The capital structure of domestic and foreign denominated debt: Firm-level evidence from South Korea

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Abstract

This study uses a two-part model with firm-level fixed effects to examine the decisions of Korean firms to issue domestic and foreign denominated debt (extensive margin), and among those firms using external finance, their level of leverage (intensive margin) in each denomination. We find that less profitable and fast-growing firms adopt a pecking order in their leverage decisions, which is evident in their preference for domestic, relative to foreign denominated debt. Interestingly, this relation is shown to be stronger following the 2007 financial crisis and suggests demand side factors are important to leverage decisions. Our results also indicate the fixed costs of issuing debt are important to debt use along the extensive margin and vary in strength by denomination. The use of foreign debt, with its higher fixed costs, is shown to be largely determined by factors associated with these costs.

Key words: Capital structure; financial leverage; foreign debt; two-part fractional model

JEL Classification: G01; G20; G30

I. Introduction

Debt issuance by firms in developing markets has risen rapidly over the last two decades and has increased by nearly thirty times in the period 1991 – 2014 (Cortina et al., 2018). While greater access to debt provides firms in developing markets with the capital needed to finance growth opportunities, it also increases systemic risk because firms become more highly leveraged. The globalization of debt markets has also, in part, helped to fuel this growth by providing access to foreign denominated debt for firms. A significant number of firms, though, choose not to issue debt denominated in terms of either domestic or foreign currency. Allayannis et al. (2003) observe that 11% of firms from East Asia in their sample did not use domestic debt and 44% did not use foreign debt. This suggests a firm's choice of debt structure is influenced by separate decisions as to whether to issue debt, and if so, the amount of debt. The implication is that the factors that influence whether debt is used may differ from those that affect leverage. Factors, for example, that influence the fixed costs of issuing debt (e.g. legal, accounting and registration fees), would theoretically affect the decision to issue debt (i.e. the extensive margin), but would not affect the level of debt among firms already issuing debt (i.e. the intensive margin). Therefore, to understand the structure of firms' debt it is important to distinguish between the factors that influence the decision whether debt of a given type is used from those that influence the level of debt.

The main goal of this paper is to examine firms' debt structure along both the extensive and intensive margins by using a sample of 1,807 publicly listed firms on the Korea Stock Exchange for the years 2001-2016. Korea provides an interesting setting for our study of this two-part decision-making process as 12% of the firms in our sample choose not to use domestic debt, while the majority (66%) choose not to issue foreign debt. The setting is also interesting because it has been shown (Allayannis et al., 2003) that Korean firms tend to use more domestic

than foreign debt relative to other East Asian firms and are more highly leveraged. Thus, we look to identify whether there are unique factors that contribute to why Korean firms forgo the use of certain types of debt and their choice of leverage, along with how this relates to their overall capital structure.

The econometric model we use is a two-part fractional response model. The model allows us to jointly examine the decisions of firms to use debt and the level of their leverage when conditioning on their use of debt. Our model is similar to the model Ramalho and da Silva (2009) use to explain the total leverage decisions of a cross-section of Portuguese firms from 1999. We extend the model in an important way to control for firm-level fixed effects (Wooldridge, 2010) in our panel dataset. By including these firm-level fixed effects, we reduce the potential for bias in our estimates from omitted variables that are invariant over the time period examined for a given firm and have been shown to influence the use of debt (Berger and Udell, 1995; Carvahlo et al., 2015; Hanssens et al., 2016; Lemmon et al., 2008).

Our two-part modelling framework offers a distinct advantage over the typical Tobit regression model that Allayannis et al. (2003) use to determine the level of firms' domestic and foreign leverage for a cross-section of the 315 largest firms from eight East Asian countries. By using a Tobit model, Allayannis et al. (2003) assume observations with leverage values equal to 0 (i.e. firms that do not issue debt) are attributed to censoring in the data, which implies the factors that influence a firm's choice to forgo debt altogether are the same as those that influence the choices made by firms with leverage values near zero. This assumption does not hold as we find factors associated with the fixed cost of issuing debt (e.g. firm size and tangible assets) affect whether firms issue foreign debt, yet have no effect on leverage denominated in foreign currency. Another limitation of the Allayannis et al. (2003) model is their analysis of a cross-

section of firms for a single year, which implies they are unable to control for important firm-level fixed effects that affect firms' borrowing decisions.

Alternative modeling approaches exist that allow for factors to have different effects on the decisions to use debt and the level of debt. Bae et al. (2020), for example, use a multinomial logit model to estimate the probability of Korean firms' use of foreign debt relative to domestic debt. The dependent variable in Bae et al.'s (2020) analysis is a non-ordinal measure with three outcomes identified: firms that hold no foreign currency debt, firms where foreign debt is less than 50% of domestic debt, and firms where foreign debt is more than 50% of domestic debt. The limitation of this model specification is it does not allow one to estimate the intensity of foreign or domestic debt use. It is along the intensive margin of leverage where firm systemic risk is measured, as risk both increases with leverage, in general, and leverage denominated in foreign currency. Bae et al.'s (2020) model specification also fails to control for firm-level fixed effects in their analysis.

The results from our two-part model with fixed effects reveal that domestic debt increases along both margins with a firm's size and tangible assets and increases along the intensive margin with growth opportunities, while decreasing along both margins with the firm's profitability. These findings are consistent with pecking order theory (Myers, 1984; Myers and Majluf, 1984) where firms prefer internal finance to external and debt to equity. We also observe that business risk has an important effect on the choice of debt denomination. Firms with higher risk, i.e. lower quality (Minton and Schrand, 1999), are more intensively leveraged in terms of domestic debt and are less so in terms of foreign debt. The pattern suggests Korean firms substitute between debt denominations with changes in their quality. This is a new channel

affecting foreign debt use that has not been observed in previous studies (Allayannis et al. 2003; Bae et al., 2020).

In addition, we observe along the extensive margin that a firm's size and asset tangibility increase the probability they use foreign debt, but it does not influence their choice of leverage. This suggests Korean firms are further constrained in their decisions to use foreign debt by the fixed cost of issuing foreign debt, which is negatively associated with the firm's size and tangible assets. This relationship has also been observed by Ramalho and da Silva (2009) in the total debt decisions of small Portuguese firms. Together, our findings indicate there exist different unique factors that influence both the type of debt Korean firms use based on currency denomination and also the separate decisions of whether to issue debt from the level of leverage. The implication is that reducing Korean firms' fixed costs to issuing foreign debt and their exposure to business risk are both important to increasing their access to foreign capital markets.

The format of the paper is organized as follows. Section 2 reviews the literature on corporate debt and develops the hypotheses we test. In section 3, we describe the data set, and section 4 describes the econometric specification of our two-part fixed effects model of firm leverage. Section 5 presents the empirical results and their discussion. The paper then concludes with section 6.

II. The determinants of capital structure

Four factors are identified by Rajan and Zingales (1995) as being consistently correlated in previous studies with a firm's capital structure. These factors include a firm's tangible assets, size, profitability, and growth opportunities. In addition, we consider in our baseline model the effects of cash flow volatility (i.e. business risk), which Harris and Raviv (1991) also identify as an important factor previously found to empirically influence leverage. Three main theories

(trade-off, agency cost, and pecking order) are used to explain how these factors influence a firm's capital structure.[1] Trade-off theory (Myers, 1984) hypothesizes that firms optimally choose their level of leverage by balancing the costs of debt (e.g. financial distress) in relation to the benefit debt payments have on reducing taxes. Alternatively, pecking order theory (Myers, 1984; Myers and Majluf, 1984) hypothesizes a firm's debt use is tied to their need for external finance and the presence of asymmetric information between firm insiders and outsiders such that firms prefer to use internal over external funds and prefer debt over equity. Lastly, agency cost theory (Harris and Raviv, 1990; Jensen and Meckling, 1976) hypothesizes managers face incentives that differ from owners', and a higher level of debt may constrain managers' decisions and align their interests with owners.

Multiple theories are related to each of the factors of debt that we examine. For example, a firm's tangible assets act as collateral and reduce the potential cost of bankruptcy, which increases a firm's willingness to use debt, according to trade-off theory. Under pecking order theory, collateral in the form of tangible assets increase the willingness of lenders to provide credit, which increases the use of debt relative to equity in the firm's choice of external finance. Tangible assets are also said to reduce the effects of agency costs (Jensen and Meckling, 1976) on capital decisions. In Harris and Raviv's (1990) theoretical model with agency costs, the presence of collateral, i.e. tangible assets, increases the liquidation value of the firm. Given managers face incentives to avoid liquidation and retain their jobs, even when optimal for owners and debtholders, a higher level of debt increases the ability of debtholders to force liquidation. More tangible assets, therefore, increase owners' incentives to use debt financing to

[1] For a through discussion of the relevant theories of capital structure see Myers (1984) and Harris and Raviv (1991).

bind the hands of managers and reduce the effects of agency costs. Each of the theories predicts that tangible assets are positively related to firms' leverage.

The theoretical predictions for a given factor, though, are not always as clear. Large firms are better able to diversify and fail less often (Titman and Wessels, 1988), which suggests a positive association between firm size and leverage based on trade-off theory. Rajan and Zingales (1995) suggest that if shareholders of large firms are subject to less information asymmetry, then investors subject to fewer agency costs should prefer equity to debt and firms should be less leveraged. The effect of firm size on leverage therefore depends on which of the two effects is stronger.

Opposite predictions also exist for the effects growth opportunities and profitability have on firm leverage. If a firm's profitability equates to more internal cash flows, then more profitable firms will be less leveraged due to their preferences towards using internal funds, according to pecking order theory. This theory predicts the presence of growth opportunities makes it less likely internal funds are sufficient to meet the firm's financing needs and thereby increase the need for debt (Shyam-Sunder and Myers, 1999). Agency cost theory, though, predicts higher free cash flows tied to increased profitability provide managers with greater opportunities to divert fungible cash flows away from productive purposes of the firm for their own personal gain, which results in owners increasing the firm's debt to bind the hands of managers. Higher growth opportunities reduce the need for this constraint and the use of debt in the agency cost models of Jensen (1986) and Stulz (1990).

A firm's cash flow volatility is negatively related to its quality (Minton and Schrand, 1999) and serves as a proxy for business risk (Allayannis et al., 2003; Booth et al., 2000; Colla et al., 2013; Guedes and Opler, 1996; Kim and Sorensen, 1986; Minton and Schrand, 1999).

Trade-off theory predicts firms subject to greater risk have a lower debt capacity and use less leverage. The presence of asymmetric information, though, may theoretically result in a positive correlation between a firm's leverage and their probability of bankruptcy (Harris and Raviv, 1990; Ross, 1977). In Ross' (1977) model, the firm's managers know the true distribution of returns, whereas outside investors do not. A firm with high expected returns is then able to credibly signal to investors their quality by using higher levels of debt, which is associated with a higher level of bankruptcy risk. Harris and Raviv (1990) come to a similar prediction based on managers' failure to liquidate the firm when optimal for owners. In their theoretical model, the probability of default is positively related to the firm's liquidation value, which increases owners' use of debt in order to force liquidation.

The theoretical models of capital structure (trade-off, agency cost, and pecking order) are shown (Allayannis et al., 2003; Bae et al., 2017; Bae et al., 2020; Rauh and Sufi, 2010) to be generalizable to the types of debt that firms use in their leverage decisions and along the extensive and intensive margins (Ramalho and da Silva, 2009). Differences in the level of asymmetric information between firms and domestic lenders, relative to levels with foreign lenders, may result in a pecking-order in the firm's choice of leverage in domestic and foreign denominated debt. Similar to Allayannis et al. (2003), we theorize domestic lenders may have an information advantage and are thus subject to less asymmetric information than their foreign counterparts. Our hypothesis is factors that are consistent with a pecking-order will be more sensitive to leverage decisions denominated in domestic debt, relative to those with respect to foreign debt. Differences in the costs (e.g. bankruptcy, agency) and benefits between the two debt types, though, may also affect the firm's choice of debt.[2] Factors that increase the direct

[2] See Bae et al. (2017) for a summary of literature on the costs and benefits of foreign currency debt usage.

cost of issuing foreign debt, relative to domestic denominated debt, may result in firms substituting between the two types of debt. The interest rate on debt is determined, in part, by the lender's assessment of risk and need for costly monitoring. Firms are shown (Diamond, 1991) to move between types of debt as their credit quality changes, with higher quality firms avoiding debt types with higher costs of monitoring. Given foreign debt is subject to higher risk (e.g. exchange rate risk), and monitoring costs, we hypothesize firms may substitute between the two types of debt with changes in their credit quality. This implies the effect on leverage from proxy measures for firm quality (e.g. business risk) may differ in direction for the use of foreign and domestic debt, such that an increase in risk reduces leverage in foreign debt, while increasing leverage in domestic debt.

In our two-part model, we are able to examine the decisions of whether firms use debt from their choice of how much debt to use. We posit the predictions of the various capital structure theories apply similarly to both the extensive and intensive margins. Where we expect differences might exist between the two margins are a result of factors associated with differences in the fixed costs of issuing debt. Fixed costs (e.g. registration, legal, accounting, printing, and trustees' fees) from issuing public debt can be quite substantial (Altinkiliç and Hansen, 2000; Esho et al., 2001) and are sunk costs that influence whether debt is used rather than the intensity of the debt issued. Esho et al. (2001), for example, find that the fixed costs of public debt, which they proxy for based on a firm's size, is positively related to whether firms issue debt, such that lower fixed costs increase the likelihood firms issue debt.[3] The fixed costs of debt are also influenced by a firm's credit quality. Altinkiliç and Hansen (2000) observe that

[3] Altinkiliç and Hansen (2000) find evidence that the fixed costs associated with bond issues decrease with firm size, irrespective of the size of the issue.

firms with lower credit ratings and firms with more volatile returns both exhibit higher fixed costs to issuing bonds, which they argue is a result of a need to more closely monitor these firms' efforts. This is particularly relevant to firms' use of foreign denominated debt, given Guedes and Opler (1996) show that low credit quality firms may be screened from foreign denominated debt markets based on their credit rating. We therefore hypothesize factors associated with the firm's fixed costs (e.g. size, tangible assets, business risk) are more likely to influence the extensive than intensive margin and are more likely to influence foreign than domestic debt along the extensive margin.

III. Data description

Our sample consists of firm-level data of 1,807 publicly listed companies on the Korea Stock Exchange. Similar to others (Brav 2009; Rauh and Sufi, 2010; Hall, 2012; Colla et al., 2013; Fernandes, 2011; González, 2015; Keefe and Yaghoubi, 2016), we exclude from the analysis firms that operate in the finance and insurance sector.[4] Firms' balance sheet and income statement data for the period 2001-2016 are drawn from the Korea Investors Service (KIS) database. The balance sheet information includes a breakdown of firm debt into foreign and domestic denominations, which, like the other financial data, are all reported in terms of Korean Won.[5] Firms with negative shareholder (common) equity are also excluded. This unbalanced panel data consists of 17,879 firm-year observations.

The dependent variables used in our analysis are standard measures (e.g. Rajan and Zingales, 1995; Rauh and Sufi, 2010) of firm leverage. Total leverage is equal to total debt

[4] Sector information of firms is obtained from the Financial Supervisory Service of South Korea. There are 25 sectors in the sample when finance and insurance is excluded.

[5] Our data is limited in that it does not include a breakdown of earnings (income statement) by currency denomination. Further we do not know with which foreign currencies the debt is associated.

divided by the sum of total debt and the book value of shareholder equity. Leverage denominated in domestic currency (Korean Won) is simply the value of domestic denominated debt divided by the sum of total debt and the book value of shareholder equity, with foreign leverage equal to the share of foreign denominated debt. Each of the dependent variables is scaled by the same denominator, thus total leverage is the sum of domestic denominated and foreign denominated leverage. Table 1 provides descriptive statistics of our firm-level data, where we also condition on whether a firm uses a particular type of debt. The average firm's total leverage is 27%, which is 24% in domestic debt and 3% in foreign debt. Of the 17,879 firm-year observations in our dataset, domestic debt is used in 88% of firm-year observations, while foreign debt is used in 34%. Our firms' foreign debt usage differs from the sample of large firms examined by Allayannis et al. (2003), where 66% of their East-Asian firms used foreign debt. The fact that many firms choose not to use debt, and the majority do not use foreign debt is an important feature of our data we look to model empirically.

[Insert Table 1 about here]

Explaining firm leverage in our model are the four standard firm-level determinants used by Rajan and Zingales (1995) in their model specification, which include measures of a firm's tangible assets, size, growth opportunities, and profitability. Tangible assets are measured similar to others (Colla et al., 2013; González, 2015; Fernandes, 2011; and Rajan and Zingales, 1995), as the share of total assets made up of fixed assets (e.g., land, buildings, machinery, furniture, tools, and vehicles). Following Brav (2009), Fernandes (2011), Hall (2012), Hanssens et al. (2016) and Keefe and Yaghoubi (2016), size is measured here using the natural logarithm of total assets.[6] Firms' growth opportunities are measured using their market-to-book ratio

[6] An alternative is to use sales, which is also used by Allayannis et al. (2003), González (2015), Lemmon et al., (2008), Rajan and Zingales (1995), Ramalho and da Silva (2009).

(Booth et al., 2000; González, 2015; Rauh and Sufi, 2010), and profitability is equal to the natural logarithm of their return on assets, i.e. the firms' EBITDA divided by the book value of assets (Rajan and Zingales, 1995). We add to our model specification a measure of business risk, which similar to others (Allayannis et al., 2003; Booth et al., 2000; Fernandes, 2011; Keefe and Yaghoubi, 2016; Kim and Sorensen, 1986) is proxied for by the standard deviation of the firm's operating income. The standard deviation is calculated over the previous five years and the logarithm is taken (Keefe and Yaghoubi, 2016). To address possible outliers in our financial data we follow others in the literature (Colla et al. 2013; Fernandes, 2011; Keefe and Yaghoubi, 2016) and winsorize each of our variables at the 1% level in both tails. As shown in Table 1, firms with debt, regardless of the type of debt, have on average more tangible assets, less growth opportunities and are larger and risker. Interestingly, firms with foreign debt are more profitable, while we find opposite pattern for firms with domestic debt. Note also that the coefficient of variation (the ratio of the standard deviation to the mean) indicates firms with domestic debt have more variation in profitability than those without debt, while the opposite pattern is found for firms with foreign debt.

Our model specification of firm leverage includes controls for year, industry, and most importantly, firm-level fixed effects. Lemmon et al. (2008) show that most of the variation in firms' leverage is driven by differences in firm-level fixed effects, and once controlled for the effects of the standard determinants (profitability, size, tangibility, and growth opportunities) decrease in magnitude by 86%. Inclusion of a firm-level fixed effect allows us to control for the effects of firm-level factors that are invariant over time. This includes potentially observable factors that influence debt use in previous studies, such as family affiliation, i.e. Chaebols (Allayannis et al., 2003; Lee et al., 2000), initial debt choice (Hanssens et al., 2016; Lemmon et

al., 2008), and strength of relationships with lenders (Berger and Udell, 1995; Carvahlo et al., 2015). For example, Hanssens et al. (2016) find for a sample of Belgian firms that a firm's initial debt choice during their year of start-up influences leverage choices in subsequent years, independent of the contemporaneous and initial levels of the standard determinants of leverage. While a firm-level fixed effect controls for a firm's initial debt choice, it also allows us to control for time-invariant factors that are otherwise unobservable. This reduces the potential for biased estimates caused by omitted variables.

IV. The two-part fractional model with fixed effects

The dependent variables in our empirical models are the ratios of total leverage, domestic currency denominated leverage, and foreign currency denominated leverage. Each measure is a proportion, bounded by the unit interval and equal to zero for a significant number of firm-year observations. Most studies (Brav, 2009; Fernandes, 2011; González, 2015; Hall, 2012; Hanssens et al., 2016; Lemmon et al., 2008; Rauh and Sufi, 2010) ignore these features of firm leverage and estimate the model using OLS regression.[7] One approach to econometrically deal with the significant number of firms with zero values of leverage is with a Tobit regression model (Allayannis et al., 2003; Rajan and Zingales, 1995). The limitations of this censored regression model are that it does not bound the leverage ratio to the unit interval and treats zero outcomes as due to censoring, rather than a choice made by firms.

Accounting for the fractional nature of the leverage ratio can be done with a fractional response model (Papke and Wooldridge, 1996). A fractional response model allows leverage (Keefe and Yaghoubi, 2016) to take fractional values and includes the bounds of zero and one. The limitation of Keefe and Yaghoubi's (2016) approach is their model assumes leverage ratios

[7] Brav (2009) and Hanssens et al. (2016) note their OLS results are robust using a Tobit model (not reported).

arbitrarily near zero are similarly explained to the large number of observations equal to zero. This, though, ignores the significant fixed costs associated with firms using debt to borrow (Altinkiliç and Hansen, 2000; Esho et al., 2001). Determinants of leverage, such as firm size, may therefore be a more important influence on whether firms are able to cover the fixed costs of using debt, relative to the intensity of use among firms that use debt. Ramalho and da Silva (2009) find this is the case, as firm size increases the probability that debt is used and reduces the level of leverage for a cross-section of leveraged small and medium sized firms in Portugal.

The econometric approach we use is a two-part model (Wooldridge, 2002), similar to the model of Ramalho and da Silva (2009), that allows us to model whether firms use debt (the extensive margin), and the intensity of debt among those using debt (the intensive margin). The first part of the specification models a firm's decision to use debt, a binary outcome y*, where:

$$y^* = \begin{cases} 0 & \text{if } y = 0 \\ 1 & \text{if } 0 < y \leq 1 \end{cases} \quad (1)$$

We assume $P(y^* = 1 \mid x) = G(x\gamma + \mu_i)$ with G denoting the cumulative density function of the normal distribution, γ the coefficient estimates from the probit regression of firm debt use using the entire sample, x the covariates, and μ_i representing the firm level fixed effect. The second part of the specification estimates the fractional response model of Papke and Wooldridge (1996, 2008) using only the sample of non-zero leverage observations. Their Quasi Maximum Likelihood Estimator (QMLE) estimator is used to find the firm's leverage conditioning on their leverage being positive using $E(y \mid x, y^* = 1) = G(x\beta + \eta_i)$, where β represents the QMLE coefficient estimates, η_i is the firm-level fixed effect, and G is again the normal cumulative

density function.[8] This represents the intensive margin of debt use. One can also find the unconditional expectation of a firm's leverage using the probability they use debt multiplied by the conditional expectation of those firms using debt.

$$\begin{aligned} E(y \mid x) &= P(y^* = 0 \mid x) \cdot (y \mid x, y^* = 0) + P(y^* = 1 \mid x) \cdot (y \mid x, y^* = 1) \\ &= G(x\gamma + \mu_i) \cdot G(x\beta + \eta_i) \end{aligned} \tag{2}$$

The model specification used here extends the two-part model used by Ramalho and da Silva (2009) by incorporating firm-level fixed effects with unbalanced panel data. Incorporating fixed effects into the two-part fractional model is achieved by Wooldridge's (2010) adaptation of the Mundlak-Chamberlain approach, which models firm-level fixed effects as a linear function of the firm-level means of the covariates.[9] The method uses Mundlak's (1978) observation that in linear models the within (fixed effects) estimator is equivalent to a pooled OLS regression that adds to the specification each firm's time averaged means of the covariates ($\bar{x}_i$). Wooldridge (2010) shows this extends to both the probit and fractional response models and the use of unbalanced data. In the latter case, one also adds to the specification each firm's mean value of the time indicators ($\bar{\delta}_i$) and separate indicator variables for the number of firm observations (d_i), which vary by firm due to differences in the number of time-series observations per firm in our data.

We estimate the probability a firm uses debt with firm level fixed effects and unbalanced data using probit on the entire sample of data, where we include in the specification a constant, our lagged covariates x_{it-1}, a time (δ_t) and industry-sector (z_s) fixed effect, the means of the

[8] QMLE are found using Stata's GLM command with the probit link and binomial family specified, in addition to cluster robust standard errors.

[9] Egger and Kesina (2014) use the same framework to model Chinese firms' decisions whether to export and the shares of export sales among firms that export.

covariates ($\bar{x}_i$) and time fixed effects ($\bar{\delta}_i$) and the indictor variables for the number of firm observations (d_i). With these coefficient estimates (γ), we are then able to use the normal cumulative density function, $G(x\gamma)$, to calculate debt use along the extensive margin and the corresponding marginal effects. To find debt use along the intensive margin, we instead use GLM, along with the same set of controls, to estimate a fractional response model of firm leverage using only observations with positive leverage. The estimates from this model (β) when transformed, $G(x\beta)$, represent the conditional expectation of leverage, when conditioning on leverage being positive. Our specification of the two-part model lags each of the covariates by one year to control for potential problems from endogeneity and includes robust standard errors clustered by firm.

V. Results and discussion

The estimates from our two-part model with fixed effects appear in Table 2. The marginal effects reported in the table indicate the impact of a one-unit change in each measure on the probability a firm uses debt, and for firms that use debt, their level of leverage. We observe for domestic debt along the extensive and intensive margins that a firm's tangible assets and size increase leverage, whereas profitability decreases leverage along both margins. We find that growth opportunities and business risk increase leverage, but only along the intensive margins. The sign and statistical significance of the coefficients we observe for tangible assets, size, profitability, and growth opportunities are all consistent with evidence of a pecking order in the firm's choice of internal funds over debt, and debt over equity. The positive and significant coefficient for business risk we find for the intensity of domestic leverage suggests asymmetric information (Harris and Raviv, 1990; Ross, 1977) also plays a role in debt choices.

[Insert Table 2 about here]

If there exists a pecking order, where firms prefer the use of domestic to foreign debt, we then expect the factors associated with this theory to have less of an effect on foreign debt, which implies the factors' coefficients are smaller in magnitude. This explains why tangible assets, size, profitability, and growth opportunities do not have a statistically significant effect on the intensity of foreign leverage. Allayannis et al. (2003) observe a similar relation between profitability and leverage by currency denomination.

The only factor we find that influences the intensity of foreign leverage is our measure of business risk. Business risk reduces the intensity of foreign debt use, whereas it increases for domestic debt. This suggests firms substitute between the two types of debt with a change in their quality. We hypothesize an increase in business risk increases the direct interest costs of using foreign debt, relative to domestic debt, due to its higher information asymmetries and increased risk (e.g. foreign exchange risk, monitoring costs). As business risk increases, the firm then achieves its optimal level of debt by substituting domestic in the place of foreign denominated debt. The substitution effect between currency denominations of debt is shown to be one-for-one, such that business risk has no effect on either margin for aggregate measures of leverage (i.e. the sum of domestic and foreign leverage).

Along the extensive margin, our results indicate that size and tangible assets, in addition to business risk, influence whether foreign debt is used. Increasing the share of tangible assets by 1 percentage point (0.01), increases the probability of using foreign debt by 0.09 percentage points. We also find a 1% increase in firm size increases the probability of using foreign debt by 7.9 percentage points. The fact that size and tangible assets affect the extensive and not the intensive margins for foreign debt use suggests these factors may be more associated with the

fixed costs to issuing foreign denominated debt, rather than the traditional theories of capital structure.

The influence of traditional factors on leverage decisions differs substantially by the denomination of debt. Our analysis, though, reveals aggregate leverage (sum of foreign and domestic denominations) decisions are closely related to domestic leverage, which is not entirely surprising, given in our data 66% of Korean firms do not use foreign debt. Our estimates of total leverage are consistent with those of previous findings using one-part models of leverage (Fernandes, 2011; Hanssens et al., 2016; Keefe and Yaghoubi, 2016; Lemmon et al., 2008; Rajan and Zingales, 1995). Hanssens et al. (2016), for example, find the marginal effect of size is between 4.1 and 6.6 percentage points across different specifications for their sample of Belgian firms, whereas we find the effect is 5.8 percentage points along the intensive margin for Korean firms. Similarly, Fernandes (2011) finds the marginal effect of asset tangibility is 0.13 percentage points in their panel analysis of firms in emerging markets and we find the effect's intensity is 0.12 percentage points. The negative coefficient for profitability we observe of -0.34 on the intensive margin is similar in magnitude to the value (-0.41) Rajan and Zinagles (1995) observe among U.S. firms and is within the range of values Ramalho and da Silva (2009) observe among small (-0.38) and (-0.92) large Portuguese firms in their two-part model. We also find similar to others (Booth et al., 2001; Hanssens et al., 2016; Ramalho and da Silva, 2009) that growth opportunities, measured by the market to book ratio, are positively associated with leverage. Our results, as we previously noted, show that business risk does not affect aggregate debt decisions. This is supported by several recent studies (Allayannis et al., 2003; Fernandes,

2011; González, 2015; Lemmon et al., 2008) that find no evidence that business risk, i.e. volatile cash flows, affects aggregate leverage decisions.[10]

Extension with bankruptcy risk

The results of our baseline model reveal that business risk, measured by the volatility of earnings, is an important factor influencing firms' use of foreign debt. Here we extend the model to include an additional measure of firm risk to test the robustness of our findings. The measure we add is the Z-score (Altman, 1968), which is negatively associated with a firm's bankruptcy risk.[11] A higher Z-score indicates a lower likelihood of failure. We therefore predict the effects of our measure of bankruptcy risk will have the opposite sign of those for our measure of business risk. The results in Table 3 are qualitatively and quantitatively quite similar to those in our baseline model for the factors included in both specifications. With respect to the extensive margin, we find that firms with greater bankruptcy risk (i.e. a lower value of our measure) are more likely to use domestic denominated debt and are less likely to use foreign denominated debt, which provides additional evidence of the substitution effect we found related to business risk. With respect to the intensive margin, we also observe that domestic leverage increases with bankruptcy risk, similar to the effect of business risk. We, though, did not observe that bankruptcy risk had an effect on the intensity of foreign debt use. This suggests a lower risk of bankruptcy based on a higher Z-score is important to reducing the firm's fixed costs associated with issuing foreign debt.

[10] A notable exception is Booth et al. (2001) who find a negative relation between business risk and total leverage in their sample of 93 Korean firms for the period 1980-1990.

[11] We use the original Z-score: $Z = 0.012\,X_1 + 0.014\,X_2 + 0.033\,X_3 + 0.006\,X_4 + 0.999\,X_5$ where $X_1 =$ working capital/total assets, $X_2 =$ retained earnings/total assets, $X_3 =$ earnings before interest and taxes/ total assets, $X_4 =$ market value of equity/book value of total liabilities, $X_5 =$ sales/total assets. Note Altman et al. (2017) show the original coefficients are extremely robust across countries and over time.

The negative effects we observe along both margins for total debt indicate that firms with greater bankruptcy risk are more likely to take on debt and are more leveraged, which suggests higher systemic risk among firms. A key distinction we observe is that firms with higher risk (business or bankruptcy) are less likely to use foreign debt and their leverage in foreign denominated debt is either lower (business risk) or unaffected (bankruptcy), which suggests the risk is not heightened by added exposure to debt in foreign currency.

[Insert Table 3 about here]

Extension with foreign sales

A factor that also may influence a firm's preferences between domestic and foreign denominated debt is their exposure to foreign exchange risk associated with their share of foreign sales (Allayannis and Ofek, 2001; Graham and Rogers, 2002; Pramborg, 2005). To mitigate this risk firms may match the currency composition of their debt to that of their sales. Foreign sales are associated with factors that influence a firm's debt structure (Egger and Kesina, 2014), which could create omitted variable bias. We therefore extend the basic model specification to include the share of foreign sales to test for robustness. Allayannis et al. (2003) use a similar measure in their model and find firms with a larger share of earnings in a foreign currency have, in general, more total debt, and debt denominated in foreign currency. Our estimates in Table 4, though, reveal the opposite effect, as Korean firms with a larger share of exports are less reliant on debt and domestic denominated leverage. The estimates of the other coefficients are quantitatively and qualitatively similar to our previous estimates and reveal there is no bias.

Our finding that exporting firms are less dependent on debt, though, is consistent with previous studies (Campa and Shaver, 2002; Greenaway et al., 2007; Li and Yu, 2009; Manova et al., 2015; Muûls, 2015) that examine the relation between exporting firms and their financial

constraints. For example, Campa and Shaver (2002) find that exporters are less liquidity constrained than non-exporters using Spanish manufacturing firms. Greenaway et al. (2007) observe a similar relation among manufacturing firms in the UK, as exporting firms have better financial health (more liquidity and less leverage) than non-exporters. The theory is exporting firms are more liquid and less dependent on borrowing because they are better able to stabilize and diversify their cash flows from imperfectly correlated sales across countries. Multinational firms are also more likely to export and have greater access to internal credit from foreign affiliates (Li and Yu, 2009). Manova et al. (2015) find evidence of this in China, as multinational firms export more in sectors with high external financial dependence than do non-multinational firms.

[Insert Table 4 about here]

Extension to the financial crisis

The previous estimates discussed were based on the period 2001-2016, which included the Great Financial Crisis. We now split the sample into the pre-crisis period (2001-2006) and post-period (2007-2016) to evaluate whether the determinants of leverage shifted over time in response to the increase in asymmetric information from the crisis. Previous research (Duchin et al., 2010; Carvalho et al., 2015; González, 2015) shows that the crisis had a heterogeneous effect on firms' access to credit due to differences in firms' financial constraints.

Figure 1 displays the conditional mean of firms' leverage in domestic and foreign denominated debt over time, where we condition on firms holding the type of debt. During the pre-crisis period (2001-2006), strong profitability and growth opportunities led firms to reduce their leverage in domestic debt. At the start of the crisis (2007), firms responded to the economic downturn by increasing both domestic and foreign leverage, which suggests the two types of

debt were compliments in the period. As the crisis continued to unfold (2008-2010), higher business risk then adversely affected firms' ability to use both types of debt, with a stronger effect on foreign debt. This supply shock to credit markets reduced leverage in both currency denominations. With the economic recovery (2011-2013) and the return of growth opportunities, firms took on more debt, which was more readily available in the domestic market due to business risk that remained elevated. The return of higher profitability and lower business risk in 2015 then led firms to reduce their debt in both currency denominations.

[Insert Figure 1 about here]

Our estimates in Table 5 of the separate periods identify two interesting changes that occurred over time. In the pre-crisis period, collateral, in the form of tangible assets, did not impact whether firms use debt (i.e. the extensive margin), but in the post-period had a strong effect on the use of domestic denominated debt, and debt more generally. Higher quality firms, with more tangible assets, were therefore less constrained from the rise in asymmetric information in their ability to access credit, which was supplied by domestic markets. This result strongly suggests the credit supply channel affects firm leverage domestically in the post-crisis period.

Another interesting finding between periods is the influence growth opportunities have on firms' leverage when using debt. We observed for the entire period (2001-2016) that growth increases domestic denominated and total leverage among debt users, but between periods we find the sign of the effect changes. In the pre-crisis period the effect is negative, whereas the effect turns positive in the post-period. We interpret this result as evidence that following the crisis firms strengthened their pecking order in favor of domestic over foreign denominated debt

in response to the rise of asymmetric information. Additional evidence of this behavior in the post-crisis period is observed for the effect profitability has on the intensive margins for domestic and foreign denominated debt. Higher profitability reduces the intensity of leverage in both denominations, with a stronger marginal effect for domestic debt (-0.32) than for foreign debt (-0.04). The post-period marginal effects of firm profitability are also stronger than the pre-crisis period and indicate a stronger pecking order.

In the pre-crisis period, we observe that the intensity of foreign leverage is negatively influenced by a firm's size, while size increases the intensity of domestic debt use. This suggests firms in the pre-crisis period substitute between the two types of debt. In the post-crisis period, however, foreign and domestic debt are complimentary to each other and determined by a pecking order where firms more strongly prefer the use of domestic over foreign debt.

[Insert Table 5 about here]

VI. Conclusions

In this study, we investigate the capital structure of publicly listed firms in Korea from 2001 to 2016. We use a two-part model with fixed effects to determine the factors that influence whether firms choose to use debt, and the level of leverage among firms using debt. The results here indicate that factors (size, tangible assets, business risk) that influence the fixed costs of debt play an important role in whether firms use debt. Firms that are larger in size and have more collateral are more likely to use debt. Size has a stronger effect on the use of foreign denominated debt, whereas collateral has a stronger effect on domestic debt. Business risk, measured by the volatility of earnings, is found to reduce the use of foreign debt, which is subject to greater information asymmetries.

The factors that influence the leverage of firms that use debt are observed to be similar to those that influence domestic leverage, where leverage increases with tangible assets, growth opportunities, and firm size, while decreasing with profitability. Firms are shown to adjust their leverage intensity according to a pecking order, where they increase leverage when internal cash flows generated by profits are insufficient to meet the financing needs from their growth opportunities. The results show this response is stronger for domestic than foreign denominated debt and suggests firms prefer domestic to foreign debt. Business risk is the only factor we find that affects the intensity of foreign debt over the entire period. Firms respond to an increase in business risk by reducing their leverage in foreign debt, while increasing their leverage in domestic debt such that their leverage ratio remains unchanged. Other factors (size, tangible assets) influence foreign leverage, but only through the firm's likelihood of using foreign debt, which highlights the contribution of using a two-part model to identify along which margins the determinants matter.

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Table 1. Descriptive Statistics

	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Panel a.	All firm-year observations					
Total Debt Ratio	17,879	0.265	0.218			
Domestic Debt Ratio	17,879	0.236	0.208			
Foreign Debt Ratio	17,879	0.029	0.069			
Tangible Assets	17,879	0.298	0.187			
Business Risk	17,879	15.188	1.357			
Size	17,879	18.650	1.414			
Profitability	17,879	0.040	0.085			
Growth Opportunity	17,879	1.312	1.302			
Panel b. Total debt	0< Total Debt Ratio <1			Total Debt Ratio=0		
Total Debt Ratio	15,735	0.301	0.207	2,144	0.000	-
Tangible Assets	15,735	0.312	0.187	2,144	0.197	0.153
Business Risk	15,735	15.238	1.384	2,144	14.821	1.074
Size	15,735	18.715	1.442	2,144	18.170	1.070
Profitability	15,735	0.036	0.083	2,144	0.065	0.092
Growth Opportunity	15,735	1.282	1.281	2,144	1.535	1.429
Panel c. Domestic debt	0< Domestic Debt Ratio <1			Domestic Debt Ratio =0		
Domestic Debt Ratio	15,328	0.275	0.199	2,551	0.000	-
Tangible Assets	15,328	0.314	0.187	2,551	0.204	0.154
Business Risk	15,328	15.250	1.390	2,551	14.820	1.070
Size	15,328	18.728	1.450	2,551	18.179	1.056
Profitability	15,328	0.036	0.083	2,551	0.065	0.089
Growth Opportunity	15,328	1.288	1.290	2,551	1.459	1.363
Panel d. Foreign Debt	0<Foreign Debt Ratio<1			Foreign Debt Ratio=0		
Foreign Debt Ratio	5,987	0.087	0.096	11,892	0.000	-
Tangible Assets	5,987	0.340	0.180	11,892	0.277	0.187
Business Risk	5,987	15.432	1.510	11,892	15.066	1.256
Size	5,987	19.021	1.522	11,892	18.463	1.317
Profitability	5,987	0.042	0.068	11,892	0.039	0.092
Growth Opportunity	5,987	1.076	1.045	11,892	1.432	1.398

Panel a reports the summary statistics of the three leverage ratios and our independent variables for all firm-year observations. Columns 1-3 of panels b, c, and d report summary statistics of one of the three leverage ratios and the independent variables with positive debt, and columns 4-6 report these values for firm-year observations with no debt.

Table 2. Determinants of firm leverage, 2001-2016

	(1)	(2)	(3)	(4)	(5)	(6)
	Decision to Have Debt			**Intensity of Debt Use**		
	Total Debt	Domestic Debt	Foreign Debt	Total Debt	Domestic Debt	Foreign Debt
Tangible Assets	1.038***	1.079***	0.276*	0.361***	0.374***	-0.122
	(0.208)	(0.197)	(0.148)	(0.067)	(0.069)	(0.106)
	[0.176]	[0.206]	[0.087]	[0.121]	[0.120]	[-0.019]
Business Risk	0.006	-0.005	-0.073***	0.007	0.020*	-0.042***
	(0.031)	(0.030)	(0.022)	(0.010)	(0.010)	(0.016)
	[0.001]	[-0.001]	[-0.023]	[0.002]	[0.006]	[-0.006]
Size	0.203***	0.214***	0.251***	0.174***	0.163***	-0.011
	(0.048)	(0.047)	(0.047)	(0.020)	(0.020)	(0.033)
	[0.034]	[0.041]	[0.079]	[0.058]	[0.052]	[-0.002]
Profitability	-0.965***	-1.131***	-0.047	-1.026***	-1.023***	-0.170
	(0.235)	(0.229)	(0.180)	(0.082)	(0.083)	(0.114)
	[-0.164]	[-0.216]	[-0.015]	[-0.343]	[-0.328]	[-0.026]
Growth Opportunity	-0.008	-0.006	-0.011	0.013**	0.014**	-0.010
	(0.014)	(0.015)	(0.013)	(0.006)	(0.006)	(0.008)
	[-0.001]	[-0.001]	[-0.004]	[0.004]	[0.004]	[-0.002]
Observations	17,799	17,799	17,799	15,637	15,224	5,861
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

The specifications in columns 1-3 estimate the binary decision to use (1) debt, (2) domestic debt, and (3) foreign debt. In columns 4-6 the dependent variables are each of the three leverage ratios for (4) total debt, (5), domestic debt, and (6) foreign debt. The samples used to estimate columns 4-6 are restricted to non-zero firm-year observations for each type of debt. Each specification includes a constant and firm, sector, and time fixed effects, which are not reported. Standard errors clustered by firm appear in parentheses, where *** p<0.01, ** p<0.05, * p<0.1. The marginal effect is reported in brackets.

Table 3. Leverage and the role of bankruptcy risk

	(1)	(2)	(3)	(4)	(5)	(6)
	Decision to Have Debt			**Intensity of Debt Use**		
	Total Debt	Domestic Debt	Foreign Debt	Total Debt	Domestic Debt	Foreign Debt
Tangible Assets	1.020***	1.072***	0.260*	0.359***	0.374***	-0.151
	(0.206)	(0.196)	(0.152)	(0.068)	(0.069)	(0.109)
	[0.173]	[0.205]	[0.081]	[0.119]	[0.120]	[-0.023]
Business Risk	0.011	0.003	-0.080***	0.010	0.023**	-0.039**
	(0.031)	(0.030)	(0.023)	(0.010)	(0.010)	(0.016)
	[0.002]	[0.001]	[-0.025]	[0.003]	[0.007]	[-0.006]
Size	0.180***	0.183***	0.267***	0.169***	0.158***	-0.020
	(0.049)	(0.049)	(0.050)	(0.021)	(0.021)	(0.035)
	[0.030]	[0.035]	[0.083]	[0.056]	[0.050]	[-0.003]
Profitability	-0.807***	-0.912***	-0.219	-0.973***	-0.961***	-0.172
	(0.252)	(0.245)	(0.190)	(0.088)	(0.089)	(0.136)
	[-0.137]	[-0.175]	[-0.068]	[-0.324]	[-0.307]	[-0.027]
Growth Opportunity	-0.005	-0.002	-0.015	0.014**	0.015***	-0.013
	(0.015)	(0.015)	(0.013)	(0.006)	(0.006)	(0.008)
	[-0.001]	[-0.000]	[-0.005]	[0.005]	[0.005]	[-0.002]
Bankruptcy Risk	-0.129**	-0.163***	0.130**	-0.045*	-0.052**	-0.008
	(0.065)	(0.063)	(0.051)	(0.023)	(0.024)	(0.038)
	[-0.022]	[-0.031]	[0.040]	[-0.015]	[-0.017]	[-0.001]
Observations	17,665	17,665	17,665	15,509	15,097	5,785
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

The specifications in columns 1-3 estimate the binary decision to use (1) debt, (2) domestic debt, and (3) foreign debt. In columns 4-6 the dependent variables are each of the three leverage ratios for (4) total debt, (5), domestic debt, and (6) foreign debt. The samples used to estimate columns 4-6 are restricted to non-zero firm-year observations for each type of debt. Each specification includes a constant and firm, sector, and time fixed effects, which are not reported. Bankruptcy risk is Altman's (1968) Z-score. Standard errors clustered by firm appear in parentheses, where *** p<0.01, ** p<0.05, * p<0.1. The marginal effect is reported in brackets.

Table 4. Leverage and the role of firm exports

	(1)	(2)	(3)	(4)	(5)	(6)
	Decision to Have Debt			**Intensity of Debt Use**		
	Total Debt	Domestic Debt	Foreign Debt	Total Debt	Domestic Debt	Foreign Debt
Tangible Assets	1.057***	1.086***	0.272*	0.368***	0.381***	-0.120
	(0.210)	(0.198)	(0.149)	(0.067)	(0.069)	(0.107)
	[0.177]	[0.206]	[0.085]	[0.123]	[0.122]	[-0.019]
Business Risk	0.007	-0.005	-0.073***	0.007	0.020**	-0.041***
	(0.032)	(0.030)	(0.022)	(0.010)	(0.010)	(0.016)
	[0.001]	[-0.001]	[-0.023]	[0.002]	[0.006]	[-0.006]
Size	0.204***	0.213***	0.250***	0.174***	0.164***	-0.009
	(0.048)	(0.047)	(0.047)	(0.020)	(0.020)	(0.033)
	[0.034]	[0.040]	[0.079]	[0.058]	[0.052]	[-0.001]
Profitability	-0.945***	-1.117***	-0.041	-1.016***	-1.013***	-0.172
	(0.235)	(0.228)	(0.181)	(0.082)	(0.083)	(0.114)
	[-0.159]	[-0.212]	[-0.013]	[-0.339]	[-0.325]	[-0.027]
Growth Opportunity	-0.006	-0.005	-0.011	0.013**	0.014**	-0.010
	(0.015)	(0.015)	(0.013)	(0.006)	(0.006)	(0.008)
	[-0.001]	[-0.001]	[-0.003]	[0.004]	[0.004]	[-0.002]
Export Share	-0.013	0.047	0.060	-0.059**	-0.059**	-0.036
	(0.099)	(0.100)	(0.075)	(0.030)	(0.030)	(0.047)
	[-0.002]	[0.009]	[0.019]	[-0.020]	[-0.019]	[-0.006]
Observations	17,758	17,758	17,758	15,605	15,193	5,845
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

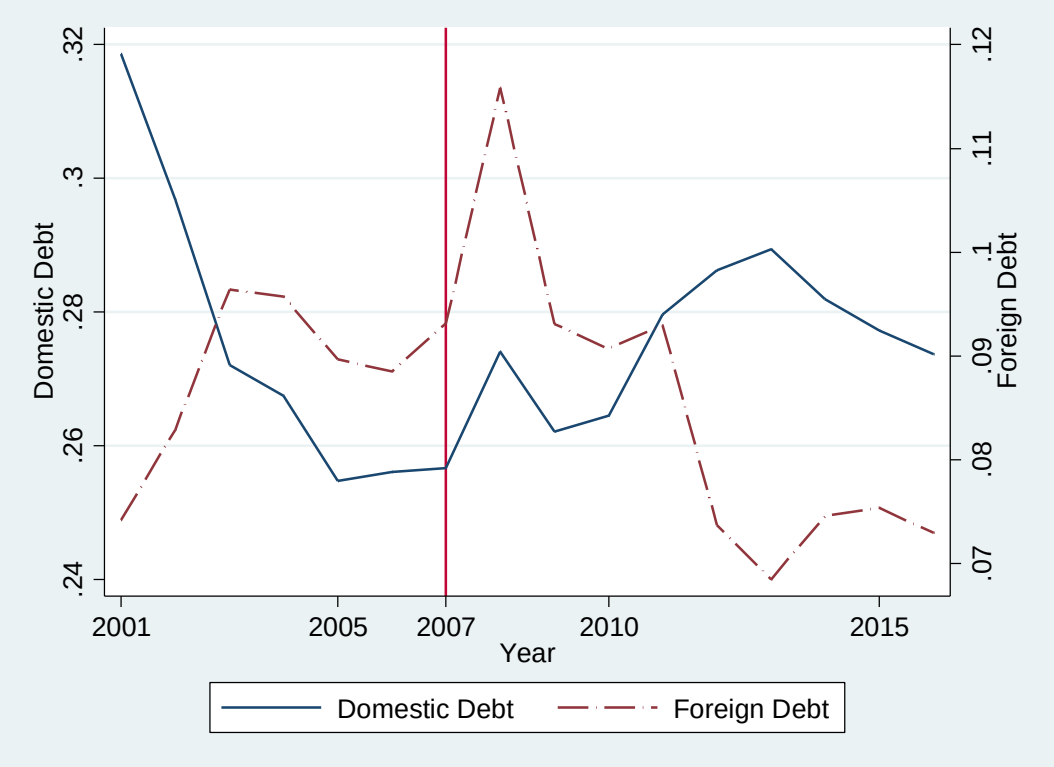
The specifications in columns 1-3 estimate the binary decision to use (1) debt, (2) domestic debt, and (3) foreign debt. In columns 4-6 the dependent variables are each of the three leverage ratios for (4) total debt, (5), domestic debt, and (6) foreign debt. The samples used to estimate columns 4-6 are restricted to non-zero firm-year observations for each type of debt. Each specification includes a constant and firm, sector, and time fixed effects, which are not reported. Standard errors clustered by firm appear in parentheses, where *** p<0.01, ** p<0.05, * p<0.1. The marginal effect is reported in brackets.

Table 5. Pre- and post-crisis determinants of leverage

	(1)	(2)	(3)	(4)	(5)	(6)
	Decision to Have Debt			**Intensity of Debt Use**		
Pre-crisis (2001-2006)	Total Debt	Domestic Debt	Foreign Debt	Total Debt	Domestic Debt	Foreign Debt
Tangible Assets	0.318	0.564	0.411	0.338***	0.362***	-0.254
	(0.383)	(0.363)	(0.302)	(0.122)	(0.130)	(0.176)
	[0.049]	[0.100]	[0.142]	[0.116]	[0.117]	[-0.040]
Business Risk	-0.001	-0.029	-0.076*	0.003	0.010	-0.008
	(0.052)	(0.050)	(0.041)	(0.017)	(0.018)	(0.024)
	[0.000]	[-0.005]	[-0.026]	[0.001]	[0.003]	[-0.001]
Size	0.337***	0.343***	0.172*	0.212***	0.214***	-0.112**
	(0.113)	(0.110)	(0.093)	(0.037)	(0.037)	(0.054)
	[0.052]	[0.061]	[0.059]	[0.073]	[0.070]	[-0.018]
Profitability	-0.718**	-0.981***	-0.301	-0.648***	-0.682***	0.086
	(0.350)	(0.343)	(0.244)	(0.136)	(0.137)	(0.176)
	[-0.111]	[-0.174]	[-0.104]	[-0.222]	[-0.221]	[0.014]
Growth Opportunity	-0.027	-0.023	-0.023	-0.022**	-0.025**	-0.002
	(0.021)	(0.021)	(0.022)	(0.011)	(0.010)	(0.015)
	[-0.004]	[-0.004]	[-0.008]	[-0.008]	[-0.008]	[0.000]
Observations	4,931	4,931	4,927	4,382	4,264	2,041
Post-Crisis (2007-2016)						
Tangible Assets	0.757***	0.907***	0.017	0.264***	0.282***	-0.175
	(0.240)	(0.230)	(0.162)	(0.071)	(0.073)	(0.127)
	[0.132]	[0.178]	[0.005]	[0.088]	[0.090]	[-0.027]
Business Risk	-0.015	-0.016	-0.044*	-0.005	0.001	-0.037*
	(0.035)	(0.033)	(0.026)	(0.011)	(0.011)	(0.020)
	[-0.003]	[-0.003]	[-0.013]	[-0.002]	[0.000]	[-0.006]
Size	0.160***	0.155***	0.243***	0.163***	0.148***	0.054
	(0.056)	(0.054)	(0.058)	(0.024)	(0.025)	(0.041)
	[0.028]	[0.030]	[0.074]	[0.054]	[0.047]	[0.008]
Profitability	-0.816***	-0.751***	0.143	-0.981***	-1.006***	-0.287**
	(0.267)	(0.257)	(0.202)	(0.093)	(0.095)	(0.141)
	[-0.143]	[-0.147]	[0.043]	[-0.325]	[-0.321]	[-0.044]
Growth Opportunity	0.008	0.009	0.011	0.012*	0.011*	0.001
	(0.016)	(0.016)	(0.014)	(0.006)	(0.007)	(0.009)
	[0.001]	[0.002]	[0.003]	[0.004]	[0.004]	[0.000]
Observations	12,797	12,797	12,797	11,169	10,872	3,688

The specifications in columns 1-3 estimate the binary decision to use (1) debt, (2) domestic debt, and (3) foreign debt. In columns 4-6 the dependent variables are each of the three leverage ratios for (4) total debt, (5), domestic debt, and (6) foreign debt. The samples used to estimate columns 4-6 are restricted to non-zero firm-year observations for each type of debt. Each specification includes a constant and firm, sector, and time fixed effects, which are not reported. Standard errors clustered by firm appear in parentheses, where *** p<0.01, ** p<0.05, * p<0.1. The marginal effect is reported in brackets.

Figure 1. Mean of firms' domestic and foreign denominated debt over time



Note: The mean is conditional mean where we condition on firms holding each type of debt separately.