The Search for Yield and the Size Premium in Emerging Market Corporate Debt

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Abstract

Emerging market corporations have significantly increased their borrowing in international markets after the global financial crisis. We show that this expansion was led by large-denomination bond issuances (bonds with face values exceeding US$300 million, and often exceeding US$500 million). The drastic shift in the pattern of bond issuances reflects increased investor willingness to purchase emerging market corporate bonds so long as they are included in international bond indexes, which require face values of at least US$300 and US$500 million. Inclusion in the index gives investors the advantage of holding more liquid bonds, which also makes them more similar to those issued by U.S. corporates and emerging market sovereigns. Additionally, those bonds allow investors to target performance closer to the market benchmark. After 2008, emerging market firms started facing a new tradeoff. They could borrow at a lower cost (a full percentage point lower) by issuing index-eligible bonds, which often imply raising more financing than needed. Or, they could borrow smaller quantities at a higher cost, while avoiding accumulating substantial cash assets. Because the liquidity premium for large-denomination bonds is sizable, many companies have issued them. As a result, larger firms have become more likely to issue them and some smaller firms have issued large bonds for the first time, which has entailed large increases in their post-issuance cash holdings. The overall changes after 2008 in emerging market corporate issuance are not apparent in advanced economies.

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1. Introduction

Since the global financial crisis (GFC), interest rates from developed countries have been at historical lows, especially for safe assets. Several studies have argued that persistently low interest rates on safe assets have led investors to search for yield by expanding the range of investments they considered and by making them willing to accept increases in risk. As a consequence, the search for yield expanded the demand for emerging market securities, especially corporate debt issued in international markets (Becker and Ivashina, 2015; Bruno and Shin, 2017).[1]

Because the international market for debt securities is dominated by institutional investors, who face limits in their incentives or ability to undertake risk, the search for yield did not entail an unlimited willingness to accept new risks. One way to limit risk, while expanding investments into emerging market corporate debt, is to demand liquid instruments, which allows investors to sell positions if necessary to limit losses, or to increase them when desired with minimal price-impact and low transaction cost. Also, institutional investors are often penalized with withdrawals or rewarded with inflows by ultimate account investors based on their deviations from performance benchmarks, which encourages institutional investors to think of the risk that affects them (as agents) in terms of deviations from the performance of market indexes. By purchasing bonds that are included in major indexes, institutional investors both enhance liquidity and limit the risk of underperforming the index.[2] Bonds that are included in market indexes are bought and sold more frequently and are held by a wide range of investors, which means

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

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

that holding a bond that is included in the index enhances its liquidity. Bonds that are included in the index collectively define the benchmark of market performance, which means that holding those bonds limits an institutional investor's risk of underperforming the market benchmark.

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

Because of their desire for liquidity and their incentive to avoid underperforming indexes, institutional investors that expand their holdings of emerging market corporate debt see advantages from purchasing bonds that are included in the major market indexes, which meant purchasing large bonds. Given that investors prefer large, index-eligible bonds, one would expect that this preference would affect both bond prices and the issuance decisions of firms participating in international bond markets.

In this paper, we analyze how the change in global market conditions after 2008 interacted with market structure to affect the size and pricing of U.S. dollar-denominated debt issued by emerging market corporations. Specifically, we analyze a period when the low interest rate environment created by developed countries' monetary policies after the GFC interacted with preferences of international investors that follow rules governing the inclusion in debt market indexes. We also study how these changes have affected firm financing decisions and cash holdings.

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

Our first new finding is that the expansion in the supply of funds available to purchase emerging market corporate debt was accompanied by an increased preference for bonds large enough to be included in market indexes. After the GFC, emerging market firms were much more likely to issue debt securities in international markets with a face value of $500 (US$500) million. Not only were bonds with face value greater than $500 million issued significantly more by emerging market firms relative to the period before the GFC, this pattern is much more visible for emerging market issuers than for developed market firms. That pattern is consistent with the greater inherent riskiness of emerging market debt, and therefore, the greater need for risk to be mitigated by being included in the market index.

Furthermore, we find that, in the post-2008 period, large (index-eligible) emerging market corporate debt securities had yields that were 100 basis points lower than otherwise similar securities with lower face value. This yield difference is not apparent in the pre-GFC period and not apparent for developed market firms' issuances. Clearly, emerging market corporates saw major advantages in the form of lower yields from issuing large-denomination, index-eligible debt after 2008, and they responded by substantially increasing large-denomination debt issuances. Additionally, we show that interest in emerging market debt, measured by investor flows to these funds, is highly positively correlated with the percentage of $500 million bonds issued. This is suggestive of how search for yield might lead firms to issue these bonds to take advantage of the size premium.

After documenting the changes over time in the issuance sizes of emerging market corporate debt and size-related changes in debt yields, we turn to firm-level analysis of debt issuance decisions. That firm-level analysis if of interest for two sets of reasons. First, focusing on firm-level decisions allows us to distinguish between the behaviors of different types of firms, which provides clearer evidence of the causal role

of changes in the supply of funding in producing the observed changes in issuance size and pricing. Second, a firm-level focus allows us to investigate the uses of bond issuance proceeds, which is both of inherent interest, and which also provides additional evidence for the causal role of supply-side influences.

Although our narrative emphasizes the role of the monetary policy environment for shifting the demand of investors for emerging market debt, it is conceivable that demand-side factors in emerging markets could also be contributing to aggregate changes in issuance behavior. The fact that we observe emerging market firms clustering their issuances at exactly $500 million after 2008 strongly suggests the importance of supply-side influences on the change in issuance behavior. The fact that yield reductions are discontinuous at the $500 million threshold is also highly suggestive of supply-side influences. Exogenous demand-side factors that increase the desire for more funds in each capital raising activity should lead to higher yields.

A focus on firm-level decisions permits us to provide additional evidence that supply-side shocks were the more important influence. Specifically, we focus on two hypotheses that point to supply-side influences. First, if the change in the supply side was driving increased issuance, then the changes in behavior we document should be more pronounced for large firms. The reason is that large firms exogenously face smaller costs of issuing large amounts of debt. In particular, their larger scale of operations implies that they are more likely to have immediate use for funds raised in the bond market. In contrast, smaller firms responding to supply-side incentives to issue debt will likely have a harder time using large issuance proceeds, implying a cost that should make them less likely than large firms to take advantage of the changes in market conditions that favor large-denomination debt. We find that, in fact, large firms take greater advantage than smaller firms of the change in market conditions after 2008. Second, we expect to find that relatively small firms are more likely to see a change in the probability of issuing

large-denomination debt. While large firms may have been issuing large-denomination debt before 2008 simply by virtue of their larger financing needs, small firms were much less likely to issue large-denomination debt prior to 2008. We find that small firms do, indeed, see a larger increase in the probability of issuing large bonds after 2008.

Finally, we examine the uses of proceeds, again distinguishing between the behavior of large and small firms. We show that emerging market firms that issue debt in international markets with face value equal to or higher than $500 million after 2008 tend to hold more cash for every dollar of debt issued than firms that issue lesser amounts. Moreover, the increased holding of cash is greater for small firms than for large firms. This is consistent with small firms issuing more debt than necessary in order to take advantage of the size premium.

The rest of the paper is organized as follows. Section 2 describes our data sources. Section 3 presents our issuance-level results. Section 4 reports the firm-level results. Section 5 concludes by discussing additional analyses that we are currently pursuing.

2. Data

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

In this paper, we focus on issuances of corporate bonds in U.S. dollars, which is another prerequisite to be included in the bond indexes analyzed. We only study issuances that take place in international markets, defined as a firm issuing a bond in a market that is different from its country of origin. We consider a sample of firms in 44 emerging economies and 24 developed markets, for the period 2000-2016, as detailed in Appendix Table 1. We include both financial and non-financial firms, because the market structure effects that we document affect issuances by any type of firms. Our results are robust to excluding financial firms. Our sample includes 25,855 issuances from 6,943 different firms in these countries during this period.

We complement these data with additional information from two different sources. We use injections/redemptions to emerging market debt funds from Emerging Market Portfolio Research (EPFR) Global to gauge changes in investors' interest in emerging market debt. Additionally, for the use-of-funds analysis, we merge the SDC data with Worldscope data, which provide information on the financial statements of firms. Those data include important information on the firms' assets, cash holdings, and sales (reported in balance sheets, income statements, and cash flow statements). The Worldscope data are available for 44% of the firms contained in the SDC database, resulting in a merged dataset of 3,023 firms.

3. Corporate Bond Issuances

Figure 1, Panel A, plots the evolution of the total value of U.S. dollar-denominated corporate debt issued by emerging market firms. Figure 1, Panel B, plots the evolution of the total number issuances. The figure shows that the value of international bond issuances by emerging firms increased sharply after 2008. Between 2009 and 2013, the value of those bond issuances increased by 481%. This fact has been documented recently in the literature (Acharya et al., 2015). We classify emerging market corporate

bond issuances into three categories, according to their issuance size: below $300 million, between $300 and below $500 million, and above $500 million. In the same figure, we plot the time series of bond issuances for each of those three categories. Between 2000 and 2008, bonds above $500 million represented 33% of the total value of bonds issued. After 2008, their share of the total practically doubled to 62%. We regard this as an important new finding: after 2008, not only did total emerging market corporate bond issuances increase, there was also a compositional shift from small issuances to large issuances ($500 million or more). Similarly, while the number of bonds issued above $500 million represented 11% of the total number of bonds between 2000 and 2008, their share increase to 33% after 2008. Additional details on number of issues and volume in each category are provided in Table 1.

To study this compositional change in more detail, in Figure 2, Panel A, we plot the cumulative distribution of emerging corporate bond issuances by size. We plot the distribution for the periods before and after 2008. Firms issue bonds of all sizes, ranging from less than 10 million to nearly a billion dollars. For the post-2008 period, we observe a jump in the distribution at $500 million, indicating a new discontinuity in the distribution, with 20% of all bond issuances having a face value exactly equal to $500 million. This discontinuity did not exist in the pre-2000 period. The fact that, after 2008, we observe emerging market firms cluster their issuances at exactly $500 million strongly suggests the importance of supply-side influences on the change in issuance behavior.

Panel B of Figure 2 replicates the previous figure, but for the sample of advanced economies. For those advanced economies, we observe a smaller jump in the distribution at $500 million, and one that is more similar before and after 2008. This reflects the fact that many popular corporate bond indices for advanced economies (e.g., Bloomberg Barclays U.S. Aggregate Bond Index) have a minimum bond issuance size of $500 million for index inclusion. By issuing index-eligible bonds, advanced economy firms

could take advantage of the higher demand for those bonds by passive bond investment funds, resulting in lower yields. But interestingly, there was not a big change at the time of the GFC. The difference between emerging and developed corporate countries suggests the supply-side effect of the post-GFC environment was more relevant for emerging market corporate debt, which likely reflects the fact that emerging market corporates are inherently riskier. Because emerging market corporate debt is riskier, when the search for yield increased emerging market positions, it also focused more on debt that was large enough to be included in a major benchmark.

We conjecture that part of the surge in investor interest in emerging market corporate debt after the GFC reflected a change in the investor base. That is, we believe that the composition of international investors changed from relying exclusively on traditional emerging-market corporate bond investors towards involving a broader investor base, including emerging-market sovereign bond investors and advanced-economy corporate bond investors. Those investors already had significant experience with the usefulness of indexes in other bond classes. Passive emerging sovereign bond investors typically track the JP Morgan EMBI, which has a minimum size inclusion cutoff of $500 million. As noted above, several of the indices followed by passive advanced-economy corporate bond investors also have inclusion cutoffs of $500 million. The conjectured compositional shift in investor base after 2008, together with the existence since 2007 of the JP Morgan CEMBI Narrow, which also has a $500 million minimum cutoff, likely produced an immediate increase in the interest of international investors for large ($500 million and greater) emerging corporate bonds.[4]

[4] The CEMBI has two different versions. The CEMBI Broad, which includes smaller securities and has a cutoff of $300 million and the CEMBI Narrow with an inclusion cutoff of $500 million. The latter index is composed of more liquid and selected securities. As of the end of 2017, $61 billion were tracking the CEMBI Broad, and $24 billion the CEMBI Narrow. While this could indicate a larger preference towards $300 million bonds, the assets tracking the EMBI (with a cutoff of $500 million) are much larger than the assets tracking specifically corporate debt in emerging markets.

To study how the shifts in size-dependent investor interest affected market yields, in Figure 3, Panel A, we plot the average yield to maturity of bonds of different issuance size, before and after 2008. We observe that, on average, yield to maturity decreases with issuance size. More importantly, we observe a sharp decline in the yield when moving to issuance sizes of $500 million after 2008 (a fall of 108 basis points). This decline at the $500 million threshold is much more pronounced than what we observed in the pre-2008 period, suggesting that after 2008, there was an increase in the supply of financing for bonds of issuance size greater than or equal to $500 million. Note that, there is also a decline in the yield when moving to the $300 million threshold, consistent with the CEMBI Broad having a minimum size requirement for inclusion of $300 million. However, when comparing the decline in the yields relative to the pre-2008 period, the decline in the yield is much larger for $500 million bonds.

Figure 3, Panel B presents the same analysis as Panel A for corporate issuers in advanced markets. There is a decline in the yields for issuances at the $500 million threshold after 2008 of a similar magnitude to that observed for emerging markets. However, there is also a decline for the pre 2008 period, suggesting a larger effect on yields for emerging market firms.

In summary, with respect to both the size distribution and yield discontinuities, in developed economies, the size thresholds for corporate debt display smaller effects than for emerging market corporates. We also observe more similar effects for the pre-2008 and post-2008 period for developed countries' corporate debt than we observe for emerging market corporate debt.

Table 2 provides a more formal analysis of these differences. We estimate differences in conditional means of comparing the issuances and yields of bonds with issue size between [400:500) million U.S. dollars and [500:600) million U.S. dollars. Panel A shows the percentage of bonds with a face value of [400:500) and [500:600) million

issued either by emerging or developed market firms, in the period 2000-2008 or 2009-2016. The table shows that difference over time, from before to after 2008, of the two types of bonds. For emerging market firms, the percentage of [500:600) million bonds rose from 6.1% to 18.4%. Bonds in the range of [400:500) rose by a much smaller percentage, from representing 4.0% of the total to representing 6.2% of the total international issuances in U.S. dollars. The difference between these two percentage changes (0.184 – 0.061) – (0.062 – 0.040) equals 10.2 percentage points, and is highly statistically significant. For developed market firms, the comparable difference in difference over time between [500:600) million bonds and [400:500) million bonds is much smaller (1.9 percentage points, in contrast to the 10.2 percentage points for emerging market issuances). Thus, the increase in the number of eligible bonds issued relative to the non-eligible bonds issued increased significantly more for emerging than for developed market firms (by a difference of 8.3 percentage points).

We do a very similar exercise for the yield to maturity of the bonds issued in the two different bins, [400:500) and [500:600). We observe that yield to maturity of bonds just above the threshold decreased 217 (82) basis points for emerging (developed) market firms. For bonds just below the threshold this fall in yields was 120 (17) basis points. Thus, the difference-in-difference estimate is a significant reduction of 97 (66) basis points for emerging (developed) market firms. In the end, the fall in the yield to maturity of index eligible relative to non-index eligible bonds is 31.5 basis points larger for emerging market firms than for developed market firms, although that 31.5 basis point difference is not statistically significantly different from zero.

Next, we document in a regression format how issuances and yields of bonds of different size categories changed after 2008 for emerging market firms. The regressions allow us to control for observable and unobservable characteristics that may predict issuance size and yields. We estimate the following regression:

$$[Issuance = [X: X + 100)]_{i,t} = \theta_t + \theta_c + \theta_j + \beta * Post\ 2008 * EM + Z_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $[Issuance = [X: X + 100)]_{i,t}$ is a dummy equal to 1 if firm i in year t issued a bond of size in the interval $[X: X + 100)$ and 0 otherwise, where X takes values in [0, 100, 200,…,1000]. $\theta_t, \theta_c, \theta_j$ denote year, country, and industry fixed effects, respectively. $Post\ 2008$ is an indicator variable equal to 1 after the year 2008 and 0 otherwise; EM is a dummy equal to 1 if the firm is from an emerging market and 0 otherwise. Z is a vector of firm-bond controls (rating, maturity, fixed or flexible rate indicator). We cluster the standard errors in all regressions at the country and year level.

This regression is effectively a difference-in-difference specification, where we use the issuance behavior of advanced economy firms as a counterfactual for the issuance behavior of emerging market firms. We are interested in the coefficient of the interaction term, β. It measures the change in the probability of issuing a bond of a certain size before and after 2008 for emerging market firms, relative to the same change for advanced economy firms. To test for pre-treatment parallel trends, in Figure 4 we plot the evolution of the average number of bond issuances of size equal to $500 million, relative to the total number of issuances, for both emerging and advanced economies. Until 2008, we observe similar behavior for the two groups of countries. After 2008, we observe a sharp increase in the number of $500 million issuances only for emerging market firms.

We report the results of Equation (1) in Table 3, Panel A, which examines differences in the probability of issuing bonds of different sizes. Each column of the table estimates Equation (1) for a different issuance size interval. The coefficient of the interaction term is positive and highly significant for issuances of size between $500 and $600 million. This means that after 2008, emerging market firms were 8.6% more likely to issue bonds in this size bin, relative to advanced economies firms. This is a sizable

effect, compared to the average probability of emerging market firms issuing a bond of $500 million, which is 10%. At the same time, the likelihood of issuing bonds in the two smallest bins decreased. This suggests that after 2008, emerging firms substituted issuance of small bonds with issuance of large bonds.

Table 3 estimates Equation (1) for a sample of strictly positive issuance observations. In Appendix Table 2, we re-estimate the equation for a sample containing all observations (including those with no issuances) and the results remain unchanged. In Table 3, Panel B we do a stricter test where we add both firm fixed effects and bond controls (maturity fixed effects, floating versus fixed interest rate dummy and whether the bond is issued privately or publicly). Because several firms only issue one bond during our sample we also lose many observations. Still, the results remain unchanged and coefficients are of similar magnitude.

Next, we re-estimate Equation (1) using the yield to maturity for bonds in different size bins as the dependent variable. We report results first without full controls in Table 4, Panel A. We find a negative and significant effect for yields of bonds of size between $500 and $600 million. After 2008, the yield to maturity of emerging market bonds in this size interval decreased by 72 basis points, relative to advanced economy bonds. This is a large effect, compared to the average yield of emerging market bonds of 518 basis points for the same size bin. We also find large effects for bonds greater than $300 million, which were included in the broad index. In Panel B, we include firm fixed effects and bond controls, and observe a similar significant decrease (63 basis points) for bonds of size between $500 and $600 million, and a lesser decrease (42 basis points) for bonds of size between $300 and $400 million.

We report an alternative specification (Equation (2)) for the yield-to-maturity analysis that allows us to compare yields of adjacent bin sizes, before and after 2008:

$$ytm_{i,t} = \theta_{[X:X+100)} + \theta_{[X:X+100)} * Post\ 2008 + \varepsilon_{i,t} \quad (2)$$

where $\theta_{[X:X+100)}$ are fixed effects for each bin size. The interaction term measures the reduction of yield after 2008 in the corresponding bin size. We observe, as expected, that yields in all bins decreased after 2008 for emerging markets (Table 5). More importantly, we can contrast the yield changes in time across adjacent bins. For example, the yield change of bonds between $500 and $600 million was 2.2 percentage points. This change is 100 basis points larger than the yield change of bonds between $400 and $500 million, which was 1.2 percentage points. The difference is statistically significant (see bottom of table). We find similar, but somewhat smaller unusually large yield reductions for the [300,400) relative to the [200,300) bin (a difference of 1.39 – 0.47 = 0.92 percentage point).

Our identification strategy, thus far, has been based on a difference-in-difference specification confined entirely to corporate debt issues. It relies on a macroeconomic (monetary policy) change happening after 2008 that differentially affected the issuances of debt for firms in emerging markets relative to advanced economies. Advanced economies' corporates are useful as controls because they are less risky as an investment class, and therefore, less affected by the change after 2008. We argue that the driver of change across time is movement to a low interest rate environment in advanced economies, which prompted a search for yield across the world and an increase in investor interest in emerging market corporates, but also raised the value to investors of emerging market debt issues that were included in indexes. We also speculate that the composition of international investors changed from a near exclusive reliance on traditional emerging-market corporate bond investors towards a broader investor base, including emerging-market sovereign bond investors and advanced-economy corporate bond investors.

So far, however, our estimations have not made use of information that directly captures changes in investor interest in emerging market debt after 2008. Figure 5

presents evidence that connects investor interest with changes in emerging market corporate bond issuance. We plot the cumulative flows into mutual funds that invest in emerging market sovereign and corporate debt from 2004 until 2016 (blue line). We also plot the number of bonds of $500 million face value issued by emerging market firms, as a fraction of all bonds issued by these firms (red line). The correlation between the two is 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.

4. Consequences for Firms

Our analysis of changes in the size distribution and size-related changes in bond yields has shown that the post-GFC environment produced major increases in the issuance of bonds with face values of $500 million or greater, and substantial reductions (roughly one percentage point) for issuances that crossed the $500 million threshold. The clustering of issues at the $500 million amount is strongly suggestive of supply-side shifts as the causal influence driving these patterns. The fact that yield reductions are also discontinuous at the $500 million threshold is also highly suggestive of supply-side influences. However, that evidence does not rule out some potential demand-side influence – that is, greater growth opportunities or lower fundamental risks in emerging markets – in driving some of the growth in large-face value emerging market corporate bond issuances.

Our analysis here of firm-level differences in their issuance behavior provides additional evidence that is useful for testing the causal role of supply-side changes in driving our results. That evidence is reported in two parts. In the first part of our analysis, we test two implications about supply-side shifts for cross-sectional differences, both of which follow from the fact that small firms face higher economic costs when

issuing large amounts in the bond market. In particular, because small firms cannot deploy large amounts of funds in new investments as easily as large firms can, they will tend initially to retain large amounts of cash from the issuances, with the attendant opportunity costs of maintaining excessive cash balances. First, this relative cost difference between large and small firms implies that, if supply-side shifts were important, then the responses of large firms should have been greater than the response of small firms. Second, changes in the probability of issuing large bond issues (moving from small to large issuance size) should be greater for small firms.

After documenting those differences, in the second part of our firm-level analysis, we examine the uses of funds raised by firms in the bond market. We find that small firms engaging in large bond issues after 2008 saved a much higher proportion of the funds raised in cash, compared to the cash retentions of large firms.

4.1 Bond Issuance Differences by Small and Large Firms

Figure 6 plots the issuer density functions with respect to firm size (measured as the log of total assets), which shows the changes in the size distributions of issuers from the pre-2008 era to the post-2008 era. The left top panel displays issuer distributions for emerging market countries. The right top panel displays issuer distributions for developed countries. For emerging market countries, the post-2008 period shows a distributional shift of issuers in favor of large firms. This pattern is not visible in developed economies. This confirms the hypothesis that large firms were better positioned to take advantage of the shift in funding supply that favored large-denomination (index-eligible) bond issues. Small issuers faced higher costs of issuing large amounts of debt, given that the magnitude of their investment opportunities is generally smaller.

Figure 7 tests a second firm size-related implication of the post-GFC supply-side shift. Small-size firms should display the biggest change in their propensity to issue large (index-eligible) bonds. Prior to 2008, small firms should have been very unlikely to issue large amounts of debt, but some of them (those willing to accumulate excess cash balances in order to access low-interest funding) decided to issue $500 million issuances for the first time. Figure 7 confirms this prediction: the size distribution of firms issuing bonds of $500 million or more shifted to the left after 2008.

Tables 6 and 7 provide more formal tests of the two firm-size-related hypotheses investigated in Figures 6 and 7. Table 6 reports regression results for Logit and Probit regressions, run separately for emerging and developed economy issuers.[5] The regressions test for firm size-related differences in the probability of issuing, comparing behavior for the pre-2008 and post-2008 eras.[6] We find that large firms in emerging market were 6 percentage points more likely to issue bonds in the post-2008 period than they were in the pre-2008 period. Furthermore, we do not find that relative propensity difference over time in developed economies. Large issuers in developed economies were not more relatively likely to issue bonds in the post-2008 period than they were in the pre-2008 period.

Table 7 reports Logit and Probit results, separately for emerging and developed economies' firms, that estimate how firm size affected the change in the probability of

[5] The regressions are estimated using aggregated data at the firm-subperiod level, where the subperiods correspond to the 2000-08 and 2009-16, following the equation: $Issuer_{i,p} = \beta_1 * Pre\ 2008 + \beta_2 * Post\ 2008 + \beta_3 * Log(Assets_{i,p}) * Pre\ 2008 + \beta_2 * Log(Assets_{i,p}) * Post\ 2008 + \varepsilon_{i,p}$, where $Issuer_{i,p}$ is an indicator variable equal to 1 if firm *i* in sub-period *p* issued bonds of the relevant size category. $Pre\ 2008$ is a dummy variable equal to 1 for 2000-08. $Post\ 2008$ is a dummy variable equal to 1 for 2009-16. $Assets_{i,p}$ is mean value per firm per sub-period. We Also estimate a variant of the equation with a $Large$ dummy, equal to 1 if the mean assets of the firm (over both sub-periods) is more than or equal to the median of the assets of all firms in the same country.

[6] We use two measures of size. First, we use a continuous measure, defined as the log of firm assets. Second, we use a binary measure, equal to one if the mean assets of the firm (over both sub-periods) is greater or equal to the median assets of all firms in the same country.

issuing a large (greater or equal than $500 million) bond from the pre-2008 to post-2008 periods. As in Figure 7, we find that small firms in emerging markets saw the greatest increase in the probability of issuance.

These results confirm the view that a shift in supply acted as a treatment effect in emerging economies to a much greater degree than in developed countries. 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 small firms in emerging markets, seeking to borrow at unusually low rates available in the post-2008 environment to firms issuing large (index-eligible) bonds, engaged in unprecedented issuance of large bonds, which resulted in a relatively large increase in the probability of large bond issuance by those small firms.

4.2 Uses of Funds from Bond Issuances of Small and Large Firms

Next, we investigate the uses of funds by emerging market bond issuers, and differences in the uses of funds by small and large firms. Firms taking advantage of the premium in $500 million bonds might be issuing bonds that are larger than the investment project opportunities they face. As a consequence, some 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. (2011). We focus exclusively on the use of funds of cash and short-term investments accumulation.

We begin by calculating the use of funds after each firms' bond issuance by estimating the following regression:

$$Y_{ict} = \alpha_c + \alpha_t + \beta log\left[1 + \left(\frac{Issuance}{Assets}\right)_{ict}\right] + \gamma log\left[1 + \left(\frac{OtherSources}{Assets}\right)_{ict}\right] + Z_{ict} + \varepsilon_{ict} \quad (3)$$

where $Y = \log\left[\frac{V_n - V_0}{Assets} + 1\right]$ and $V =$ cash holdings and short-term investments. $n = 1,2,3,4$ denotes the time periods considered for the analysis, and are years after the issuance. $Assets$ are the total assets of the firm in the year previous to the issuance. $OtherSources = log\left[\frac{\sum_{i-1}^{n} Total\ sources_i - Issuance}{Assets} + 1\right]$, where total sources of funds represent the total funds generated by the firm internally and externally during a given year. Z_{ict} are firm observable characteristics that we use as controls.

Figure 8 reports the results of estimating Equation (3), controlling for the log of assets, for the use of fund of cash and short-term investments. We report the dollar effects, breaking down our sample into different categories. We find that emerging market firms issuing $500 million and above bonds tend to hold more cash after a bond issuance in 2009-2016 relative to the 2000-2008 period. Quantitatively, in 2000-2008, for every million dollar raised, they held 0.16 million dollars in cash and short-term instruments two years after the issuance. In the 2009-2016 period, this number jumps to 0.75 million dollars. We do not observe this increase in the use of cash and short-term instruments for emerging market firms issuing bonds smaller than $500 million. Firms that issue these bonds held 0.46 (0.43) million dollars per million dollars issued in 2000-2008 (2009-2016). We do observe an increase for developed market firms, but of a much smaller magnitude (from 0.07 to 0.22).

It is conceivable that these results might be driven by selection bias. Emerging market firms that issue in the 2000-2008 period differ on average from the ones issuing in 2009-2016 (as we showed in Tables 6 and 7). 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 re-estimating Equation (3) with additional controls, which include the log of assets, the growth of sales, and the standard deviation of sales for each firm. Figure 9 illustrates the results

from this exercise. We observe a very similar pattern for emerging market firms issuing $500 million or above bonds. The use of funds for cash and short-term investments increases from $0.12 million per million dollar raised in 2000-2008 to 0.71 in 2009-2016.

We combine the evidence on the uses of funds analysis with the results on the firm size distribution to form an additional prediction. If smaller firms are the ones stretching to take advantage of the premium in $500 million bonds in 2009-2016, then we should observe that these are the firms driving our results in the uses of funds, and specifically, the accumulation of cash. In Figure 10 we present the Kim and Weisbach (2008) analysis for the period 2009-2016 for emerging market firms, dividing companies into high and low assets firms (above and below the median of assets, respectively). Small firms tend to hold much more cash than large firms after a bond issuance during this period, consistent with our prediction.

5. Conclusions

The global financial crisis ushered in a persistent period of low interest rates throughout the developed world. This low interest rate environment produced a search for yield that favored some classes of global securities, such as emerging market corporate debt, that previously had not been as popular among developed countries' institutional investors prior to the GFC. In this paper, we show that institutional investors searching for yield in emerging market corporate debt, however, strongly favored corporate debt issuances that were large enough to qualify for inclusion in market indexes. Inclusion in market indexes likely is favored by institutional investors because holding a portfolio of bonds included in the index limits the risk that their performance will deviate from the market benchmark. It also improves the liquidity of their positions, permitting them to better protect themselves from losses and realize profit opportunities.

Emerging market bond issuers responded to this new incentive by issuing many large (index-eligible) bonds. The financial rewards of doing so were large. Firms able to issue a $500 million bond, rather than, say, a $450 million bond, saved roughly a full percentage point in yield to maturity. These changes were not apparent for developed country corporate bond issues, 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 issuing large bonds at lower yields. Their share of bond issuance increased as a result of the change in market conditions. Smaller size emerging economy firms, however, saw the greatest change in the probability of issuing large bonds. The smaller emerging economy issuers who issued large bonds were willing to retain large amounts of cash from the proceeds of their bond issues in order to access funds at a lower interest rate. We find that relatively small emerging economy firms issuing large amounts of debt did, in fact, accumulate a much larger share of their offering proceeds in cash than large firms.

In future versions of this paper we plan to add to our results in two ways. First, there is some evidence (not explored above) that learning happened during the post-2008 period in a way that increased investor interest in emerging market corporate debt over time within the post-2008 period. This is reflected, in particular, in an increase over time in the relevance of the $300 million face value threshold for emerging market corporate debt issuance. In future work, we will explore the timing of that threshold effect in detail.

Second, we are currently analyzing additional data from Morningstar on the holdings of individual institutional investors. We will use those data to connect specific bond issuances with specific investors, which will allow us to understand better which

types of investors were most important in causing the change in the demand for large (index-eligible) emerging economy corporate debt.

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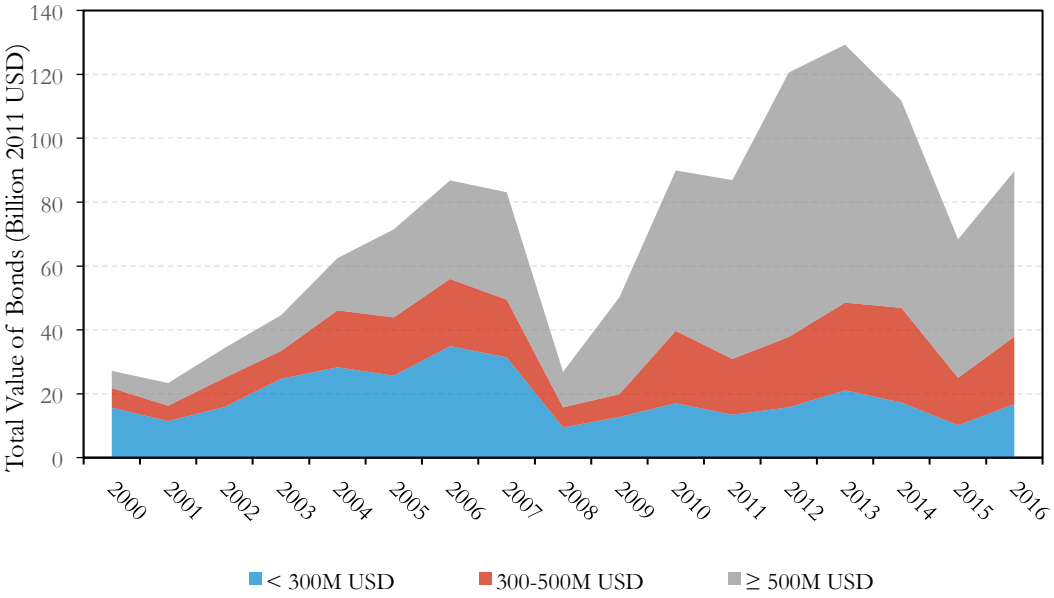
Figure 1
Total Value of Dollar Bonds Issued for EM

This figure reports the total value and number of international U.S. dollar (USD) bonds issued by firms in emerging markets, during the 2000-16 period. Panel A reports the total value of bonds issued. Panel B reports the total number of bonds issued. The blue area represents the total of bonds issued with a premium<300 million USD within a year. The red area represents the total of bonds issued with a 300≥premium>500 million USD. The grey area represents the total of bonds issued with a premium≥500 million USD.

Panel A. Total Value of Bonds



Panel B. Total Number of Bonds

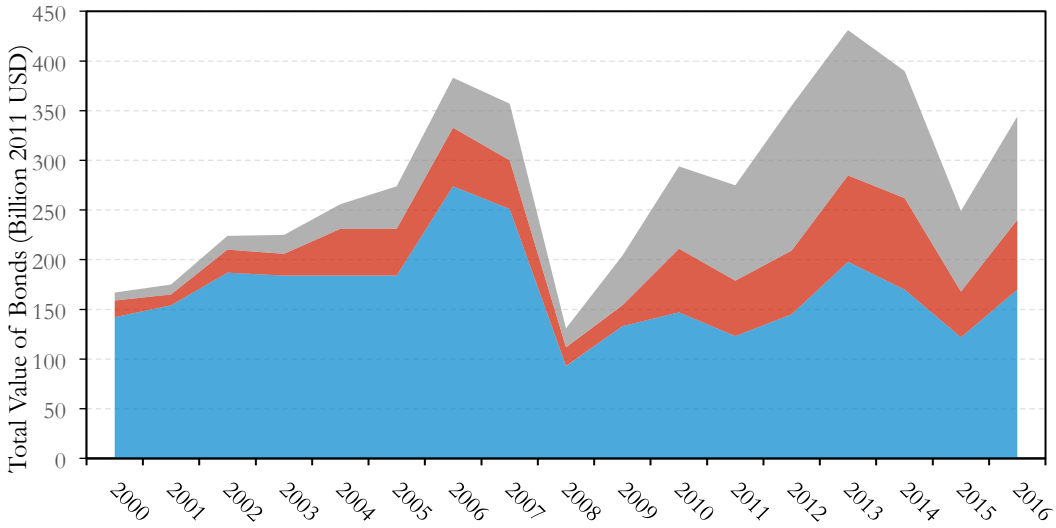


Figure 2
Cumulative Densities of Issuance Pre and Post 2009 for EM and DM

This figure reports the cumulative distribution of bond issuances by size for emerging markets (Panel A) and developed markets (Panel B), during the 2000-08 and 2009-16 periods.

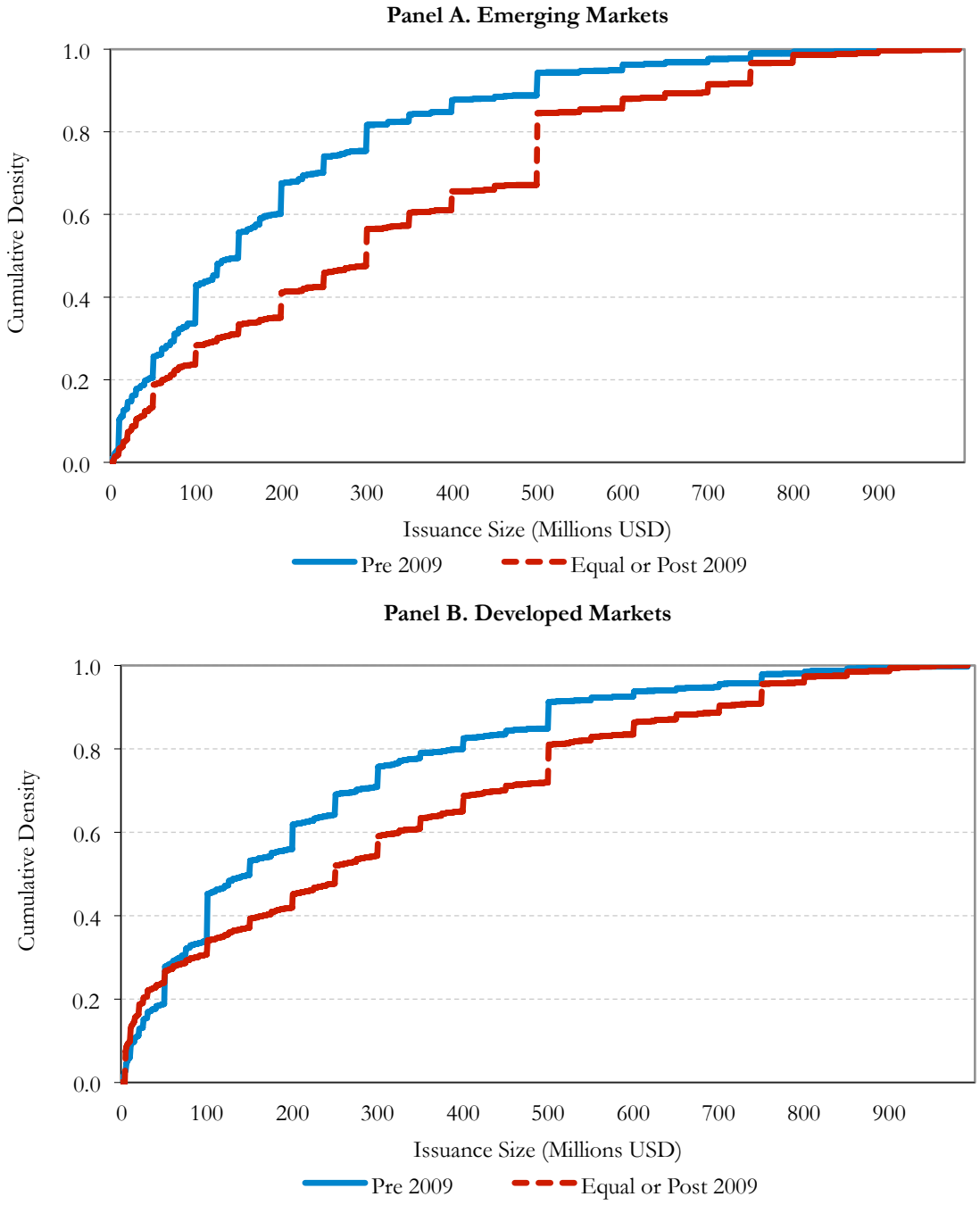
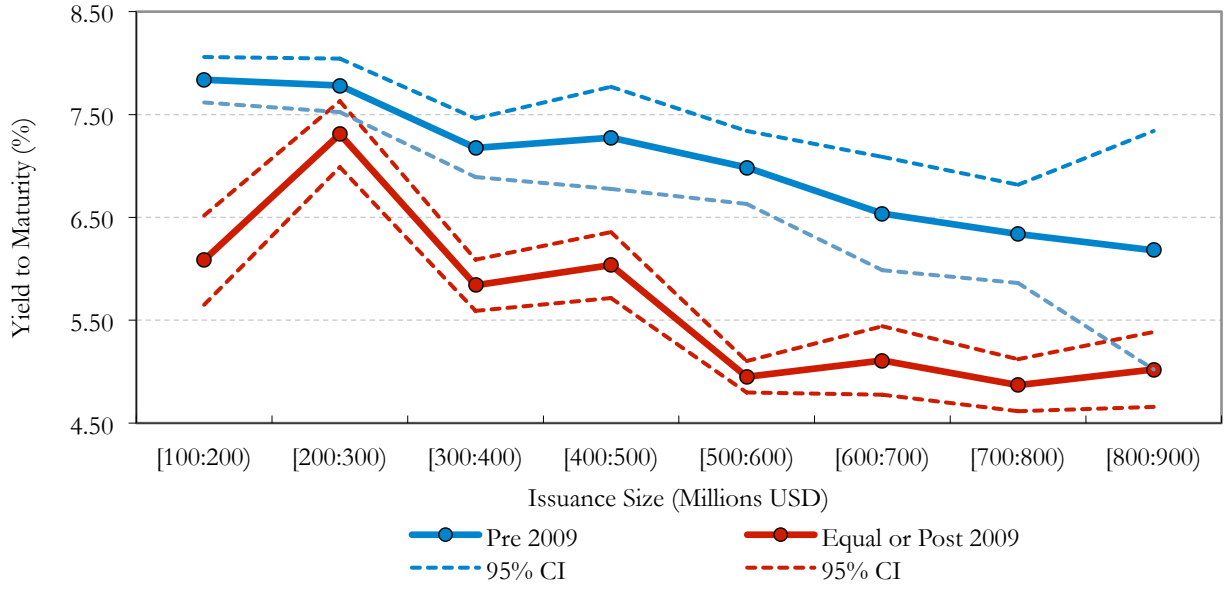


Figure 3
Yield to Maturity of Issuances of Different Size Pre and Post 2009 for EM and DM

This table reports the average yield to maturity of bonds of different issuance sizes for emerging markets (Panel A) and developed markets (Panel B), during the 2000-08 and 2009-16 periods.

Panel A. Emerging Markets



Panel B. Developed Markets

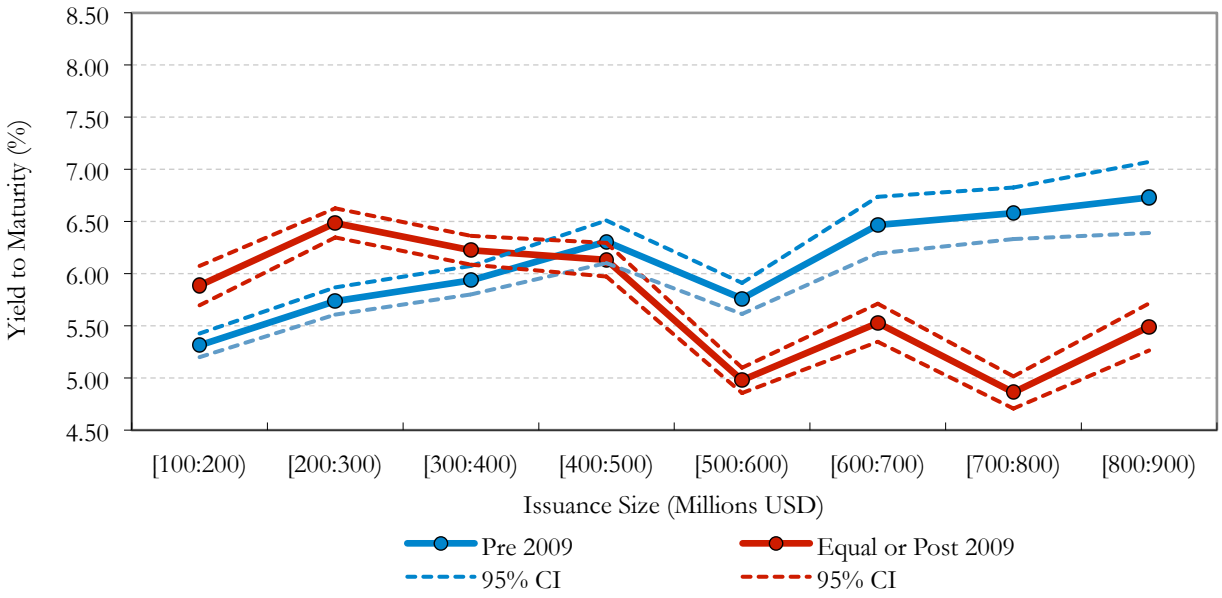


Figure 4
Parallel Trends Tests in 500 Issuances

This figure reports the evolution of the average number of bond issuances of size equal to 500 million U.S. dollars, relative to the total number of issuances, for emerging and developed markets, during the 2000-16 period.

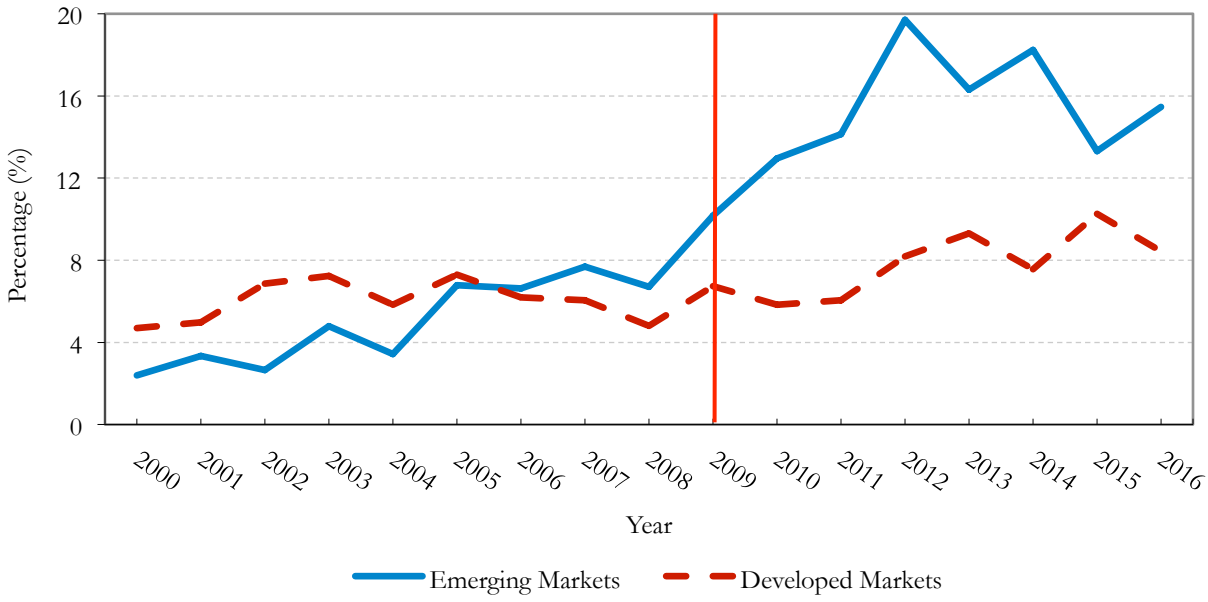


Figure 5
EM Debt Fund Flows and 500 Issuances

This figure reports the cumulative flows into emerging market sovereign and corporate debt, from 2004 until 2016 against the number of bonds of 500 million U.S. dollars issued by emerging market firms, relative to all bonds issued by these firms. The correlation coefficient between the two time series is reported at the top of the figure.

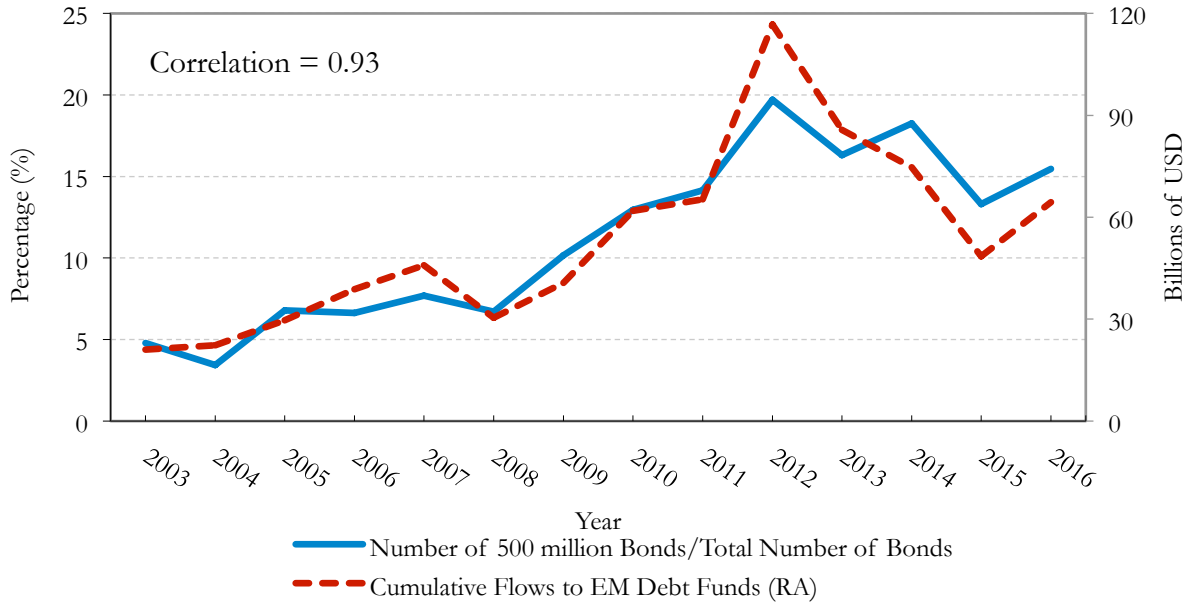


Figure 6
Firm Size Distribution for Issuers and Non-Issuers of Bonds

This figure reports the firm size distribution of bond issuers and non-issuers in emerging and developed markets, during the 2000-08 and 2009-16 periods. The size of firms is measured by the log of their total assets. Issuers in a certain sub-period are defined as firms that issued bonds at least once during this period. Non-issuers are firms that did not issue bonds at all during 2000-16. Densities are estimated using the Epanechnikov kernel function.

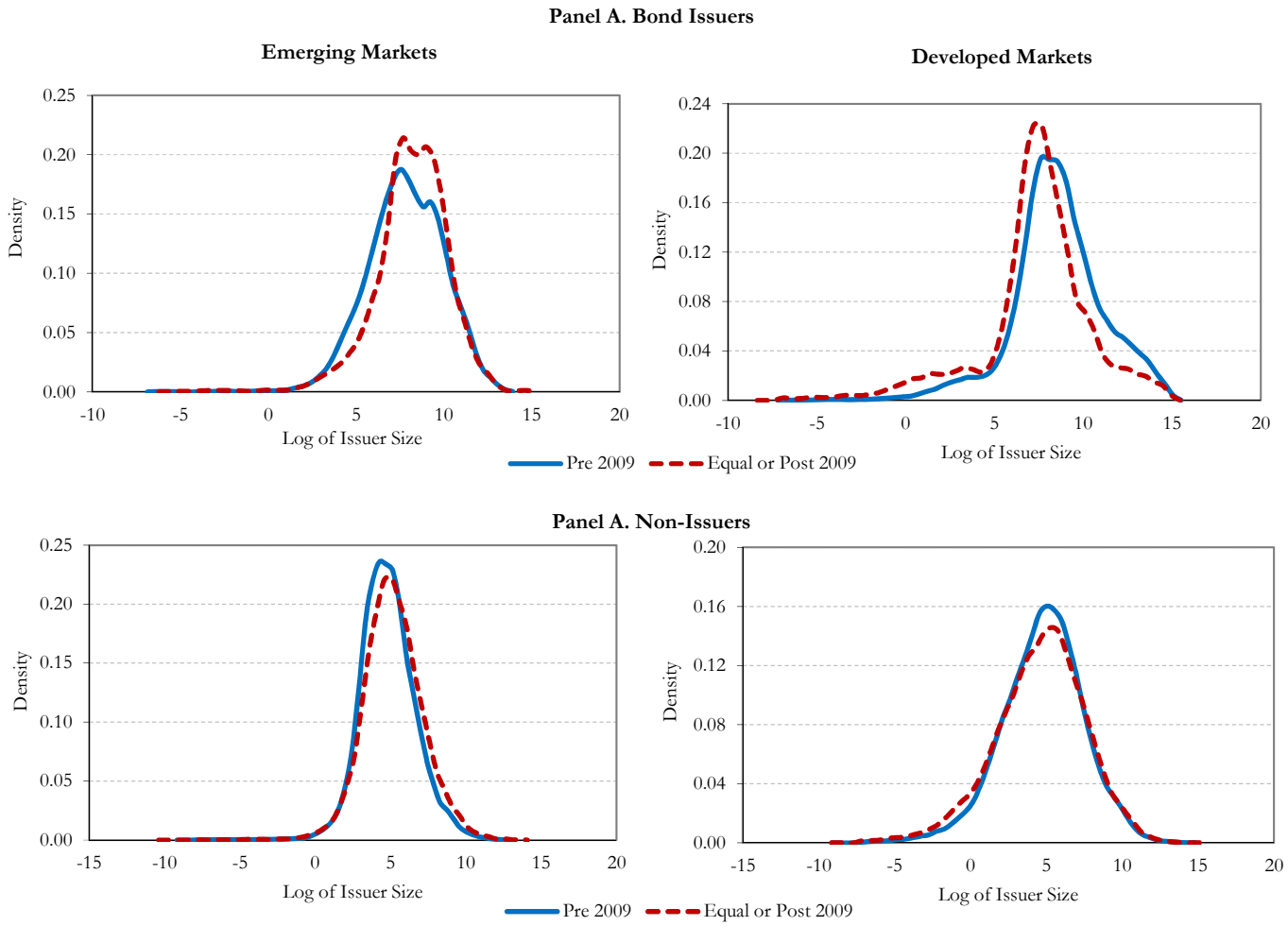


Figure 7
Firm Size Distribution for Issuers of Different Bonds Sizes

This figure reports the firm size distribution of bond issuers, of different issuance sizes, in emerging and developed markets, during the 2000-08 and 2009-16 periods. The size of firms is measured by the log of their total assets. Issuers in a certain sub-period are defined as firms that issued bonds of a certain size at least once during this period. Densities are estimated using the Epanechnikov kernel function.

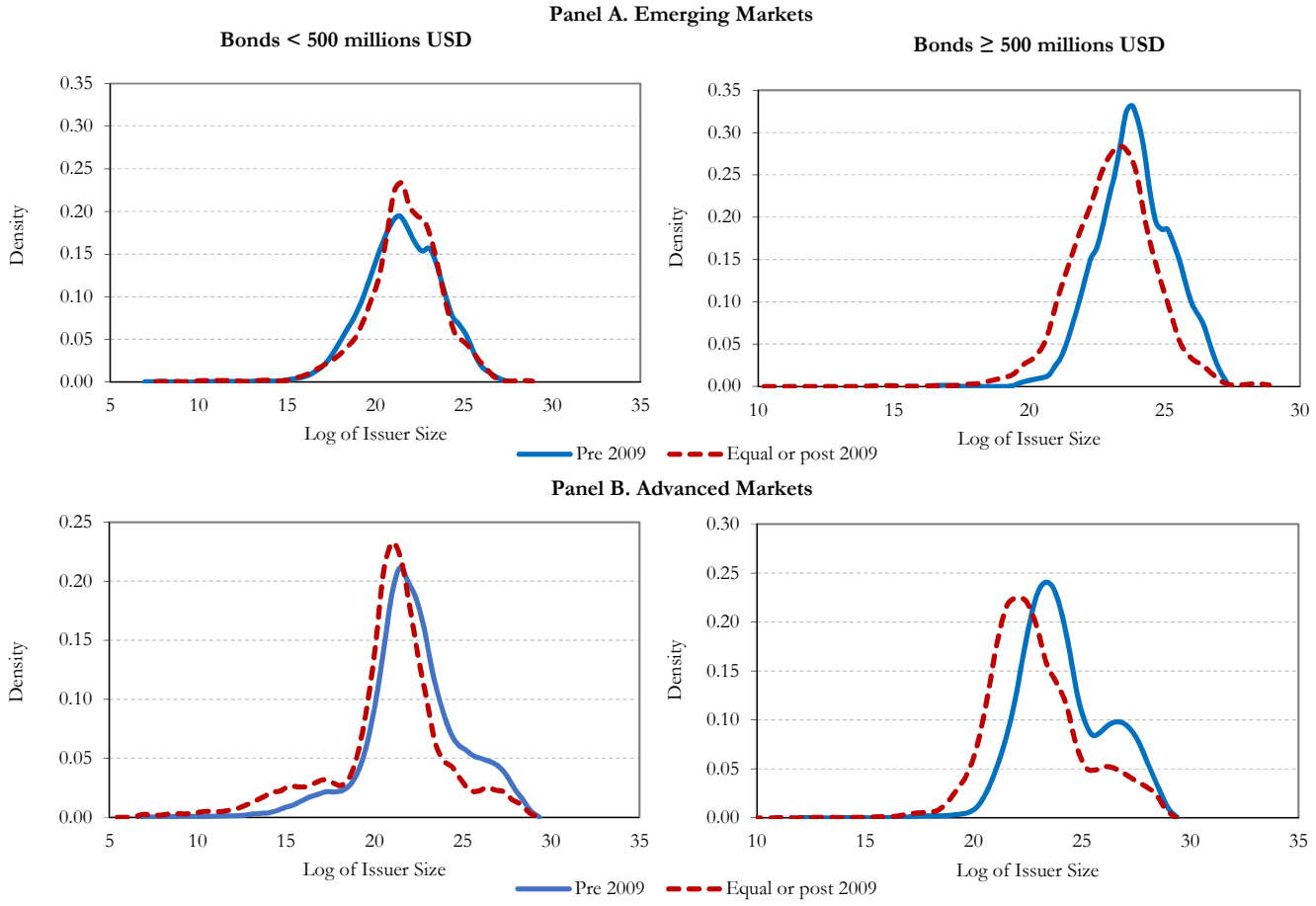
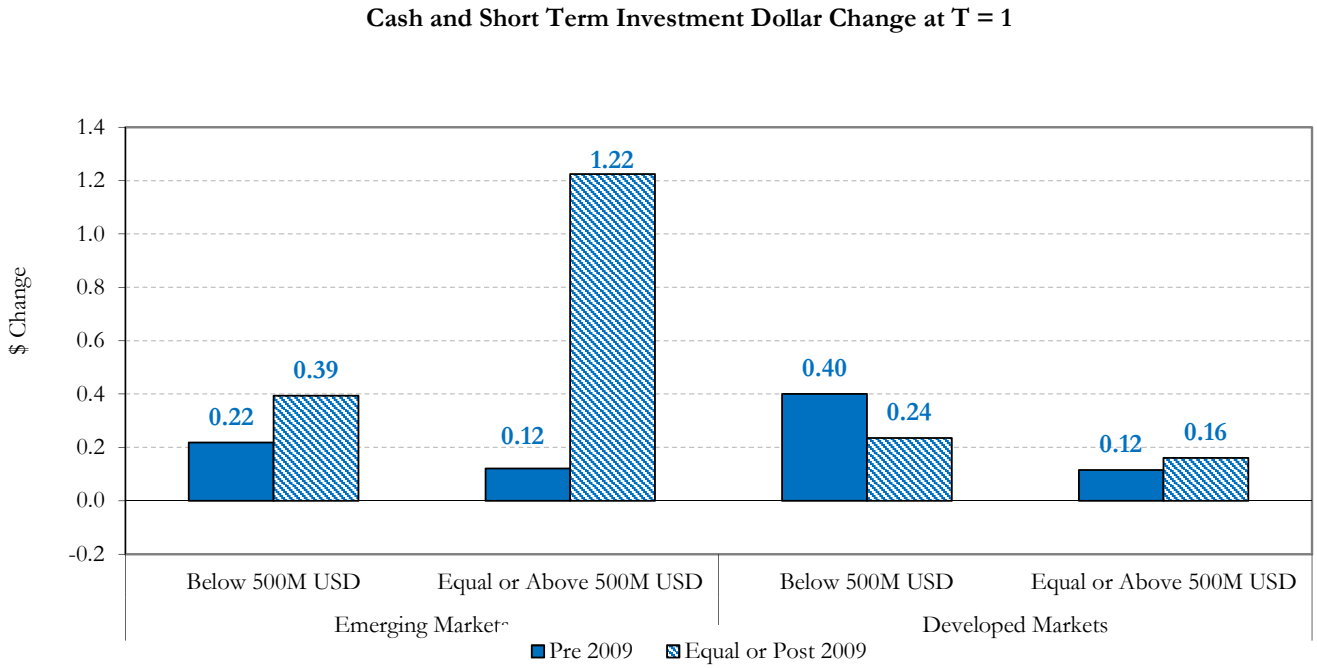


Figure 8
The Use of Cash and ST Investments, Controlling fot Log Assets

This figure plots the dollar-change coefficients of cash and short term investments, of the firm-level panel OLS regressions for the use-of-funds analysis for bond issuers, during the 2000-16 period. The analysis follows the specification of Kim and Weisbach (2008). The dependent variable for year t is Y = log[(Vt - V0)/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. Total assets are measured at the value of the year just before the issuance. Dollar changes capture the change in the dependent variable resulting from a one-million-dollar increase in a firm's bond issuance. All variables are winsorized at the 1% level. All regressions include country and year fixed effects. Standard errors are clustered at the industry (two-digit SIC) level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.



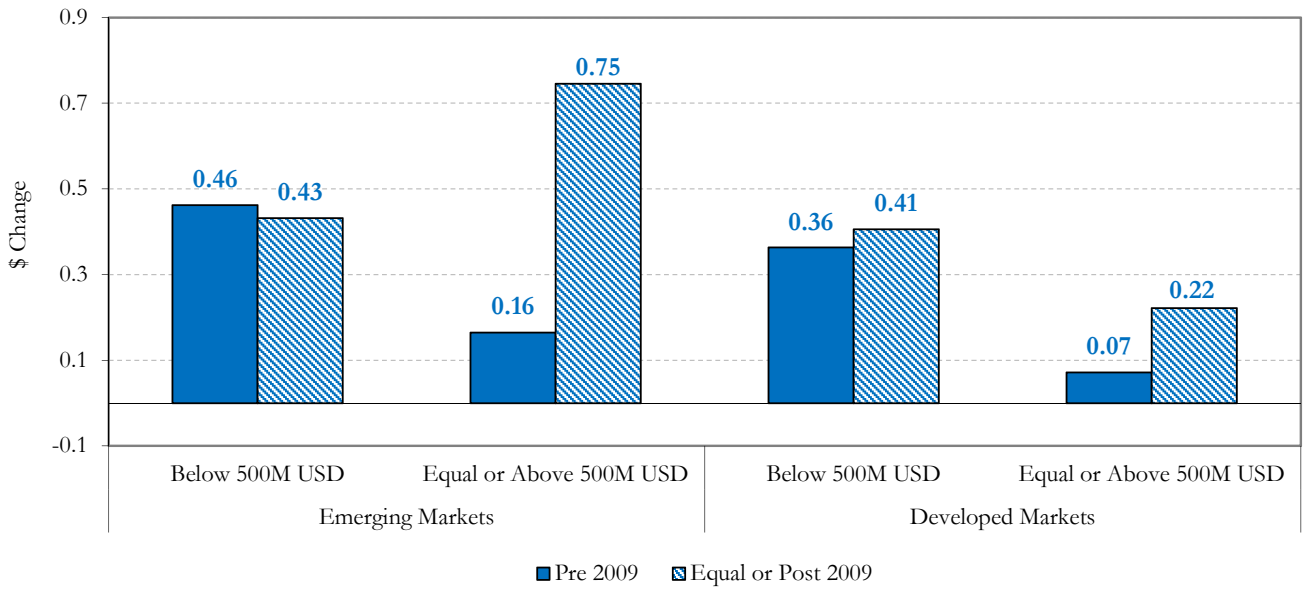
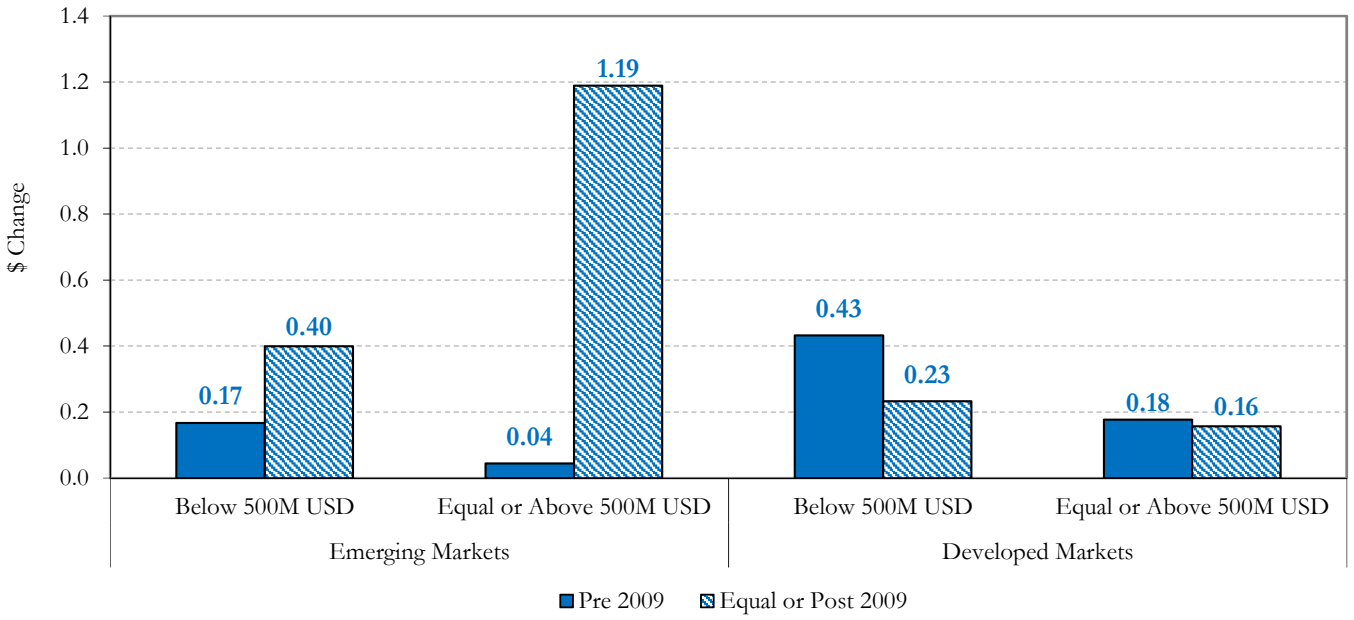


Figure 9
The Use of Cash and ST Investments, Controlling for Log Assets, Growth of Sales and the Standard Deviation of the Growth of Sales

This figure plots the dollar-change coefficients of cash and short term investments, of the firm-level panel OLS regressions for the use-of-funds analysis for bond issuers, during the 2000-16 period. The analysis follows the specification of Kim and Weisbach (2008). The dependent variable for year t is Y = log[((Vt - V0)/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, the contemporaneous growth rate of sales and the standard deviation of the growth of sales. Total assets are measured at the value of the year just before the issuance. Dollar changes capture the change in the dependent variable resulting from a one-million-dollar increase in a firm's bond issuance. All variables are winsorized at the 1% level. All regressions include country and year fixed effects. Standard errors are clustered at the industry (two-digit SIC) level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Cash and Short Term Investment Dollar Change at T = 1



Panel B. Cash and Short Term Investment Dollar Change at T = 2

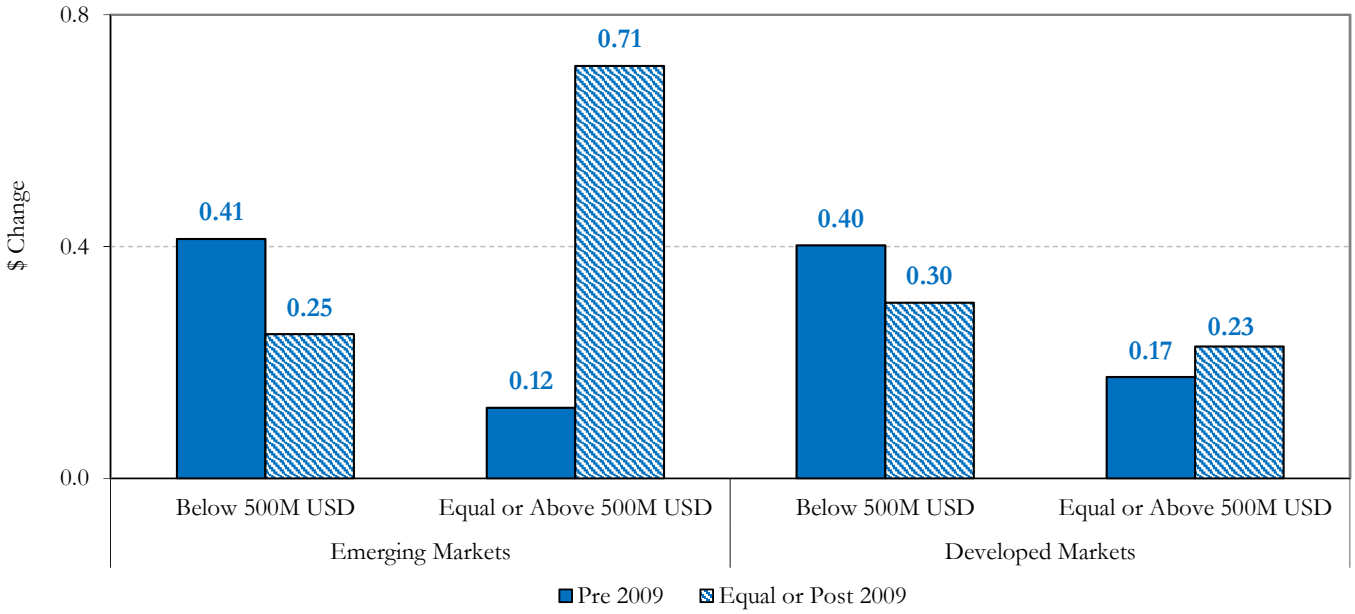


Figure 10
The Use of Cash and ST Investments, Dividing into High and Low Asset EM Firms

This figure plots the dollar-change coefficients of cash and short term investments, of the firm-level panel OLS regressions for the use-of-funds analysis for emerging market bond issuers, separately for firms with high and low assets, during the 2009-16 period. A firm is classified as a high asset firm if their average asset value for the period 2009-16 is equal or higher than the country median value. The analysis follows the specification of Kim and Weisbach (2008). The dependent variable for year t is Y = log[(Vt - V0)/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. Total assets are measured at the value of the year just before the issuance. Dollar changes capture the change in the dependent variable resulting from a one-million-dollar increase in a firm's bond issuance. All variables are winsorized at the 1% level. All regressions include country and year fixed effects. Standard errors are clustered at the industry (two-digit SIC) level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

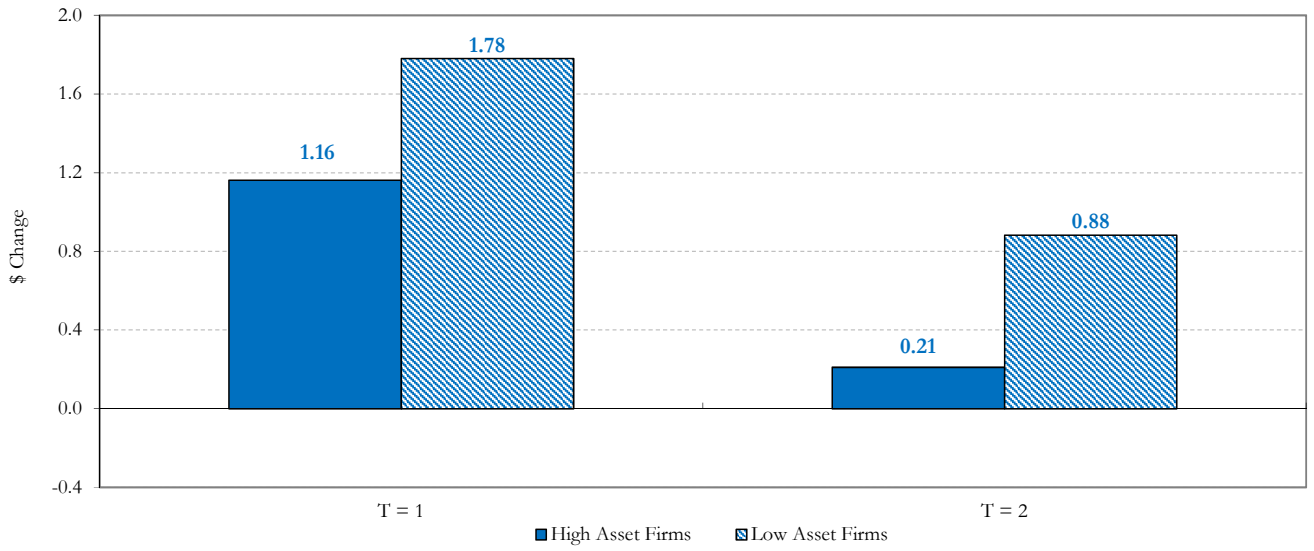


Table 1
Percentages of Bonds Issued by Size

This table reports the percentage of bonds issued of different sizes by firms in emerging markets, during the 2000-08 and 20009-16 periods. Column (1) computes the percentage of the total value of bonds issued in each size category from the total number of bonds issuances of all sizes. Column (2) computes the percentage of the total number of bonds issued in each size category from the total value of bonds issued of all sizes.

	(1) Total Value of Bonds		(2) Total Number of Bonds	
	Pre 2009	Post 2009	Pre 2009	Post 2009
Below 300 Premium	42.9%	16.6%	75.4%	47.5%
300-500 Premium	24.0%	21.7%	13.4%	19.7%
Above 500 Premium	33.2%	61.6%	11.2%	32.8%

Table 2
Mean Issuance and YTM of [400:500) and [500:600) U.S. dollar bonds

This table reports the difference in mean test for the percentage of issuing bonds (Panel A) and the yield to maturity (Panel B) of [400:500) and [500:600) million USD bonds issued, between the 2000-08 and 2009-16 periods, for firms in emerging and developed markets. Columns (1)-(3) show the mean tests and difference, pre and post 2009, for the [400:500) million USD bonds for each group of countries. Columns (4)-(6) show the mean tests and difference, pre and post 2009, for the [500:600) million USD bonds for each group of countries. Column (7) shows the difference-in-differences effects between columns (3) and (6) for each group of countries. Column (8) reports the triple difference between emerging and developed markets.

Panel A. Issuance

	[400,500)			**[500,600)**			**Diff-in-Diff**	**Triple Diff**
	Pre 2009	Post 2009	Diff	Pre 2009	Post 2009	Diff		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Emerging Markets	0.040	0.062	0.022 ***	0.061	0.184	0.124 ***	0.102 ***	0.083 ***
	(0.004)	(0.005)	(0.006)	(0.005)	(0.008)	(0.010)	(0.012)	
Developed Markets	0.049	0.069	0.020 ***	0.076	0.116	0.039 ***	0.019 ***	(0.013)
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	

Panel B. Yield to Maturity

	[400,500)			**[500,600)**			**Diff-in-Diff**	**Triple Diff**
	Pre 2009	Post 2009	Diff	Pre 2009	Post 2009	Diff		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Emerging Markets	7.231	6.032	-1.198 ***	7.071	4.899	-2.171 ***	-0.973 ***	-0.315
	(0.250)	(0.181)	(0.311)	(0.192)	(0.083)	(0.201)	(0.346)	
Developed Markets	6.270	6.104	-0.166	5.729	4.904	-0.824 ***	-0.657 ***	-0.344
	(0.101)	(0.071)	(0.147)	(0.075)	(0.066)	(0.115)	(0.183)	

Table 3
Probability of issuance in each size bucket

This table reports the difference-in-difference estimation of the change in the probability of issuing a bond of a certain size interval before and after 2009 for emerging market firms, relative to the same change for advanced economy firms, during the 2000-16 period. The analysis is restricted to positive issuance observations. Panel A reports the regression for the bond issuance dummy of each size bucket on the the interaction term between post 2009 with the emerging market dummy. Panel B reports the same regression including bond-firm controls. Bond firm controls are maturity fixed effects, credit ratings fixed effects, a fixed or flexible rate dummy, and a dummy indicating whether the bond was issued privately or publicly. All regressions include country, industry and year fixed effects. Standard errors are clustered at the country and year levels. All variables are winsorized at 1% level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Dependent Variable: Dummy=1 if Issuance=[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 2009	-0.062	-0.078 **	-0.010	0.032	0.009	0.086 ***	-0.002	0.018	0.006
	(0.06)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.31	0.17	0.14	0.10	0.06	0.10	0.04	0.05	0.02
N. of Countries	68	68	68	68	68	68	68	68	68
Observations	23,274	23,274	23,274	23,274	23,274	23,274	23,274	23,274	23,274
R^2	0.20	0.06	0.03	0.03	0.03	0.04	0.03	0.03	0.02

Panel B. Dependent Variable: Dummy=1 if Issuance=[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 2009	-0.003 *	-0.084 **	-0.029	0.016	-0.025	0.092 ***	0.011	0.032 *	-0.011
	(0.04)	(0.04)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)	(0.01)
Bond Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Probability	0.31	0.17	0.14	0.10	0.06	0.10	0.04	0.05	0.02
N. of Countries	68	68	68	68	68	68	68	68	68
Observations	19,704	19,704	19,704	19,704	19,704	19,704	19,704	19,704	19,704
R^2	0.56	0.35	0.35	0.37	0.39	0.36	0.38	0.34	0.41

Table 4
Yield to Maturity in each size bucket

This table reports the difference-in-difference estimation of the change in the yield to maturity of bonds of a certain size interval before and after 2009 for emerging market firms, relative to the same change for advanced economy firms, during the 2000-16 period. The analysis is restricted to positive issuance observations. Panel A reports the regression for the bond yield to maturity of each size bucket on the the interaction term between post 2009 with the emerging market dummy. Panel B reports the same regression including bond-firm controls. Bond firm controls are maturity fixed effects, credit ratings fixed effects, a fixed or flexible rate dummy, and a dummy indicating whether the bond was issued privately or publicly. All regressions include country, industry and year fixed effects. Standard errors are clustered at the country and year levels. All variables are winsorized at 1% level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Dependent Variable: Yield to Maturity if Issuance=[X,Y)

	Yield to Maturity of an Issuance 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 2009	0.127	-0.210	-0.145	-1.105 **	-0.922 **	-0.716 **	-0.037	-0.450	3.818 **
	(0.58)	(0.56)	(0.40)	(0.46)	(0.44)	(0.32)	(0.53)	(0.52)	(1.61)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean YTM	4.98	5.87	6.41	6.11	6.20	5.18	5.63	5.11	5.66
N. of Countries	54	53	50	50	43	46	35	35	28
Observations	3,540	2,273	2,045	1,678	1,011	1,658	663	908	344
R^2	0.58	0.55	0.45	0.35	0.33	0.37	0.38	0.43	0.51

Panel B. Dependent Variable: Yield to Maturity if Issuance=[X,Y)

	Yield to Maturity of an Issuance 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 2009	0.716	0.895	0.148	-0.418 *	-0.026	-0.630 **	-2.303	0.254	0.000
	(0.52)	(0.58)	(0.79)	(0.39)	(0.33)	(0.30)	(0.24)	(0.38)	(.)
Bond Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean YTM	4.59	5.11	5.71	5.57	6.67	4.76	5.29	4.73	5.39
N. of Countries	48	45	37	40	30	39	22	27	18
Observations	2,779	1,401	1,105	811	427	961	298	526	150
R^2	0.90	0.94	0.92	0.92	0.97	0.91	0.96	0.92	0.94

Table 5
YTM specification to compare adjacent bucket size

This table reports the difference-in-difference estimation of the change in the yield to maturity of bonds of a certain size interval after 2009 relative to the change in time across adjacent bins, for emerging and developed markets during the 2000-16 period. The analysis is restricted to positive issuance observations. The table reports regressions for the bond yield to maturity of each size bucket on the dummy for a bond of a certain size interval and on the the interaction term with the Post 2009 dummy, equal to 1 for the 2009-16 period. All regressions include fixed effects for each bin size. All variables are winsorized at 1% level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Yield to Maturity Curve	
	Emerging Markets	Developed Markets
(0,100)	6.117 ***	5.428 ***
	(0.40)	(0.19)
[100,200)	7.699 ***	5.239 ***
	(0.36)	(0.17)
[200,300)	7.778 ***	5.683 ***
	(0.34)	(0.18)
[300,400)	7.167 ***	5.898 ***
	(0.47)	(0.09)
[400,500)	7.231 ***	6.271 ***
	(0.51)	(0.16)
[500,600)	7.071 ***	5.729 ***
	(0.33)	(0.11)
[600,700)	6.227 ***	6.423 ***
	(0.50)	(0.28)
[700,800)	6.339 ***	6.451 ***
	(0.33)	(0.16)
[800,900)	6.290 ***	6.759 ***
	(0.61)	(0.37)
[000,1000)	5.250 ***	7.673 ***
	(1.38)	(0.43)
(0,100)*Post 2009	-1.818 ***	-1.021
	(0.66)	(1.14)
[100,200)*Post 2009	-1.625 ***	0.543
	(0.54)	(0.81)
[200,300)*Post 2009	-0.467 **	0.756
	(0.20)	(0.64)
[300,400)*Post 2009	-1.385 ***	0.269
	(0.26)	(0.41)
[400,500)*Post 2009	-1.198 ***	-0.166
	(0.44)	(0.39)
[500,600)*Post 2009	-2.171 ***	-0.824 **
	(0.17)	(0.33)
[600,700)*Post 2009	-1.159 **	-0.939 ***
	(0.51)	(0.17)
[700,800)*Post 2009	-1.572 ***	-1.665 ***
	(0.30)	(0.21)
[800,900)*Post 2009	-1.294 **	-1.319 ***
	(0.51)	(0.23)
[000,1000)*Post 2009	-0.789	-1.969 ***
	(1.49)	(0.54)
DiD [300,400)-[200,300)	-0.918	-0.487
P-Value	0.001	0.109
DiD [500,600)-[400,500)	-0.973	-0.658
P-Value	0.013	0.001
P-Value Joint	0.013	0.001
N. of Countries	44	24
Observations	3157	11233
R^2	0.88	0.86

Table 6
Probability of Issuing Any Bonds

This table reports the probability of issuing bonds by firms in emerging and developed markets, during the 2000-16 period, using probit and logit regressions. The data used is aggregated at the firm-subperiod level, where the subperiods correspond to the 2000-08 and 2009-16 period. Firms are restricted to issuers who issued bonds at least once durng 2000-16. The dependent variable is a dummy equal to 1 if the firm issued any bond in any year during the sub-period, and zero otherwise. Assets are taken as the mean value per firm per sub-period. Pre 2009 is a dummy variable equal to 1 for the 2000-08 period. Post 2009 is a dummy variable equal to 1 for the 2009-16 period. Large is a dummy variable equal to 1 if the mean assets of the firm (over both sub-periods) is more than or equal to the median of the assets of all firms in the same country.

Panel A. Direct Output Results: Log(Odds Ratio)

	Probit Regressions				Logit Regressions			
	Emerging Markets		Developed Markets		Emerging Markets		Developed Markets	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pre 2009	0.137	0.272 ***	-1.252 ***	-0.38 ***	0.209	0.435 ***	-2.086 ***	-0.61 ***
	(0.16)	(0.06)	(0.09)	(0.04)	(0.26)	(0.10)	(0.16)	(0.07)
Post 2009	-1.05 ***	-0.05	1.183 ***	0.583 ***	-1.784 ***	-0.08	1.973 ***	0.945 ***
	(0.17)	(0.06)	(0.10)	(0.04)	(0.30)	(0.10)	(0.18)	(0.07)
Log(Assets)*Pre 2009	0.046 **		0.165 ***		0.076 **		0.274 ***	
	(0.02)		(0.01)		(0.03)		(0.02)	
Log(Assets)*Post 2009	0.151 ***		-0.049 ***		0.254 ***		-0.084 ***	
	(0.02)		(0.01)		(0.04)		(0.02)	
Large*Pre 2009		0.172 **		0.482 ***		0.28 **		0.774 ***
		(0.09)		(0.06)		(0.14)		(0.09)
Large*Post 2009		0.318 ***		-0.017		0.51 ***		-0.028
		(0.08)		(0.06)		(0.13)		(0.10)
Observations	1,712	1,824	3,603	4,102	1,712	1,824	3,603	4,102

Table 7
Probability of Issuing ≥500 Bonds

This table reports the probability of issuing bonds, of a size ≥500 million USD, by firms in emerging and developed markets, during the 2000-16 period, using probit and logit regressions. The data used is aggregated at the firm-subperiod level, where the subperiods correspond to the 2000-08 and 2009-16 period. Firms are restricted to issuers who issued bonds at least once durng 2000-16. The dependent variable is a dummy equal to 1 if the firm issued ≥500 bond in any year during the sub-period, and zero otherwise. Assets are taken as the mean value per firm per sub-period. Pre 2009 is a dummy variable equal to 1 for the 2000-08 period. Post 2009 is a dummy variable equal to 1 for the 2009-16 period. Large is a dummy variable equal to 1 if the mean assets of the firm (over both sub-periods) is more than or equal to the median of the assets of all firms in the same country.

Panel A. Direct Output Results: Log(Odds Ratio)

	Probit Regressions				Logit Regressions			
	Emerging Markets		Developed Markets		Emerging Markets		Developed Markets	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pre 2009	-4.725 ***	-0.862 ***	-3.063 ***	-0.682 ***	-8.071 ***	-1.421 ***	-5.113 ***	-1.111 ***
	(0.73)	(0.14)	(0.27)	(0.07)	(1.35)	(0.24)	(0.49)	(0.13)
Post 2009	2.252 ***	1.085 ***	1.577 ***	0.863 ***	3.958 ***	1.825 ***	2.673 ***	1.424 ***
	(0.76)	(0.15)	(0.29)	(0.08)	(1.39)	(0.28)	(0.52)	(0.14)
Log(Assets)*Pre 2009	0.461 ***		0.311 ***		0.79 ***		0.521 ***	
	(0.08)		(0.03)		(0.14)		(0.05)	
Log(Assets)*Post 2009	-0.128 *		-0.08 ***		-0.234 *		-0.14 ***	
	(0.08)		(0.03)		(0.14)		(0.05)	
Large*Pre 2009		0.584 ***		0.744 ***		0.977 ***		1.211 ***
		(0.18)		(0.10)		(0.30)		(0.17)
Large*Post 2009		-0.255		-0.29 ***		-0.458		-0.495 ***
		(0.20)		(0.11)		(0.35)		(0.18)
Observations	447	472	1,200	1,348	447	472	1,200	1,348

Appendix Table 1
List of Countries

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

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

Appendix Table 2
Unconditional Probabilities of Issuing a Bond in Certain Bucket Size

This table reports the difference-in-difference estimation of the change in the probability of issuing a bond of a certain size interval before and after 2009 for emerging market firms, relative to the same change for advanced economy firms, during the 2000-16 period. The analysis is restricted to positive and zero issuance observations. Columns (1)-(9) report the regression for the bond issuance dummy of each size bucket on the the interaction term between post 2009 with the emerging market dummy. All regressions include country, industry and year fixed effects. All variables are winsorized at 1% level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Unconditional 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 2009	-0.055	-0.074 **	-0.011	0.027	0.008	0.081 ***	-0.002	0.018 **	0.006
	(0.04)	(0.03)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N. of Countries	68	68	68	68	68	68	68	68	68
Observations	25855	25855	25855	25855	25855	25855	25855	25855	25855
R^2	0.14	0.06	0.03	0.03	0.02	0.03	0.02	0.02	0.02

Appendix Table 3
Frequency of Bond Issuances

This table reports the mean number of and duration between issuances for bonds of different sizes, by firms in emerging and developed markets, during the 2000-16 period. The analysis is restricting to firms that issued the relevant type of bond at least once during the sample period. Panel A computes 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, (3) the mean firm is computed. Panel B reports the duration it takes an average firm to issue bond. The values are computed as 1/the respective values in Panel A.

Panel A. Number Issuances Per Year		
	Emerging Markets	Developed Markets
All Bonds	0.15	0.25
Below 300 Premium	0.13	0.23
300-500 Premium	0.09	0.11
Above 500 Premium	0.11	0.15
Panel B. Years Between Issuances		
	Emerging Markets	Developed Markets
All Bonds	6.60	4.06
Below 300 Premium	7.84	4.36
300-500 Premium	11.67	9.24
Above 500 Premium	8.85	6.90