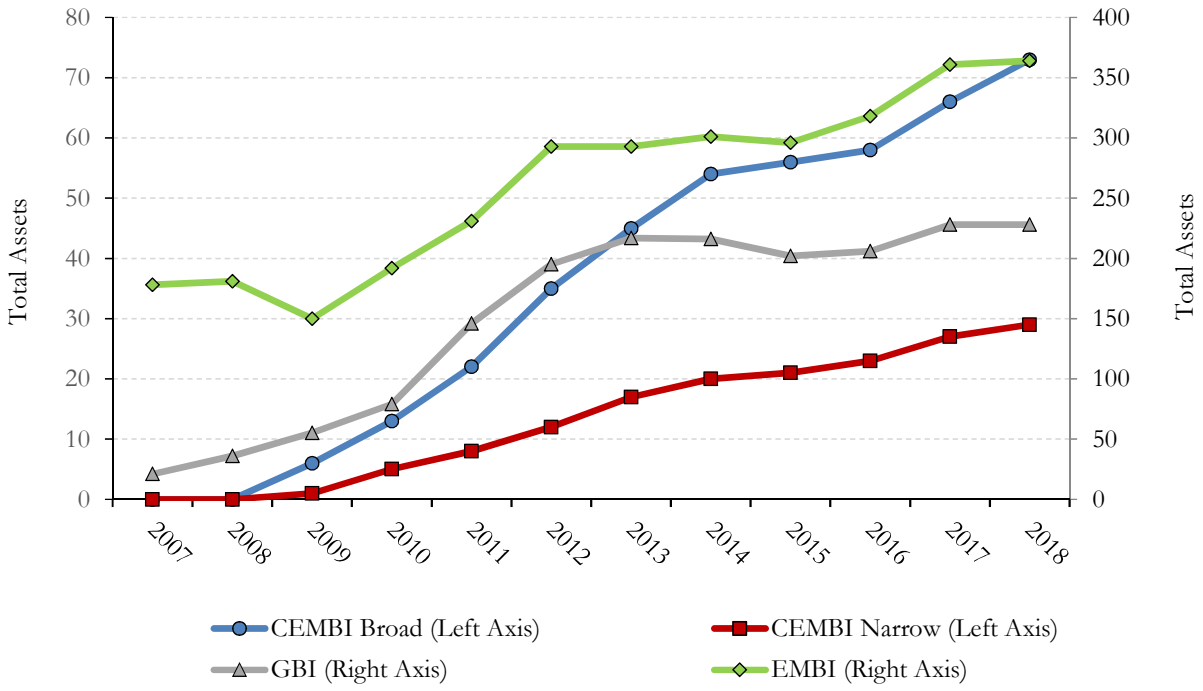
Appendix Figure 7
Probability of Issuing Large Corporate Bonds by Firm Size, Pre and Post 2008

This figure shows the probability of issuing an international U.S. dollar-denominated bond with face value equal to or above $500 million [500:1,000) in the pre-2008 (2000-2008) and post-2008 (2009-2016) periods for firms of different sizes. Firm size is measured by the log of total assets. The sample is restricted to firms that issued at least one bond during 2000-2016. The probabilities are computed from Probit and Logit regressions reported in Table 11 for the [500:1,000) bond issuance dummy on the pre-2008 dummy, the post-2008 dummy, and the interaction of the pre and post dummy variables with the log of assets. Panel A reports the probabilities computed using Probit regressions. Panel B reports the probabilities computed using Logit regressions. The left-side graphs restrict the sample to firms in emerging markets. The right-side graphs restrict the sample to investment grade firms in developed markets.



Appendix Figure 8
Assets Benchmarked to J.P. Morgan Emerging Market Debt Indexes

This figure shows the evolution of assets of funds that track their performance against J.P. Morgan's emerging market debt indexes during 2007-2018. Values are in billions of U.S. dollars. CEMBI stands for Corporate Emerging Market Bond Index, EMBI stands for Emerging Market Bond Index, and GBI stands for Government Bond Index.



Appendix Table 1
List of Countries

This table displays the list of markets classified as emerging and developed in the sample.

Emerging Markets	Emerging Markets (Cont'd)	Developed Markets
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 Kong SAR, China
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	Netherlands
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 Table 2
Emerging Market Bond Issuances of Different Sizes

This table reports the percentage of international U.S. dollar-denominated bonds 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) issued by firms in emerging markets during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Column 1 displays the percentage of the total value of international U.S. dollar-denominated bonds of different sizes relative to the total value of all international U.S. dollar-denominated bonds. Column 2 displays the percentage of the total number of international U.S. dollar-denominated bonds of different sizes relative to the total number of all international U.S. dollar-denominated bonds. The value of bonds is in 2011 U.S. dollars.

	(1) Total Value of Bonds		(2) Total Number of Bonds	
	Pre 2008	Post 2008	Pre 2008	Post 2008
(0:300)	42.86%	16.64%	75.41%	47.52%
[300:500)	23.99%	21.72%	13.41%	19.67%
[500:1,000)	33.15%	61.64%	11.18%	32.81%

Appendix Table 3
CEMBI and EMBI Requirements

This table reports the requirements for bonds to qualify for inclusion in the J.P. Morgan CEMBI and EMBI indexes.

	CEMBI		EMBIG Diversified
	CEMBI Broad/ Broad Div.	**CEMBI / Div (Narrow)**	
Country/Region	Issuer needs to belong to a country in one of the following regions: Asia ex Japan, Latam, Eastern Europe, or Middle East/Africa.		GNI per capita must be below the Index Income Ceiling (IIC) for three consecutive years.
Issuer	Headquartered in an emerging market (EM) country, 100% of the issuer's assets are within EM economies, or 100% secured by assets within EM economies.		N/A
Liquidity	N/A	N/A	Daily available pricing from third party evaluation vendor.
Instrument Type	All fixed, floaters, amortizers, and capitalizers. Defaulted bonds are excluded.	All fixed, bullets (only two largest instruments from any issuer). Defaulted bonds are excluded.	All fixed, floaters, amortizers, capitalizers, and loans.
Minimum Outstanding Face Value Amount	$300 Million	$500 Million	$500 Million
Maturity	Enter when at least five years to maturity. Exit when less than thirteen months to maturity.		Enter when at least two and a half years to maturity. Exit when less than one year to maturity.
Law/Settlement	Local law instruments are not eligible; Euroclearable or settled through another institution outside the issuing country.		N/A
Includes Quasi-Sovereign Bonds	N/A		Yes

Appendix Table 4
Probability of Issuing and Size Yield Discount of [500:550) Bonds

This table reports mean difference tests for the probability of issuing and size yield discount of international U.S. dollar-denominated bonds for firms in emerging markets and investment grade firms in developed markets during the pre-2008 (2000-2008) and post-2008 (2009-2016) periods. Panel A reports the percentage of issued bonds with face value between $500 and $550 million [500:600). Panel B reports the size yield discount. The size yield discount is the difference between the yield to maturity of [500:550) bonds and that of bonds between $400 and $500 million [400:500). Column 3 shows the mean tests and differences across time, separately for emerging and developed markets. Column 4 reports the difference-in-difference across time and country group. The yield to maturity observations in the top and bottom 5% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel B. Issuance

	Pre 2008	Post 2008	**Diff**	**Diff-in-Diff**
	(1)	(2)	(3)=(2)-(1)	(4)=EM(3)-DM(3)
Emerging Markets	0.060	0.180	0.120 ***	
	(0.005)	(0.007)	(0.009)	0.088 ***
Developed Markets	0.067	0.100	0.032 ***	(0.010)
	(0.003)	(0.004)	(0.005)	

Panel B. Size Yield Discount

	Pre 2008	Post 2008	**Diff**	**Diff-in-Diff**
	(1)	(2)	(3)=(2)-(1)	(4)=EM(3)-DM(3)
Emerging Markets	-0.323	-1.470 ***	-1.147 ***	
	(0.303)	(0.177)	(0.344)	-0.915 ***
Developed Markets	-0.238 **	-0.471 ***	-0.232	(0.332)
	(0.109)	(0.100)	(0.150)	

Appendix Table 5
Unconditional Probabilities of Issuing a Bond of Different Sizes

This table reports difference-in-difference regressions of the change in the probability of issuing an international U.S. dollar-denominated bond of a certain size pre and post 2008 for firms in emerging markets relative to the same change for investment grade firms in developed markets during the 2000-2016 period. Issuance size is in millions of U.S. dollars. The analysis is restricted to positive and zero bond issuance observations. Columns 1-9 report the regressions for the bond issuance dummy of each bucket size on the interaction of the post 2008 dummy (equal to one for 2009-2016) with the emerging market (EM) dummy. Regressions include country, industry-year, maturity, quarter-year, and rating fixed effects (FE), in addition to bond-firm controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Dummy=1 if Issuance Size=[X:X+100)									
	Probability of Issuing Debt of a Certain Amount								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	[500:600)	[600:700)	[700:800)	[800:900)
EM*Post 2008	-0.049	-0.103 ***	-0.009	0.044 **	0.013	0.084 ***	0.002	0.002	0.013
	(0.044)	(0.031)	(0.021)	(0.017)	(0.015)	(0.023)	(0.009)	(0.012)	(0.009)
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.358	0.172	0.126	0.091	0.047	0.102	0.030	0.050	0.017
Number of Countries	69	69	69	69	69	69	69	69	69
Number of Observations	19,114	19,114	19,114	19,114	19,114	19,114	19,114	19,114	19,114
R^2	0.341	0.151	0.124	0.16	0.134	0.163	0.131	0.144	0.143

Appendix Table 6
Probability of Issuing Bonds of Different Sizes: Robustness
Using $500 Million Issuances Instead of [500:600) Issuances

This table reports robustness tests for the probability of issuing bonds regressions in Table 2. The bucket size [500:600) is replaced by bonds with face value equal to $500 million. Columns 1-9 report the regressions for the bond issuance dummy of each bucket size on the emerging market (EM) dummy, the post dummy, and the interaction of the post dummy with the EM dummy. Regressions include country, industry-year, maturity, quarter-year, and rating fixed effects (FE), in addition to bond-firm controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Dummy=1 if Issuance Size=[X:X+100)									
	Probability of Issuing Debt of a Certain Amount								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0:100)	[100:200)	[200:300)	[300:400)	[400:500)	$500	[600:700)	[700:800)	[800:900)
EM*Post 2008	-0.049	-0.103 ***	-0.009	0.044 **	0.013	0.084 ***	0.002	0.002	0.013
	(0.044)	(0.031)	(0.021)	(0.017)	(0.015)	(0.023)	(0.009)	(0.012)	(0.009)
Bond-Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.358	0.172	0.126	0.091	0.047	0.102	0.030	0.050	0.017
Number of Countries	69	69	69	69	69	69	69	69	69
Number of Observations	19,114	19,114	19,114	19,114	19,114	19,114	19,114	19,114	19,114
R^2	0.341	0.151	0.124	0.155	0.134	0.163	0.131	0.144	0.143

Appendix Table 7
Yield to Maturity and Issuance Sizes: Pre-2008 Coefficients

This table reports difference-in-difference regressions of the yield to maturity of international U.S. dollar-denominated bonds of different sizes, measuring the relative change after 2008 separately for firms in emerging markets and investment grade firms in developed markets. Issuance size is in millions of U.S. dollars. The analysis is restricted to positive issuance observations during 2000-2016. The full equation estimated is Equation (2) in the text. Columns 1-4 report regressions for the yield to maturity on the interaction term between the dummy of each bucket size and the emerging market (EM) or developed market (DM) dummy. The coefficients $\beta_X^{EM,Post}$ and $\beta_X^{DM,Post}$ are reported in Table 3 to conserve space. Columns 1-4 include different sets of fixed effects and controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. The yield to maturity observations in the top and bottom 5% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Associated Coefficients	Dependent Variable: Yield to Maturity				
		(1)	(2)	(3)	(4)	(5)
EM*[100:200)	β_{100}^{EM}	1.963 ***	1.992 ***	2.097 ***	1.173	-0.314
		(0.339)	(0.484)	(0.532)	(0.795)	(0.893)
EM*[200:300)	β_{200}^{EM}	1.952 ***	1.81 ***	1.884 ***	1.408 *	-0.441
		(0.359)	(0.460)	(0.497)	(0.821)	(0.882)
EM*[300:400)	β_{300}^{EM}	1.283 ***	1.538 ***	1.591 ***	1.108	-0.335
		(0.464)	(0.453)	(0.489)	(0.770)	(0.849)
EM*[400:500)	β_{400}^{EM}	1.495 ***	1.182 ***	1.220 ***	0.805	-0.467
		(0.500)	(0.428)	(0.439)	(0.779)	(0.918)
EM*[500:600)	β_{500}^{EM}	1.184 ***	1.245 **	1.271 **	1.343	-0.171
		(0.343)	(0.480)	(0.504)	(0.847)	(0.949)
EM*[600:700)	β_{600}^{EM}	0.308	0.795	0.81	1.004	-0.56
		(0.488)	(0.538)	(0.541)	(0.910)	(0.860)
EM*[700:800)	β_{700}^{EM}	0.685 *	1.198 **	1.200 **	1.047	-0.493
		(0.385)	(0.570)	(0.573)	(0.872)	(0.991)
EM*[800:900)	β_{800}^{EM}	0.507	0.608	0.605	0.835	0.424
		(0.552)	(0.568)	(0.568)	(0.904)	(1.214)
DM*[100:200)	β_{100}^{DM}	-1.047 ***	-0.21	-0.101	-0.523 *	-0.646 ***
		(0.271)	(0.130)	(0.307)	(0.270)	(0.207)
DM*[200:300)	β_{200}^{DM}	-0.73 ***	-0.293 **	-0.221	-0.549 *	-0.586 ***
		(0.178)	(0.112)	(0.215)	(0.284)	(0.195)
DM*[300:400)	β_{300}^{DM}	-0.412 **	-0.177	-0.124	-0.435	-0.488 **
		(0.167)	(0.132)	(0.199)	(0.279)	(0.198)
DM*[400:500)	β_{400}^{DM}	-0.388 **	-0.251	-0.213	-0.369	-0.287
		(0.175)	(0.175)	(0.213)	(0.307)	(0.214)
DM*[500:600)	β_{500}^{DM}	-0.552 ***	-0.137	-0.110	-0.269	-0.277
		(0.125)	(0.111)	(0.129)	(0.286)	(0.167)
DM*[600:700)	β_{600}^{DM}	-0.206	-0.155	-0.14	-0.071	-0.16
		(0.161)	(0.187)	(0.192)	(0.290)	(0.194)
DM*[700:800)	β_{700}^{DM}	-0.084	0.004	0.01	-0.093	0.029
		(0.150)	(0.139)	(0.142)	(0.249)	(0.202)
DM*[800:900)	β_{800}^{DM}	-	-	-	-	-
Log(Issuance Size)				0.058		
				(0.152)		
Log(Assets)					-0.191 ***	
					(0.039)	
Bond-Firm Controls		No	Yes	Yes	Yes	No
Country FE		No	Yes	Yes	Yes	No
Firm FE		No	No	No	No	Yes
Industry-Year FE		No	Yes	Yes	Yes	No
Maturity FE		No	Yes	Yes	Yes	No
Quarter-Year FE		No	Yes	Yes	Yes	Yes
Ratings FE		No	Yes	Yes	Yes	No
Number of Observations		7,907	7,785	7,785	3,974	7,907
R^2		0.349	0.765	0.765	0.778	0.885

Appendix Table 8
Yield to Maturity and Issuance Sizes: Robustness
Using $500 Million Issuances Instead of [500:600) Issuances

This table reports robustness tests for the yield to maturity regressions in Table 3. The bucket size [500:600) is replaced by bonds with face value equal to $500 million. The full equation estimated is Equation (2) in the text. Columns 1 and 2 report regressions for the yield to maturity on the interaction term between the dummy of each bucket size, the post dummy and the emerging market (EM) or developed market (DM) dummy. The coefficients β_X^{EM} and β_X^{DM} are not reported to conserve space. Column 2 includes country, industry-year, maturity, quarter-year, and rating fixed effects (FE), in addition to bond-firm controls. Bond-firm controls include a dummy indicating whether the bond was issued publicly or privately, a dummy indicating whether the firm is foreign-owned, a dummy indicating whether the firm has partial government ownership, and a fixed or flexible coupon dummy. Standard errors are clustered at the country and quarter-year levels. The yield to maturity observations in the top and bottom 5% are dropped. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Associated Coefficients	Dependent Variable: Yield to Maturity	
		(1)	(2)
EM*[100:200)*Post 2008	$\beta_{100}^{EM,Post}$	-1.773 ***	-2.381 ***
		(0.548)	(0.461)
EM*[200:300)*Post 2008	$\beta_{200}^{EM,Post}$	-0.479 **	-1.911 ***
		(0.217)	(0.438)
EM*[300:400)*Post 2008	$\beta_{300}^{EM,Post}$	-1.331 ***	-2.523 ***
		(0.250)	(0.458)
EM*[400:500)*Post 2008	$\beta_{400}^{EM,Post}$	-1.050 **	-1.888 ***
		(0.408)	(0.482)
EM*$500*Post 2008	$\beta_{500}^{EM,Post}$	-2.107 ***	-2.771 ***
		(0.199)	(0.444)
EM*[600:700)*Post 2008	$\beta_{600}^{EM,Post}$	-1.004 **	-2.576 ***
		(0.481)	(0.613)
EM*[700:800)*Post 2008	$\beta_{700}^{EM,Post}$	-1.737 ***	-3.001 ***
		(0.346)	(0.503)
EM*[800:900)*Post 2008	$\beta_{800}^{EM,Post}$	-1.304 **	-2.140 **
		(0.499)	(0.824)
DM*[100:200)*Post 2008	$\beta_{100}^{DM,Post}$	-0.969 **	-2.791 ***
		(0.420)	(0.404)
DM*[200:300)*Post 2008	$\beta_{200}^{DM,Post}$	-0.824 ***	-2.817 ***
		(0.213)	(0.374)
DM*[300:400)*Post 2008	$\beta_{300}^{DM,Post}$	-1.299 ***	-2.98 ***
		(0.126)	(0.391)
DM*[400:500)*Post 2008	$\beta_{400}^{DM,Post}$	-1.442 ***	-2.995 ***
		(0.141)	(0.349)
DM*Iss500*Post 2008	$\beta_{500}^{DM,Post}$	-1.701 ***	-3.216 ***
		(0.155)	(0.338)
DM*[600:700)*Post 2008	$\beta_{600}^{DM,Post}$	-1.834 ***	-3.083 ***
		(0.234)	(0.327)
DM*[700:800)*Post 2008	$\beta_{700}^{DM,Post}$	-2.316 ***	-3.463 ***
		(0.152)	(0.360)
DM*[800:900)*Post 2008	$\beta_{800}^{DM,Post}$	-1.937 ***	-3.231 ***
		(0.212)	(0.426)
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 Size Yield Discount EM	$\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post}$	-1.057 ***	-0.883 **
P-Value		0.002	0.016
Diff Size Yield Discount DM	$\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post}$	-0.259 **	-0.221 *
P-Value		0.047	0.083
Diff-in-Diff SYD EM-DM	$\beta_{500}^{EM,Post} - \beta_{400}^{EM,Post} - (\beta_{500}^{DM,Post} - \beta_{400}^{DM,Post})$	-0.798 **	-0.662 *
P-Value		0.039	0.073
Number of Observations		7,721	7,604
R^2		0.352	0.766

Appendix Table 9
Frequency of Bond Issuances

This table reports the mean number of issuances and the duration between issuances for international U.S. dollar-denominated bonds of any size, 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) by firms in emerging markets and investment grade firms in developed markets during 2000-2016. The analysis is restricted to firms that issued the relevant type of bond at least once during the sample period. Panel A reports the number of issuances per year as follows: (1) the total number of bonds issued are summed per firm-year observation, (2) the mean number of issuances are then computed per firm, and (3) the mean firm is computed. Panel B reports the number of years between bond issuances on average. The values are computed as one over the respective values in Panel A.

Panel A. Number of Issuances per Year		
	Emerging Markets	Developed Markets
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 Markets
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