

# Corporate bond use in Asia and the United States

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## Abstract

We examine the determinants of Asian firms' decisions to participate in the corporate bond market and the determinants of the magnitude of bond debt for firms that do issue bonds. We compare the behaviour of Asian firms with US firms and investigate what drives differences in their financing decisions. We also analyse how firms alter their mix of bank and bond debt as their demand for cash varies. Our results show that firm characteristics account for only a very small portion of the difference in corporate bond use between Asian and US firms. Asian firms are simply less likely to issue bonds than US firms. The wedge in bond use between US and Asian firms is primarily driven by the likelihood that a firm issues bonds, rather than the magnitude of bond debt conditional on issuance. These results point to weak infrastructure, ie markets and institutions, as an important factor behind much of the lower use of bond financing in Asia. However, while policies aimed at facilitating the use of bond debt by Asian firms may result in increased bond issuance, it may not necessarily give firms more flexibility in meeting their financing needs. Even firms with a substantial presence in the corporate bond market primarily adjust their bank debt rather than their bond debt as demand for cash varies.

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## 1. Introduction

We study the financing of firms in Asia through corporate bonds and compare their financing decisions with those of firms in the United States. This is an important issue from a public policy perspective, since a robust corporate bond market has the potential to help dampen macroeconomic fluctuations by providing an alternative source of funds in case bank financing dries up.

Following the 1997–98 Asian financial crisis, policymakers in the region encouraged the development of local bond markets. The primary goal was to increase the issuance of local currency bonds relative to foreign currency bonds, in an effort to better insulate domestic economies from the effects of large exchange rate swings. Thus, much of the emphasis and resulting growth was concentrated in the government bond sector. But efforts were also made to improve conditions for corporate bond issuance in Asia. Partly as a result of these efforts, the total value of local currency corporate bonds across all nine Asian countries we study increased from US\$36.5 billion in 1995 to US\$3,795 billion in 2015, or as a percentage of GDP from 1.6% to 23.3% of combined GDP.

Nevertheless, on average, firms in Asia rely much more on banks for their financing needs than on bonds. For the nine Asian economies we study, less than a quarter of publicly traded non-financial firms in the region had corporate bonds outstanding, whereas most such firms in the United States had corporate bond liabilities. A key question is therefore why Asian firms' use of corporate bonds is so low.

One possibility is that the bond infrastructure is weak in Asian economies. In other words, the institutions needed to support a robust corporate bond market are weak. This includes information disclosure rules, accounting standards, corporate governance, bankruptcy rules and secondary market trading mechanisms. A weak financial infrastructure is problematic from a policy perspective because it limits the options for firms to find alternative funding sources outside the banking system in times of stress. Adverse shocks to the banking sector could therefore lead to greater financial distress in the corporate sector, magnifying the adverse effects on the economy as a whole.

However, weak bond infrastructure may not be the only, or even the main, driver behind the low use of corporate bonds among Asian firms. It is instead possible that intrinsic properties of Asian firms could result in them relying less on bond financing. For example, firms in Asia tend, on average, to be smaller than in the United States, and smaller firms are more likely to finance themselves via banks rather than bonds because informational asymmetries are greater for small firms than large ones.

In addition, it is not clear how beneficial the development of corporate bond markets is from an economic stability point of view. For example, financially strong firms may treat bank and bond financing as substitutes, but firms in financial distress may rely on banks for quick cash even if they have access to the bond market.

We investigate both aspects of the infrastructure problem; the role that infrastructure plays in the low use of corporate bonds in Asia, and the potential importance of bond market development for financial and economic stability.

To get at the first aspect, we study the variation in capital structure among US and Asian corporations using firm-specific variables. This follows the spirit of Rajan and Zingales (1995), although they study total debt while we focus on bond leverage. The use of firm-specific data allows us to address three questions. First, what determines the probability that a firm uses bonds to finance itself? Second, what determines the magnitude of bond financing once firms have decided to use bonds? Third, to what extent do firm-specific variables explain differences in bond leverage between Asian and US firms?

To get at the second aspect – the role of bond market development for financial and economic stability – we analyse how firms change their levels of bond and bank debt as the demand for financing changes. This follows the spirit of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003), who study changes in firm's total debt as financing demand varies.

A number of key results emerge from our empirical analysis. First, the large difference in bond use between the United States and Asia is mainly due to the likelihood that a firm has issued bonds in the first place, rather than the magnitude of bond debt it has issued. The difference is therefore primarily driven by the extensive margin rather than the intensive margin. Second, small firms account for much of the difference between the bond use in the United States and bond use in Asia, with around half of US firms having bond debt compared with less than 10% of Asian ones. Third, firm characteristics other than size account for little of the difference between average bond leverage of US and Asian firms. This suggests that weak infrastructure in Asian economies is largely behind the difference in bond leverage. Finally, we find that both US and Asian firms with substantial bond leverage tend to rely mainly on banks rather than the bond market for marginal financing to offset variations in cash from operations. In addition, Asian firms with a substantial presence in the bond market tend to use bank debt as marginal financing of investment. This suggests that banks play a special role in the financing of firms, and that the potential for the corporate bond market to play a stabilising role in Asia may be limited even if the market expands.

## 2. Data

Our analysis requires international firm-level data on both bank and bond debt obligations as well as information on other firm-specific characteristics. The S&P Capital IQ Premium Financials (Capital IQ) database contains all of this relevant information.

The Capital IQ data is gathered from financial statements (income, balance and cash flows) that firms file with regulators. Our sample consists of data for firms in China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand, as well as the United States. Although accounting standards differ among countries, Capital IQ reports data on a harmonised basis, making it possible to compare the data. The data is reported on a consolidated basis, allowing us to capture bond issuance by both parent firms and subsidiaries. All reported amounts are converted to US dollars, and we use the US Consumer Price Index to convert the current dollars to end-2017 dollars. As is typical in the literature, we focus on non-financial firms, given that financial and non-financial firms differ qualitatively in how they use debt.

Finally, we include only data for firms that have publicly traded equity. This allows us to avoid a sampling bias whereby firms enter the data set because they have decided to issue bonds and therefore become subject to regulatory filing. All firms with publicly traded equity will appear in Capital IQ, regardless of their use of bond financing, and hence their presence in the dataset does not convey information about any future bond issuance. Including non-public firms, in contrast, would effectively oversample privately held firms that issue corporate bonds (the so-called backfilling problem).

While Capital IQ includes data for most countries from the early 1990s, we include data only as of 2003. The reason is that the data gathered by Capital IQ did not, with very few exceptions, distinguish between different types of debt before 2000. The coverage of bank and bond debt increased substantially through 2003, when it appears to have reached stable levels.

Table 1 reports summary information about bond and bank leverage for the firm years in our data.<sup>2</sup> On average, Asian firms' total leverage (the sum of bond and bank leverage) is similar to the total leverage for US firms. The average book leverage for Asian firms is 0.25, whereas the corresponding figure for US firms is slightly higher at 0.28. The mean leverage based on market assets is slightly higher for Asian firms (0.23) than for US firms (0.19). Although the average total leverage is similar in Asia and the United States, Asian firms make much greater use of bank debt than bond debt. The average bank leverage for Asian firm years is 0.22, measured using book assets, and 0.19 using market assets, while for US firm years the corresponding values are 0.15 and 0.10 respectively. US firms have roughly as much bond debt as bank debt, while the typical firm in Asia uses no bond debt at all. The median bond leverage is zero for all Asian economies in our sample, while the mean values (using book assets) range from 0.01 to 0.06.

Summary statistics for leverage ratios										Table 1
	Number of obs	Leverage using book equity				Leverage using market equity				
		Bond		Bank		Bond		Bank		
		Mean	Median	Mean	Median	Mean	Median	Mean	Median	
China	19803	0.02	0.00	0.22	0.20	0.01	0.00	0.14	0.10	
Hong Kong SAR	6258	0.03	0.00	0.16	0.13	0.03	0.00	0.18	0.13	
India	23797	0.01	0.00	0.26	0.24	0.01	0.00	0.28	0.25	
Indonesia	1870	0.04	0.00	0.26	0.23	0.03	0.00	0.24	0.19	
Malaysia	8074	0.02	0.00	0.20	0.17	0.02	0.00	0.22	0.18	
Philippines	1003	0.03	0.00	0.17	0.14	0.02	0.00	0.15	0.11	
Singapore	3441	0.01	0.00	0.20	0.17	0.01	0.00	0.20	0.16	
South Korea	10348	0.06	0.00	0.18	0.15	0.05	0.00	0.19	0.14	
Thailand	4458	0.04	0.00	0.22	0.19	0.04	0.00	0.20	0.15	
All Asia	79052	0.03	0.00	0.22	0.19	0.02	0.00	0.21	0.16	
United States	29102	0.13	0.04	0.15	0.08	0.09	0.02	0.10	0.05	

The table reports means and medians for bond and bank leverage of non-financial firms with publicly traded equity. The observations are firm years, where fiscal years range from 2003 to 2016. Bond leverage is total bond debt to assets. Bank leverage is total bank debt to assets. Assets are either book value of assets or market value of assets, measured as book liabilities plus the market value of equity.

<sup>2</sup> Firm year data are included in our data set only if book assets exceed zero and all of the firm's leverage ratios (total, bond and bank) are between zero and one.

### 3. Variation in bond financing

We take a reduced form approach in trying to understand what explains the differences among countries in terms of firms' use of corporate bonds. We follow the spirit of the analysis in Rajan and Zingales (1995) and Lemmon, Roberts and Zender (2008) in assuming that leverage (in our case bond leverage) for a firm in a given year is a linear function of observable firm-specific characteristics and a residual.

We want to understand why the typical bond leverage ratio for an Asian firm differs from the typical ratio for a US firm, ie drivers of the population difference between bond leverage in Asia and in the United States. This difference in bond leverage is determined by differences in probability distributions of the firm-specific characteristics or fundamentals, differences in mappings from those fundamentals to the firm's choice of bond leverage, and regional differences that do not show up in firm fundamentals.

We can write the total difference in bond leverage between the United States and Asia, call it  $Z$ , as the sum of three terms:  $Z_1$  – the difference across regions in the probability of having issued bond debt, conditional on firms' characteristics;  $Z_2$  – the cross-region difference in the magnitude of bond leverage of firms in the bond market, given their firm characteristics; and  $Z_3$  – the difference in bond leverage created by the cross-region difference in the distribution of firm characteristics.<sup>3</sup>

In implementing this decomposition, we consider the distribution of US firm characteristics as the benchmark. As a result, we can think of  $Z_1$  and  $Z_2$  as the combined effect on a firm's choice of bond leverage if we were to take a random firm out of Asia and put it in the United States. This part can therefore be attributable to infrastructure: features of markets and institutions that facilitate or impede the use of corporate bonds. The third term,  $Z_3$ , captures the wedge in bond leverage created by the difference between the fundamental properties of firms.

In order to obtain estimates of the components  $Z_1$ ,  $Z_2$  and  $Z_3$  we assume that the conditional probability that a firm's bond leverage exceeds zero is linear in the firm's characteristics (denoted  $s$ ). We estimate the parameters of this relationship by defining a dummy variable  $I_{i,t}$  for firm  $i$ , which takes a value of one if the firm's bond leverage exceeds zero at  $t$ , and regressing it on the characteristics  $s$  of that firm:

$$I_{i,t} = b_0 + b_1 s_{i,t} + e_{i,t}.$$

This regression is run separately for US and Asian firms. Similarly, we estimate the firm's bond leverage (the ratio of corporate bonds outstanding to its market assets),  $x_{i,t}$  as a linear function of firm characteristics:

$$x_{i,t} = c_0 + c_1 s_{i,t} + e_{i,t}.$$

Again, this regression is estimated separately for US and Asian firms. Differences in the estimated parameters  $b_0$ ,  $b_1$ ,  $c_0$ , and  $c_1$  between Asia and the United States, along with differences in the distribution of  $s$ , will allow us to identify the components  $Z_1$ ,  $Z_2$  and  $Z_3$  discussed above.

A key question is which firm characteristics to include in the vector of fundamental economic determinants of bond leverage. We follow Lemmon, Roberts and Zender (2008) and include a measure of firm size (book assets), market-to-book

<sup>3</sup> See the full version of the paper for details on the derivation of this decomposition.

assets, profitability, and tangibility (measured by the ratio of net property plant and equipment (PPE) to book assets)). Firm size proxies for the magnitude of asymmetric information about a firm's future cash flows. The informational sensitivity of a firm's debt is proxied by tangibility. Market to book and profitability proxy for the economic health of the firm.<sup>4</sup>

In preliminary regressions we checked whether the relation between our size variable – book assets – and the probability of non-zero bond leverage is accurately described by a linear function. We find substantial evidence that the relation is non-monotonic, and we therefore proceed to use dummy variables to define five size buckets that we use as our size variable. These quintiles are defined on total book assets for the combined universe of US and Asian firm year observations.

Asian firms differ from their US counterparts along a number of dimensions. Asian firms are, on average, smaller than US firms: 66% of Asian firm years (75% of Asia ex China) are in the bottom three quintiles of size, while 43% of US firm years are in the bottom three quintiles. Asian firms have lower average ratios of market assets to book assets, while the mean net income for Asian firms is slightly larger than for US firms. Finally, the average ratio of tangible assets to market assets is higher for Asian firms than for US firms. Given that Asian and US firms systematically differ in firm characteristics, it is possible that part of the gap in the use of bond financing could be explained by aggregate differences in these characteristics.

Conditional probability that a firm's bond leverage exceeds zero

Table 2

	United States		Asia		Asia ex China	
Largest size	0.81*** (0.02)	0.68*** (0.02)	0.65*** (0.02)	0.58*** (0.02)	0.76*** (0.03)	0.70*** (0.03)
Size Q1	-0.36*** (0.03)	-0.30*** (0.03)	-0.60*** (0.02)	-0.59*** (0.02)	-0.69*** (0.02)	-0.67*** (0.02)
Size Q2	-0.43*** (0.04)	-0.38*** (0.03)	-0.50*** (0.02)	-0.48*** (0.02)	-0.57*** (0.03)	-0.56*** (0.03)
Size Q3	-0.48*** (0.03)	-0.42*** (0.03)	-0.47*** (0.02)	-0.45*** (0.02)	-0.49*** (0.03)	-0.49*** (0.03)
Size Q4	-0.34*** (0.03)	-0.32*** (0.03)	-0.36*** (0.03)	-0.35*** (0.02)	-0.34*** (0.03)	-0.33*** (0.03)
$(MA/BA)_{t-1}$	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
$(NI/MA)_{t-1}$	-0.17* (0.09)	-0.06 (0.09)	-0.43*** (0.07)	-0.32*** (0.06)	-0.50*** (0.07)	-0.42*** (0.07)
$(PPE/MA)_{t-1}$	0.23*** (0.05)	0.00 (0.05)	0.05** (0.02)	-0.06** (0.02)	-0.02 (0.02)	-0.09*** (0.02)
$(Debt/MA)_{t-1}$		0.81*** (0.06)		0.34*** (0.03)		0.25*** (0.03)
$R^2$	0.17	0.24	0.19	0.21	0.22	0.24

The table reports parameters of the equation specifying the conditional probability that a firm's bond leverage exceeds zero. This regresses a dummy variable equal to one if the firm's bond leverage exceeds zero at  $t$  on the explanatory variables listed in the table. Observations are firm years, from 2003 to 2016. Standard errors (in parentheses) are constructed as the mean of the standard errors obtained by running year-by-year regressions. Statistical significance at the 10th, 5th, and 1st percentiles is denoted with one, two, and three asterisks.

<sup>4</sup> In the full version of the paper, we also present results for an expanded set of firm-specific characteristics. In this "persistence version" of the model, we also include a lagged indicator variable for non-zero bond leverage, and the lagged bond leverage itself, treating these as firm characteristics.

The regression results are presented in Tables 2 and 3. We report results for US firms, for all Asian economies combined, as well as for a second group of Asian economies that excludes China. It is possible that financing of firms in China may differ in important ways from firm financing in other Asian economies, given the special features of the world's largest economy. We present results including and excluding total leverage as an explanatory variable.

Table 2 shows that size is the strongest determinant of whether a firm has issued corporate bonds: all size variables are highly significant. Among the largest firms, US firms are more likely to have issued corporate bonds (0.81) than Asian firms (0.65) or firms in Asia-ex China (0.76). Moreover, the relation between size and probability of non-zero bond debt is monotonically increasing in Asia, but U-shaped in the United States. As a result, while US firms in the smallest quintile have a probability of bond debt of around 0.45, the corresponding probability for Asian firms in the smallest quintile is below 0.1.

Focusing first on the specification excluding total leverage, Table 2 shows that profitability is inversely related to the probability of bond debt in both Asia and the United States. This is in line with the results in Harris and Raviv (1991), who show that total leverage is inversely related to profitability. While the asset tangibility of US firms is strongly positively related to the probability of bond debt, this relationship is much weaker in Asia. And the point estimate is negative for Asia ex China; a surprising result.

Conditional expectation of firms' bond leverage				Table 3		
	United States		Asia		Asia ex China	
Largest size	0.13*** (0.01)	0.06*** (0.01)	0.11*** (0.01)	0.07*** (0.01)	0.13*** (0.01)	0.08*** (0.01)
Size Q1	-0.06*** (0.01)	-0.04*** (0.01)	0.02 (0.02)	0.02 (0.02)	0.00 (0.02)	0.01 (0.02)
Size Q2	-0.08*** (0.01)	-0.07*** (0.01)	0.00 (0.01)	0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Size Q3	-0.08*** (0.01)	-0.07*** (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Size Q4	-0.03** (0.01)	-0.03*** (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
$(MA/BA)_{t-1}$	-0.00 (0.00)	0.00 (0.00)	-0.01*** (0.00)	-0.01 (0.00)	-0.01*** (0.00)	-0.00 (0.00)
$(NI/MA)_{t-1}$	-0.14*** (0.04)	-0.07** (0.04)	-0.09** (0.04)	-0.06 (0.04)	-0.10** (0.05)	-0.07 (0.05)
$(PPE/MA)_{t-1}$	0.15*** (0.02)	0.04** (0.02)	0.02 (0.01)	-0.02 (0.02)	0.01 (0.02)	-0.02 (0.02)
$(Debt/MA)_{t-1}$		0.40*** (0.03)		0.13*** (0.02)		0.12*** (0.02)
$R^2$	0.14	0.38	0.04	0.08	0.02	0.06

The table reports parameters of the equation specifying firm bond leverage (when greater than zero) on the explanatory variables listed in the table. Observations are firm years, from 2003 to 2016. Standard errors (in parentheses) are constructed as the mean of the standard errors obtained by running year-by-year regressions. Statistical significance at the 10th, 5th, and 1st percentiles is denoted with one, two and three asterisks.

Decomposition of difference in bond leverage between US and Asian firms

Table 4

	United States	Asia	Asia ex China
Expected bond leverage	0.105	0.038	0.046
Difference to US bond leverage		0.067	0.059
Component $Z_1$		0.035	0.023
Component $Z_2$		0.011	0.028
Component $Z_3$		0.022	0.007

The table reports the model-implied expected bond leverage (total outstanding bonds to market assets) and the decomposition of the difference in bond leverage between US and Asian firms into the three components described in the text. The first component,  $Z_1$ , measures the wedge in the probability of bond issuance in the United States and Asia given a set of firm characteristics  $s$ . The second term,  $Z_2$ , measures the wedge in the magnitude of leverage conditional on issuance. The third term,  $Z_3$ , captures the wedge in bond leverage created by the difference between the distribution of characteristics  $s$  in the United States and the distribution in Asia.

The literature has shown that size, profitability, and tangibility are all related to total firm leverage. To investigate whether total leverage also matters for firms' decision to financing themselves in the bond market, we include total debt to market assets as an explanatory variable. However, strictly speaking, total leverage is not a firm characteristic but an outcome of the interaction of firm characteristics and external financing environment. As expected, Table 2 shows that firms with higher total leverage are more likely to have bond debt. A one standard deviation increase in total leverage (around 0.2) raises the probability of bond debt by about 0.16 for US firms and by 0.07 and 0.05 for firms in Asia and Asia ex China, respectively.

Table 3 shows regression results for the conditional expectation of firms' bond leverage among firms that have issued corporate bonds. In the specification that excludes total leverage, we see that almost all of the variation in bond leverage among Asian firms is unexplained by firm characteristics. Only 4% of bond leverage variation among Asian firms and 2% for firms in Asia ex China is explained by firm-specific characteristics. Firm size does not matter for Asian firms. Market to book and profitability are significant, but their overall contribution is small. This is in contrast to US firms, where size, profitability, and tangibility are all important determinants for bond leverage.

When we add total leverage as an explanatory variable, market to book and profitability drops out as significant variables for Asian firms. In this specification, higher total leverage is associated with somewhat higher bond leverage among Asian firms with bond debt, while all other variation in bond leverage among these Asian firms is unexplained. By contrast, including total leverage for US firms does not change the statistical significance of the other firm characteristics.

Given these results, we can proceed to evaluate the components  $Z_1$ ,  $Z_2$  and  $Z_3$  that make up the total difference in bond leverage between US and Asian firms. Table 4 presents the results. The first row shows that there is a gap in bond leverage between US and Asian firms of around 6-7 percentage points to be explained: the estimated unconditional bond leverage for US firms is just above 0.10 while it is around 0.04-0.05 for Asian firms. The first component ( $Z_1$ ) explains roughly half of the difference. This term captures the difference in the probability that firms issue bonds in the United States and Asia, conditional on US firm characteristics. The second component ( $Z_2$ ), which measures the difference in bond leverage conditional on bond issuance, explains only around 1 percentage point of the difference when comparing US firms with firms in all of Asia. But if we exclude China, the contributions from the

two components are more evenly divided. The third component ( $Z_3$ ), finally, captures the difference in bond leverage due to discrepancies in the distribution of firm characteristics in Asia and the United States. This component explains just over 2 percentage points of the difference in bond leverage. However, this is largely driven by Chinese firms, and once we exclude these firms, this component plays essentially no role in explaining the wedge in bond leverage.

To sum up, the results from Table 4 suggest that firm-specific characteristics play a very limited role in explaining differences in corporate bond leverage across Asia and the United States. This suggests that infrastructure – institutions and markets – account for the bulk of the lower reliance on bonds among Asian firms, compared to their US counterparts. And Tables 2 and 3 show that this difference in bond use is primarily driven by the likelihood that firms issue bonds, rather than the magnitude of bond debt among firms that have issued bonds.

#### 4. The substitutability of bank and bond financing

Consider a firm that has considerable access to the bond market. Where would such a firm raise money – in the bond market or from banks – in the event that it experiences a cash crunch due to a revenue shortfall? Bond and bank financing differ in two important ways. First, bank financing provides greater flexibility than bond financing, in that it allows firms to renegotiate terms in times of financial distress. Second, bank debt, unlike bond debt, is tightly bundled with state-contingent control rights.

To specify regressions that can address this issue, we first start from an accounting identity, which states that the change in a firm's cash holdings equals cash from operations plus cash from investment plus cash from financing. Equivalently, cash from financing (change in debt and net equity issuance) equals change in cash minus cash from operations plus net investment. Now, instead of focusing on total debt, we disaggregate it into bank debt and bond debt, which, ignoring net equity issuance, will make up the dependent variables in two sets of regressions. The explanatory variables are then the change in cash, cash from operations, and two components of net investment: the change in PPE and in intangible assets. The change in PPE captures investment in physical assets and the change in intangible assets proxies for merger and acquisition activity. Finally, we scale all variables by the firm's market value of assets to not have the largest firms dominate the results.

In order to capture firms that have “considerable access to the bond market”, we include data only for firms with substantial bond debt – specifically, a ratio of bond debt to book assets of at least 0.13 in the previous year. Given this criterion, the mean firm year in the three regions we consider here – the United States, China and Asia ex China – all have bond leverage exceeding bank leverage.

Changes in debt explained by demand for cash

Table 5

Region	Debt type	Component of demand for cash				R <sup>2</sup>
		Change in cash	Negative cash from operations	Change in PPE	Change in intangible assets	
China	Bank	0.22** (0.10)	0.27*** (0.09)	0.43*** (0.07)	0.37*** (0.14)	0.27
	Bond	0.12** (0.05) [-0.95]	0.13** (0.06) [-1.29]	0.12** (0.05) [-3.58]	0.08 (0.15) [-1.42]	
Other Asia	Bank	0.14*** (0.04)	0.22*** (0.03)	0.33*** (0.02)	0.27*** (0.04)	0.19
	Bond	0.18*** (0.04) [0.66]	0.08*** (0.02) [-3.70]	0.14*** (0.02) [-6.22]	0.17*** (0.03) [-1.90]	
United States	Bank	0.05* (0.03)	0.16*** (0.02)	0.24*** (0.03)	0.22*** (0.02)	0.16
	Bond	0.20*** (0.03) [3.70]	0.06*** (0.02) [-3.85]	0.26*** (0.02) [0.56]	0.18*** (0.02) [-1.35]	

The table reports parameter estimates from panel regressions. The dependent variables are changes in either bank debt or bond debt, scaled by a firm's market value of assets. The explanatory variables are four sources of a firm's demand for cash. The term PPE refers to net property, plant, and equipment. Data for firm  $i$  in year  $t$  is included only if the firm has a (bond debt)/(book assets) ratio of at least 0.13 in year  $t-1$ . Heteroskedasticity-consistent standard errors are in parentheses. Statistical significance at the 10th, 5th, and 1st percentiles is denoted with one, two and three asterisks. Brackets contain an asymptotic t-test of the hypothesis that the coefficients are equal across the bank and bond debt regressions.

The results, as shown in Table 5, highlight three main results. First, these firms, which have a considerable presence in the corporate bond market, primarily rely on banks rather than the bond market to offset variations in cash from operations. The sensitivity of bank financing to cash from operations is more than twice the corresponding sensitivity for bond financing in all three regions. Second, while US firms use slightly more bond debt than bank debt to fund changes in long-term assets (PPE), Asian firms overwhelmingly rely on bank debt. Third, when firms simply want to increase their holdings of cash, they rely less on bank financing. US firms rely almost exclusively on bond financing, while Asian firms use bank and bond debt in roughly equal proportions (we cannot reject the hypothesis that they increase bank debt and bond debt evenly).

To sum up, bank debt is marginal financing for Asian firms that need to raise cash for operations or for acquiring long-term assets. Note that this result applies to firms with a considerable presence in the corporate bond market. While the conclusions for US firms are not as clear cut, they still rely heavily on bank financing when funding long-term assets. Hence, bank debt plays a disproportionately large role in marginal financing decisions for both US and Asian firms.

## 5. Conclusions

We ask why firms in Asia use less corporate bond debt than firms in the United States. From a policy perspective, this is an important issue because a robust corporate bond market has the potential to help dampen macroeconomic fluctuations by providing an alternative source of funds in case bank financing dries up.

Our analysis shows that firm characteristics are not important in explaining the difference in the use of bonds between Asian and US firms. Much of the gap in reliance on bond financing is due to a higher frequency in Asia of firms that have no corporate bonds at all. But even for those firms that issue corporate bonds, Asian firms have lower average bond leverage than US firms. Our results suggest that weak infrastructure – institutions and markets – account for the much of the lower use of bonds among Asian firms, relative to US firms.

However, Asian and US firms with substantial corporate bond leverage share an important property. They tend to rely mainly on banks rather than the bond market for marginal financing to offset variations in cash from operations. In addition, Asian firms with a substantial presence in the bond market tend to use bank debt as marginal financing of investment. This evidence suggests that bank financing is the marginal source of debt for firms, even when they apparently can turn to the bond market. Banks, therefore, seem to play a special role in the financing of firms, suggesting that the potential for the corporate bond market to play a stabilising role in Asia may be limited even if the infrastructure is strengthened and the market expands.

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