

## **The Determinants of Foreign Currency Debt Financing: Borrower Incentives or Lender Incentives?**

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July 2016

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The authors acknowledge helpful comments from Kang Baek, Mingsheng Li and Anthony Loviscek on the earlier version of the paper. This work was supported by the Korea Grant of the National Research Foundation funded by the Korean Government (NRF-2011-327-1300258). The usual disclaimer applies

## **The Determinants of Foreign Currency Debt Financing: Borrower Incentives or Lender Incentives?**

### **Abstract**

We investigate the determinants of firms' usage of foreign currency (FC) debt financing, relative to local currency (LC) debt financing. Employing extensive data of Korean firms during 2002-2012, we find that the firm-level determinants of FC and LC debt financing differ and vary by the period of appreciation or depreciation of LC value. Among others, consistent with the findings in the literature, a firm's export ratio is significantly related to the usage of FC debt, evidence supporting for the hedging role of FC debt. Undocumented in the literature, however, we provide new evidence on the separation of firms favoring FC debt and firms favoring LC debt. While LC debt financing is affected mainly by demand-side borrower incentives such as operating profitability, R&D expense, financing deficit, and depreciation expense that reflect borrower's capital needs, FC debt financing is affected mostly by supply-side lender incentives such as tangible asset ratio, firm size, and asset growth, which foreign lenders weigh heavily to assess the potential value of collateral, as well as export ratio. Our results remain robust to different model and time specifications.

*JEL Classification:* F31; G15

*Key words:* Foreign currency debt financing; Determinants; Borrower incentives; Lender incentives; Korean firms; Global financial crisis

## 1. Introduction

Over the past decades, foreign currency (FC, hereafter) debt financing has played as an important source of debt capital for firms around the world, especially for firms in the emerging economies. Since the global financial crisis, there has been a big increase in FC bond issuance by emerging market firms, much of it by their foreign subsidiaries, while FC bank loans provided by big Western banks have remained flat. According to the Bank for International Settlements (BIS), firms other than banks in the emerging markets have issued \$692 billion in international bonds since the global financial crisis.

Firms may decide to raise FC debt in various reasons, different from those to raise domestic or local currency (LC, hereafter) debt. Gozzi et al. (2012) demonstrate that domestic and international bond markets provide different financial services and thus debt issues in these two markets have different attributes, which are not explained by differences across firms or their country of origin. In this paper, we attempt to unveil the potentially different characteristics of firms using FC debt, relative to firms using LC debt, and the firm-specific factors that determine firms' usage of FC debt, relative to LC debt. Our paper focuses on Korean manufacturing firms. Considering that Korea has experienced one of the most volatile exchange rate changes in Asia since the Asian financial crisis and that Korean firms frequently resort to FC debt, Korean firms are an excellent experimental laboratory to examine issues on FC debt financing.

Several earlier studies examined the underlying rationales of firms' financing of FC debt.<sup>1</sup> These rationales include: to circumvent withholding taxes, capital controls, and other legal restrictions imposed by domestic governments (Shapiro, 1984; Rhee et al., 1985); to overcome segmented local capital markets (Jorion and Schwartz, 1986; Campbell and Hamao, 1992); and to arbitrage differences in tax rates across the world (Smith and Stulz, 1985; DeMarzo and Duffie, 1996). Using aggregate cross-country data, a few subsequent studies show that a firm's usage of FC debt is related to macro factors such as international

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<sup>1</sup> Another group of existing studies investigates the effects of FC debt financing on firm performance and value with mixed evidence (see, e.g., Allayannis et al., 2003; Harvey et al., 2004; Bleakley and Cowan, 2008; Clark and Judge, 2009; and Endr sz and Harasztosi, 2014). In a study of Korean firms, Bae et al. (2016) show that firms with FC debt have lower firm values than firms with LC debt, whose evidence is mainly attributed to inefficient usages of currency derivatives by firms with FC debt.

funding, exchange rate volatility, domestic inflation (Basso et al., 2007); and FC domestic deposits (Luca and Petrova, 2008). A number of other studies also document that FC debt helps firms hedge foreign exchange risk associated with their exporting activities (Allayannis and Ofek, 2001; Keloharju and Niskanen, 2001; Elliott et al., 2003; Kedia and Mozumdar, 2003; Bae and Kwon, 2013; Mora et al., 2013).

More research is, however, warranted to shed empirical light on several key issues unanswered in the current studies. First, while most rationales documented in the existing literature are macro-level and market-oriented factors, little is known about the internal, firm-specific characteristics that affect firms' financing of FC debt vs. LC debt. In a study of FC debt by small firms in the twenty-five transition economies in Europe between 2002 and 2005, Brown et al. (2011) show that FC borrowing is much better explained by firm-level factors such as FC revenues than country-level and macroeconomic factors such as interest rate differentials. Using survey data of small firms in Lebanon, Mora et al. (2013) show that firms with collateral and higher net worth are likely to have dollar debt, whereas profitable firms and firms relying on banks and supplier credit are less likely to have such debt. We extend the scope of these studies to firms in a major emerging economy by exploring the research issue of whether a firm's usage of FC debt is determined by different firm attributes than its usage of LC debt.

Second, the analysis of the first research issue would still leave a related question unanswered: If a firm attribute is found to be related to the firm's usage of both FC debt and LC debt, then would such an attribute affect both FC debt financing and LC debt financing *equally*? For example, if a firm's tangible asset ratio is found to be related to the usage of both FC debt and LC debt, would a firm with a higher tangible asset ratio prefer FC debt or LC debt or both equally? We design our empirical models to test this critical research issue too and provide new evidence on what firm-specific attributes differentiate a firm's usage between FC debt and LC debt.

Third, existing studies have focused on FC debt financing surrounding the 1997 Asian financial crisis and for the period of the LC depreciation in late 1990s and early 2000. Little research has been done for emerging market firms surrounding the 2007 global financial crisis nor for the more recent periods of

the appreciation of LCs.<sup>2</sup> Our paper intends to fill this void. As the characteristics of borrowers and lenders as well as the global capital markets have changed significantly after the global financial crisis, FC debt financing of emerging market firms may exhibit different characteristics around the global financial crisis than around the earlier Asian financial crisis. Indeed, the usage of FC debt peaked during the Asian financial crisis, then declined after the crisis, but started to increase again, reaching the highest level during the global financial crisis. What factors have contributed to the changes in FC debt financing around the global financial crisis is an important piece of information for both investors and corporate managers.

In this paper, we investigate firm-level determinants of the usage of FC debt financing, relative to LC debt financing, surrounding the global financial crisis. For this purpose, we review the implications of existing capital structure theories on firms' usage of FC debt financing and compare the characteristics of firms using FC debt with those of firms using LC debt. We conjecture that different firm-level attributes affect a firm's choice between FC debt and LC debt and that this difference would lead to the separation of firms favoring FC debt versus firms favoring LC debt. On the one hand, firms financing LC debt in the local market where borrowing firms are well known and have a great deal of negotiating power on loan terms would focus more on demand-side borrower incentives that represent their own borrowing needs. On the other hand, firms financing FC debt in the overseas market where borrowers are relatively unknown and have less bargaining power on loan terms would be more concerned about factors related to the supply-side lender incentives that foreign lenders would weigh more heavily. These firm attributes should mainly represent the potential value of collateral that foreign lenders would liquidate in case of default.<sup>3</sup>

It is worth noting that as our paper deals with Korean firms in a single economy, the country-level and macroeconomic factors are presumed to be self-controlled. Accordingly, this enables our paper to focus on firm-level characteristics that differentiate a firm's choice between FC debt and LC debt.

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<sup>2</sup> Though dealing with different research issues, Bleakley and Cowan (2008) and Endr sz and Harasztosi (2014) show that during the global financial crisis, firms using more FC debt significantly reduce their investments, compared to firms using less FC debt due to the balance sheet effect of FC debt.

<sup>3</sup> See Mora et al. (2013) for the detailed discussion of borrower and lender incentives related to the usage of FC borrowing.

Our analyses from employing extensive firm-level data of Korean firms during the 2002-2012 period show that the usage of FC debt is determined by different firm characteristics than that of LC debt. While a firm's tangible asset, operating profitability, dividend payout, firm size, and depreciation expense are significantly related to the firm's usage of both FC debt and LC debt, other firm attributes such as export ratio, financing deficit, asset growth, R&D expense, product diversification, intra-group transactions, experience in global capital markets, and affiliation to a large business group affect the firm's usage of FC debt financing differently from that of LC debt financing. For example, a firm's usage of FC debt is significantly positively related to the firm's export ratio, supporting the notion that the usage of FC debt helps exporting firms hedge their foreign exchange exposure resulting from their exporting activities. This evidence is consistent with the findings in the literature that hedging demand is an important motivation for using FC debt. Our results also reveal that while the usage of LC debt by Korean firms remained almost unchanged surrounding the global financial crisis, their usages of FC debt declined significantly after the global financial crisis. The determinants of FC debt and LC debt also vary by period, depending on the appreciation or depreciation of the LC value.

More importantly, our results provide new evidence confirming our conjectures on the separation of firms favoring FC debt and firms favoring LC debt. The usage of LC debt is affected mainly by factors related to the demand-side borrower incentives such as operating profitability, R&D expense, financing deficit, and depreciation expense that reflect local borrowing firms' capital needs. In contrast, a firm's usage of FC debt is primarily affected by the supply-side lender incentives such as tangible asset ratio, firm size, export ratio, and asset growth that foreign lenders use to assess borrowers' credit conditions. We interpret the latter result as indicating that faced with a high degree of information asymmetry regarding borrowing firms' credits, foreign lenders weigh heavily on firm attributes that represent the potential value of collateral as a way to protect themselves from possible debt delinquency.

Our paper is organized as follows. Section 2 reviews existing capital structure theories and their implications on the firm's usage of FC debt, and Section 3 presents empirical models and data. Section 4 reports empirical results and robustness tests, with summary and conclusion in Section 5.

## 2. Implications of Existing Capital Structure Theories on the Usage of FC debt

The characteristics of FC debt financing can be understood in the context of expanding the domestic perspective of firms' capital structure decisions into the international perspective. The two main theories of firms' capital structure behaviors are the trade-off theory and the pecking order theory.

According to the trade-off theory, the benefits of debt financing include the tax deductibility of interest payments and the reduction of agency costs associated with a firm's (or managers') possession of free cash flows, whereas its costs include bankruptcy costs and agency costs arising from conflicts between stockholders and debtholders. Compared to LC debt, FC debt may have different benefits and costs. On the one hand, borrowing through FC debt may be more cost effective than borrowing through LC debt. FC debt may carry lower real interest rates. Firms can also raise much larger amounts of debt when they can access the global capital markets. In addition, FC debt may help to circumvent withholding taxes, capital controls, and other legal restrictions imposed by domestic governments (Shapiro, 1984; Rhee et al., 1985); to overcome segmented local capital markets (Jorion and Schwartz, 1986; Campbell and Hamao, 1992); and to arbitrage differences in tax rates across the world (Smith and Stulz, 1985; DeMarzo and Duffie, 1996). Furthermore, FC debt may also provide hedging of foreign exchange exposure associated with firms' exporting activities by choosing a variety of currencies of FC debt (Allayannis and Ofek, 2001; Keloharju and Niskanen, 2001; Elliott et al., 2003; Kedia and Mozumdar, 2003; Bae and Kwon, 2013; Mora et al., 2013).<sup>4</sup> On the other hand, the usage of FC debt may expose firms to additional risks including foreign exchange risk, thus raising firms' bankruptcy costs relative to LC debt.

According to the pecking-order theory, however, there is a certain hierarchy in the order of financing choices because the issuing cost of common stock is far larger than costs of debt financing based on the trade-off theory (Myers and Majluf, 1984). The pecking order theory posits that firms tap into internal retained earnings first; safe debt second; risky debt third; and then external equity as the last choice.

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<sup>4</sup> For example, Bae and Kwon (2013) show that the increased asymmetric foreign exchange exposure resulting from exporting activities of Korean firms can be reduced to some extent by FC debt financing.

Accordingly, from the viewpoint of the pecking order theory, lenders of FC debt may have different standards for assessing borrowers' credit than lenders of LC debt do. Allayannis et al. (2003) point out that the information asymmetry between domestic lenders and foreign lenders regarding borrowing firms may cause a difference in assessment. Hence, foreign lenders are likely to face a different level of information asymmetry than domestic lenders, which will in turn affect foreign lenders' lending decisions.

In sum, the existing capital structure theories suggest that factors influencing a firm's choice of debt financing between FC debt and LC debt would be different, and this difference may lead to the separation of firms favoring FC debt versus firms favoring LC debt. In this paper, we posit that different firm-level attributes determine a firm's choice between FC debt and LC debt. On the one hand, firms seeking LC debt in the local market would focus more on demand-side borrower incentives that represent their own borrowing needs. This hypothesis is based on the observation that borrowing firms are well known in the local capital market, and thus their credit positions are relatively transparent to local lenders. In addition, borrowers can exercise a good deal of negotiating power on loan terms through repeated deals with the local lenders. On the other hand, firms seeking FC debt in the overseas markets would focus more on supply-side lender incentives that represent the potential value of collateral. Relative to local lenders, foreign lenders access limited information on borrowing firms' credit positions and thus would weigh the collateral value more heavily to protect themselves in case of loan default.

### **3. Research Design**

#### *3.1. Data and sample construction*

Our sample includes all non-financial firms listed on the Korean stock exchanges that financed any type of FC or LC debt or no debt during the period of 2002–2012. We exclude firms that experienced capital erosion during the sample period. Our sample period starts with 2002 year because 2002 is the first year when data on itemized FC debt and assets for Korean firms were available from the TS2000 database of Korean Association of Listed Companies. We collect sample firms' balance sheet items including FC assets and FC debt from the TS2000 database. We also collect sample firms' market-related information

such as stock returns and market values from the KIS-VALUE database. The data on sample firms' issuances of DRs and GRs during the period of 1992–2012 (for the variable of *EXPER*) are obtained from the Korea Securities Depository database. Our selection procedures result in a total of 6,460 firm-year observations for the final sample.

Table 1 reports the distribution of sample firms by year. Firms financing FC debt include two groups of firms based on their proportions of FC debt. The 'More FC debt' firms consist of firms financing FC debt only and firms financing substantially more FC debt than LC debt (that is, firms whose FC debt is more than 50% of their LC debt), and the 'Less FC debt' firms consist of firms financing both FC and LC debt but substantially less FC debt than LC debt (that is, firms whose FC debt is less than 50% of their LC debt). Approximately 45% (2,886 out of 6,460) of sample Korean firms raise debt capital through FC debt over the sample period, of which 428 firms use more FC debt financing than LC debt financing and the remaining 2,458 firms use less FC debt than LC debt. Almost 90% (2,592 out of 2,886) of firms financing FC debt raise capital through US dollar-denominated debt.

### 3.2. Regression models and measurement of variables

We perform two regression analyses to uncover the determinants of the usage of FC debt, relative to the usage of LC debt. First, we estimate the following multivariate regression model using measures of a firm's debt ratio as dependent variable:

$$\begin{aligned}
DRATIO_{i,t}(FCD_{i,t} \text{ or } LCD_{i,t}) &= \alpha_0 + \alpha_1 TAN_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 EXPORT_{i,t} \\
&+ \alpha_4 INTTR_{i,t} + \alpha_5 EXPER_{i,t} + \alpha_6 PROFIT_{i,t} + \alpha_7 DEFICIT_{i,t} + \alpha_8 RND_{i,t} + \alpha_9 \Delta A_{i,t} \\
&+ \alpha_{10} DEP_{i,t} + \alpha_{11} DIV_{i,t} + \alpha_{12} DIVER_{i,t} + \alpha_{13} CHAEBOL_{i,t} \\
&+ \sum_{j=1}^J \alpha_{13+j} INDDY_{j,i} + \sum_{y=1}^Y \alpha_{13+J+y} YEARDY_{y,i} + \varepsilon_{i,t}
\end{aligned} \tag{1}$$

where  $i$  and  $t$  denote firm and year, respectively. The dependent variable of *DRATIO* is FC or LC debt ratio (*FCD* or *LCD*), measured by FC or LC *financial* debt divided by total assets. To be more specific, each firm's FC (LC) debt is measured as the sum of all financial debt items related to the firm's financing

activities such as FC (LC) short-term loans, FC (LC) bonds, FC (LC) long-term loans, current year's payments of FC (LC) long-term debt, and FC (LC) liquidity long-term borrowings by excluding operational debt items such as accruals. Because the value of the dependent variable, *DRATIO*, is low-bounded to zero, we estimate Tobit models using robust standard errors in our sample over the sample period.

Second, we estimate ordered logit models by employing an ordinal variable as dependent variable in the following regression equation (2). While the regression equation (1) is capable of detecting whether a firm's financing of FC debt is determined by same or different firm attributes, compared to its financing of LC debt, it still fails to discern which financing option between FC debt and LC debt would be preferred by a firm whose firm attribute is found to be significant in regression equation (1). Regression equation (2) is designed to address this research issue.

$$\begin{aligned}
FCD3_{i,t} = & \alpha_0 + \alpha_1 TAN_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 EXPORT_{i,t} + \alpha_4 INTTR_{i,t} + \alpha_5 EXPER_{i,t} \\
& + \alpha_6 PROFIT_{i,t} + \alpha_7 DEFICIT_{i,t} + \alpha_8 RND_{i,t} + \alpha_9 \Delta A_{i,t} + \alpha_{10} DEP_{i,t} + \alpha_{11} DIV_{i,t} \\
& + \alpha_{12} DIVER_{i,t} + \alpha_{13} CHAEBOL_{i,t} + \sum_{j=1}^J \alpha_{13+j} INDDY_{j,i} + \sum_{y=1}^Y \alpha_{13+J+y} YEARDY_{y,i} + \varepsilon_{i,t}
\end{aligned} \tag{2}$$

In equation (2), the ordinal dependent variable of *FCD3* represents three categories of firms classified based on their level of FC debt with the value of 1 for firms with LC debt only, 2 for firms with 'Less FC debt'; and 3 for firms with 'More FC debt'. Hence, the estimated regression coefficient of an independent variable in equation (2) measures the probability or the likelihood of a firm's financing through FC debt rather than through LC debt when the unit value of the variable either increases or decreases and all other independent variables are held at their constant mean values.

Being potentially related to the firm's usage of FC or LC debt financing, the explanatory variables consist of two groups of firm attributes—supply-side lender incentives and demand-side borrower incentives. The firm attributes representing lender incentives include a firm's tangibility (*TAN*), firm size (*SIZE*), export ratio (*EXPORT*), a change in total assets ( $\Delta A$ ), and experience of raising capital in the global capital markets (*EXPER*). The firm attributes representing borrower incentives include profitability (*PROFIT*), financing deficit (*DEFICIT*), R&D ratio (*RND*), depreciation ratio (*DEP*), dividend payout

(*DIV*), product diversification (*DIVER*), intra-group transactions with foreign subsidiaries (*INTTR*), and large business group or chaebol affiliation (*CHAEBOL*)<sup>5</sup>. We also add industry dummies (*INDDY*) and year dummies (*YEARDY*) to control for the industry characteristics and yearly differences. Below we present the measurements and the expected empirical relationships of the explanatory variables to the usage of FC debt financing from the perspective of the capital structure theories and the attributes of FC debt.

#### *Lender incentives variables*

*Tangibility (TAN)*: A firm's tangibility is measured by its tangible asset ratio, the ratio of its tangible assets to total assets. Because having more tangible assets makes it easier for debt holders to collect their claims in case of the firm's financial distress, a firm with more tangible assets will have better access to debt markets. Accordingly, the variable of *TAN* is expected to be positively related to a firm's debt ratio. Furthermore, as foreign debt holders who lack information on local firms consider a borrowing firm's level of tangible assets as a key credit factor (Allayannis et al., 2003), a firm's tangibility is expected to have a positive and significant regression coefficient.

*Firm size (SIZE)*: Firm size is measured by the sum of the book value of total debt and the market values of preferred stock and common stock, and enters regression models in the natural logarithm form. Because a large-size firm tends to have well-diversified operations, its low variability of cash flows and low probability of bankruptcy will lead to an increase in debt capacity (Flath and Knoeber, 1980). Hence, the larger the size of a firm, the higher the debt ratio, implying a positive relationship between firm size and debt ratio. It is also plausible that the larger the firm, the better the investors' recognition of the firm in the market. When foreign investors assess domestic firms, one can posit that there is a close relationship between firm size and investors' recognition. Foreign lenders have limited information on domestic firms, and thus would prefer large firms when making loans. Large firms that have a wider access to the international capital markets are more likely to borrow in FCs than small firms are (Keloharju and Niskanen,

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<sup>5</sup> The chaebol-affiliation dummy is included to control for the possibility of the effect of a firm affiliated with a large business group on firm value. See Joh (2003) and Bae et al. (2011) for the detailed discussion of chaebol and its effect on firm value.

2001). In addition, when the domestic capital markets are not large nor diverse enough to meet their financing needs, large firms would reach out to foreign capital markets (Allayannis et al., 2003). Furthermore, when domestic banks intermediate dollars debt, larger firms are expected to benefit from greater access to and lower costs of bank funding because information is imperfect and monitoring (Mora et al., 2013). Hence, a strong positive relationship is expected between firm size and FC debt ratio.

*Export ratio (EXPORT)*: A firm's export ratio is measured by its exporting amount divided by sales. While the relationship between a firm's usage of LC debt and its export ratio is unclear, the usage of FC debt can be an effective tool to manage the exchange rate exposure arising from the firm's export activities. Hence, firms engaging in more exporting activities would use the FC debt more actively (Keloharju and Niskanen, 2001; Kedia and Mozumdar, 2003; Elliott et al., 2003; Bleakley and Cowan, 2008; Bae and Kwon, 2013). Accordingly, a positive relationship between the export ratio and the usage of FC debt is expected.

*Change in total assets ( $\Delta A$ )*: A change in total assets is employed as a proxy for a firm's short-term investment opportunity.<sup>6</sup> Because a firm with a high short-term growth potential has an advantage to raising capital relative to other firms without such a growth potential, a positive relationship between  $\Delta A$  and a firm's LC and FC debt financing.

*Experience in the global capital markets (EXPER)*: A firm's experience in the global capital markets is proxied by the frequency of the firm's issuance of foreign depository receipts (DRs) or global receipts (GRs) during the 1992–2010 period. If a firm issues either DR or GR in a given year, then a numeric value of 1 is assigned and 0 otherwise. Aguiar (2005) suggests that firms access FC loans from foreigners, as he finds a significant association between foreign equity issuance (ADRs) and FC debt. Firms can raise a large amount of FC debt at a relatively lower cost in the global capital markets than in the domestic capital markets. In order to raise capital from the global capital markets, however, firms must have secured the necessary level of recognition in the global markets. Hence, firms with more experience

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<sup>6</sup> While R&D ratio may also be used for a firm's investment opportunity, we use R&D ratio as a proxy for other firm attribute.

in raising capital in the global capital markets would generally have higher recognition in the markets. Accordingly, firms with experience in the global capital markets are more likely to prefer FC debt than those without such experience.

*Borrower incentives variables*

*Operating Profitability (PROFIT):* A firm's operating profitability is measured by its operating margin, earnings before interest and taxes divided by sales. According to the trade-off theory, a firm with lower profitability is likely to have a higher bankruptcy cost and thus use less debt. Furthermore, as Jensen (1986) argues, a firm with higher profitability tends to have higher free cash flows and thus is motivated to increase interest and dividend payments to mitigate its agency cost, leading to a higher debt ratio. Therefore, the disciplining effect of debt would be to increase the firm's profitability, resulting in a positive relationship between the firm's profitability and its debt ratio (Margarities and Psillaki, 2010). From a different perspective of the trade-off theory, a firm with higher profitability will use more debt in anticipation of greater tax savings resulting from its usage of debt (Frank and Goyal, 2003; Wu and Yue, 2009). Hence, a positive relationship between a firm's profitability and its usage of debt is expected. On the contrary, according to the pecking order theory, a firm with higher profitability will have more internal funds in the form of retained earnings and thus a lower need for debt financing, which will lead to a lower debt ratio. Hence, if the pecking order theory holds, the negative relationship between a firm's profitability and its debt would be stronger for the usage of FC debt than for the LC debt.

*Financing deficit (DEFICIT):* A firm's financing deficit represents the magnitude of a firm's financing need for external capital and is closely related to the firm's financial leverage. This variable has been frequently used by several studies in the testing of the pecking order theory (Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003). We measure each firm's financing deficit from the aggregation of the firm's dividends, investment, change in net working capital, and internal cash flows following Frank and Goyal (2003). A positive relationship is expected between the financing deficit and the usage of FC debt financing.

*R&D ratio (RND):* A firm's R&D ratio is measured by the ratio of the firm's R&D expenses to sales. Through R&D investment firms create intangible assets, these would, however, be difficult to

liquidate if the firms go bankrupt. This attribute of R&D investment could play as a deterrent for potential debt holders to providing funds for the firms' R&D investments. Accordingly, there would be a negative relationship between a firm's R&D intensity and debt ratio. Similarly, a negative relationship is also expected between R&D intensity and FC debt financing.

*Depreciation ratio (DEP):* The depreciation ratio represents a firm's non-debt tax shield effect and is measured as ratio of the annual depreciation divided by total assets. As our analyses focus only on financial debt, DEP is used to control for potential benefits associated with operational debt. Fama and French (2002) argue that if a firm with a non-debt tax shield effect issues debt, then the firm will not be able to use all of its existing non-debt tax shield effect. Hence, a negative relationship is expected between a firm's depreciation ratio and its financial leverage including both LC and FC debt financing.

*Dividend payout (DIV):* A firm's dividend payout is measured by its dividend amount standardized by net income. A firm with a higher dividend payout would set a lower target debt ratio and thus is likely to use less debt than a firm with a lower dividend payout. Accordingly, a negative relationship between a firm's dividend payout and debt ratio is expected. Furthermore, a firm's FC debt would be regarded as a non-trivial financial constraint due to the possibility that when the LC value declines, the burden for the payments of principal and interest of FC debt may go up. Hence, the negative relationship between a firm's dividend payout and its debt ratio is expected to be stronger for FC debt financing than for LC debt financing.

*Product diversification (DIVER):* A firm's degree of product and operating diversification is measured by the diversification index drawn from the Caves' weighted index of diversification (Caves et al., 1980).<sup>7</sup> If a firm's operations are well diversified with stabilized cash flows, then the firm will be better capable of raising debt capital and lowering the cost of debt, thus enabling the firm to issue more debt. This positive relationship between a firm's degree of diversification and debt ratio will remain for the FC debt.

*Intra-group transactions with foreign subsidiaries (INTTR):* A firm's degree of intra-group transactions with foreign subsidiaries is measured by the total amount of intra-group transactions each firm

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<sup>7</sup> See Bae et al. (2011) for the detailed measurement of the diversification index.

engages in with its foreign subsidiaries divided by the firm's sales. On the one hand, firms engaging in intra-group transactions with their foreign subsidiaries are those that have made FDIs. Because many firms use FC debt for FDIs, their FDIs may play as a factor contributing to an increase in their FC debt financing. On the other hand, firms frequently engaging in intra-group transactions with foreign subsidiaries are more likely to raise foreign funds internally, if needed. Thus, these firms may prefer not to raise FC debt from external markets. In sum, the relationship between the magnitude of a firm's intra-group transactions and its usage of FC debt is left for a further empirical investigation.

*Large business group or chaebol dummy (CHAEBOL)*: Chaebol dummy represents a firm's affiliation to a large Korean business group, known as a chaebol, and is equal to 1 for a chaebol firm and 0 otherwise. Following the Korea Fair Trade Commission's (KFTC) yearly classification, we classify sample firms into two groups: a group of the top thirty chaebol firms and a group of other firms.<sup>8</sup> If firms belong to a large business group, then related firms in the business group would form internal capital markets through intra-group transactions and thus raise debt capital through external capital markets less frequently than independent firms do. On the other hand, if chaebol-affiliated firms need large amounts of debt capital for expansion purposes, then they would be capable of raising large debt capital and raise debt capital at a lower cost using the chaebol's recognition than independent firms do. Hence, the relationship between a firm's chaebol affiliation to a large business group and the debt financing including FC debt is unclear.

Table 2 presents a summary of definitions and measurements of key variables used in the regression models. In order to test whether firms' usage of FC debt and LC debt varies and is affected by different firm characteristics according to the different levels of LC relative to FC, we also perform additional analyses by dividing the sample period into two sub-periods based on the changes in LC value of Korean won relative to US dollar—the period of 2002–2006 when the LC value gradually increased, and the period of 2007–2012 when the LC value declined with significant volatility, encompassing the global financial

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<sup>8</sup> While the KFTC classification is the most widely used practice of classification for business groups based on the size of group-level gross total assets, it is based on some arbitrary cutoff of total assets and is more of a proxy for a large business group affiliation, rather than any group affiliation. See Bae et al. (2011), Baek et al. (2006), and Joh (2003) for further discussions of chaebols.

crisis period. We further limit extreme values of top and bottom 1% of all variables in each year through the winsorizing procedure to reduce the effect of possibly spurious outliers.

## 4. Empirical Results

### 4.1. Summary statistics of variables by period

Table 3 presents summary statistics of key variables for two sub-periods as well as for the whole period. Looking first at the debt-related variables, Korean firms on average hold 6.0% of total FC debt (*FCD\_total*, including both financial and operational debt) over the whole sample period, which is higher than 5.2% of total FC assets (*FCA\_total*) they own. The average total financial debt ratio (*FinD\_total*) for a typical Korean firm is 22.6% relative to its total assets, consisting of approximately 3.3% of FC debt (*FCD*) and the remaining 19.3% of LC debt (*LCD*). Regarding other firm characteristics, Korean firms have on average a tangible asset ratio (*TAN*) of 32.7% and a financial deficit ratio (*DEFICIT*) of 4.5%, relative to total assets. A typical Korean firms also have an export ratio to sales (*EXPORT*) of 24.9%, an intra-group transaction (with their foreign subsidiaries) ratio (*INTTR*) of 7.3%, an operating margin (*PROFIT*) of 4.2%, and payout 18.5% of its earnings as dividends (*DIV*) and relative to sales.

Compared to the pre-GFC period of 2002-2006, Korean firms' FC (financial) debt ratio (*FCD*) during the post-GFC period of 2007-2012 declined significantly (from 3.5% to 3.1%), while their average LC debt ratio (*LCD*) declined slightly but not statistically significantly (from 19.5% to 19.2%). Although not reported in Table 3, the average *FCD* of sample Korean firms during 2009-2012 following the GFC is 2.4%, which is a decline of almost one third from the pre-GFC level. These findings are in supportive of the balance sheet effect that Korean firms are more likely to use FC (LC) debt during the period of an increase (decrease) in LC value relative to FC, mainly caused by the currency mismatch of their FC debt and LC assets.

It is also shown that the mean and median values of tangible asset ratio (*TAN*), export ratio (*EXPORT*), dividend payout (*DIV*), and product diversification index (*DIVER*) decline significantly following the GFC. On the other hand, other firm variables such as firm size (*SIZE*), intra-group transaction

ratio (*INTTR*), profit margin (*PROFIT*), R&D ratio (*RND*), changes in total assets ( $\Delta A$ ), and large group affiliation (*CHAEVOL*) increase significantly following the crisis.

#### 4.2. *Difference tests for firms financing foreign versus local currency debt*

Table 4 shows results from difference-in-means and median tests of several firm characteristics for two test samples of firms with more or less FC debt, compared to a control sample of firms with LC debt only. The first test sample includes firms financing more FC debt, consisting of both firms using FC debt only and firms whose FC debt is more than 50% of their LC debt. The second test sample includes firms using less FC debt, whose FC debt is less than 50% of their LC debt. Analyzing the two test samples would not only supplement the extremely small sample size of firms with FC debt only (128 out of 6,440 in the whole sample) but also enable to compare characteristics of firms using more FC debt with firms using less FC debt. As shown in first six columns of Table 4, more-FC debt firms carry an average of 13% of FC debt (*FCD*) in their capital structure. Compared to firms with LC debt only, they have higher total FC assets (*FCA\_total*) and total FC debt (*FCD\_total*) ratios<sup>9</sup> but a lower total financial debt ratio (*FinD\_total*, including both FC and LC financial debt). Firms with more FC debt also have more export (*EXPORT*), engage in more intra-group transactions (*INTTR*), experience a larger change in assets ( $\Delta A$ ), pay out more dividends (*DIV*), and belong to a large business group (*CHAEVOL*). On the other hand, these firms on average have less financing deficit (*DEFICT*), invest less in R&D (*RND*), and incur lower depreciation expense.

We now turn to the comparison of the second test sample of firms with less FC debt to firms with LC debt only. Firms using less FC debt have similarities in many aspects of firm characteristics to those using more FC debt (the first test sample), but also exhibit notable differences. For example, unlike those with more FC debt, firms with less FC debt have more total financial debt (*FinD\_total*), more tangible assets (*TAN*), larger firm size (*SIZE*), more experience in global markets (*EXPER*), less dividends (*DIV*),

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<sup>9</sup> Total FC debt includes both financial and operational short-term and long-term debt.

and more diversified products (*DIVER*) than firms with LC debt only. The overall results in Table 4 reveal that while the two test samples of firms using FC debt financing carry similar firm characteristics, the two samples also have several firm attributes vastly different from each other. These differences further validate our analysis of dividing FC debt firms into two test samples of firms with ‘more FC debt’ and firms with ‘less FC debt’ as done in Table 4.

#### 4.3. *Pearson correlation coefficients*

Before we examine regression results, we perform the analysis of Pearson correlation coefficients among several key variables using the full sample of 6,460 observations over the whole period and report the results in Table 5. On the one hand, a firm’s FC debt financing (*FCD*) is significantly (at least at the 5% level) positively correlated to tangible assets (*TAN*), firm size (*SIZE*), export ratio (*EXPORT*), and intra-group transactions with subsidiaries (*INTTR*), but significantly negatively to operating margin (*PROFIT*), R&D ratio (*RND*), dividend payout (*DIV*), and depreciation ratio (*DEP*). Hence, a firm with a higher tangible asset ratio, larger size, a higher export ratio, more intra-group transactions, but with lower operating profitability, less dividends, and/or lower depreciation expense is likely to use more FC debt.

On the other hand, a firm’s usage of LC debt is significantly positively correlated with tangible asset ratio (*TAN*), firm size (*SIZE*), financial deficit (*DEFICIT*), and diversification index (*DIV*) but significantly negatively with operating profitability (*PROFIT*), changes in total assets ( $\Delta A$ ), depreciation ratio (*DEP*), and dividend payout (*DIV*).

Hence, such firm characteristics as export ratio, intra-group transactions, R&D, changes in assets, financing deficit ratio, and product diversification affect the usage of FC debt and LC debt significantly differently or in the opposite direction. The positive correlation between *FCD* and *EXPORT* is consistent with the findings in existing studies (see, e.g., Allayannis and Ofek, 2001; Kedia and Mozumdar, 2003; Bae and Kwon, 2013).

#### 4.4. *Tobit regression results on the determinants of FC vs. LC debt financing*

Table 6 reports regression estimates from Tobit regression models (regression equation (1)) on the determinants of FC and LC debt financing (*FCD* and *LCD*) along with the predicted relationships of a firm's usage of FC and LC debt using the full sample of 6,460 firm-year observations. In order to reduce the effect of possibly spurious outliers, we limit extreme values of top and bottom 1% of all variables in each year through a winsorizing procedure.

Looking first the regression results for the whole period, the explanatory variables in general exhibit predicted relationships with *FCD* and *LCD* with a few exceptions. FC and LC (financial) debt financing carry similar regression estimates in a few explanatory variables, but exhibit notable differences in the majority of explanatory variables in terms of signs and significance levels of regression estimates. More specifically, both FC and LC debt financing are positively and significantly to tangible asset ratio (*TAN*) and firm size (*SIZE*), but negatively and significantly (at the 1% level) related to a firm's operating margin (*PROFIT*), depreciation ratio (*DEP*), and dividend payout (*DIV*). Hence, firms with higher tangible assets, larger size, lower operating profitability, lower depreciation expense, and/or lower dividend payouts are likely to use both FC and LC debt financing.

There are, however, significant differences in the relations of several firm characteristics to FC and LC debt financing. On the one hand, a firm's usage of FC debt financing is negatively and significantly related to a firm's financial deficit (*DEFICIT*), R&D investment (*RND*), and affiliation to a large business group (*CHAEBOL*) and is positively and significantly to export ratio (*EXPORT*), intra-group transactions with foreign subsidiaries (*INTTR*), and changes in total assets ( $\Delta A$ ). On the other hand, a firm's experience in global capital markets (*EXPER*) and product diversification (*DIVER*) are significantly related only to its usage of LC debt.

In sum, several firm characteristics affect a firm's usage of FC debt financing and LC debt financing differently, indicating that factors determining a firm's usage of FC debt financing are indeed different from those of LC debt financing. More specifically, such firm characteristics as tangible asset ratio, firm size, operating profitability, depreciation expense, and dividend payout affect a firm's usage of both FC and LC debt financing. However, other firm characteristics such as export ratio, intra-group transactions,

experience in global capital markets, financing deficit, R&D expense, asset growth, product diversification, and affiliation to a large business group affect a firm's usage of FC debt financing differently from that of LC debt financing.

It is worth noting that of the three firm characteristics of *EXPORT*, *INTTR*, and *EXPER* that are expected to be related only to a firm's FC debt financing, *EXPORT* and *INTTR* indeed carry significant regression coefficients with *FCD* and not with *LCD*; hence, a firm with a higher export ratio and/or a higher intra-group transactions with foreign affiliates tends to raise more FC debt capital. In contrast, *EXPER* has a negative and significant (at the 1% level) regression coefficient only with *LCD*. This result is, however, not necessarily inconsistent with the predicted relationship because this result indicates that a firm with less experience in raising capital in overseas markets is likely to raise more LC debt.

We now turn to regression results for the two sub-periods characterized by a different direction of changes in LC value of Korean won relative to US dollar. The pre-GFC period of 2002 dollar is when the LC value gradually increased, whereas the post-GFC period of 2007 dollar is when the LC value declined with significant volatility. The regression results for the two sub-periods are in general similar *to* those for the whole period, but some notable differences in regression estimates are observed. For example, the significant relationships of the usage of FC debt with *AA*, *DIV* and *CHAEBOL* for the whole period become insignificant during the pre-crisis period, indicating that the effects of these variables on the usage of FC debt are more pronounced during the post-crisis period. Furthermore, the significant effect of *INTTR* on the usage of FC debt for the whole period disappears for the post-crisis period. On the contrary, the insignificant effect of *DIVER* on the usage of FC debt for the whole period turns to a significant one during the post-crisis period. For firms using LC debt financing, the insignificant effects of *CHAEBOL* and *AA* for the whole period become significant during the pre-crisis period, whereas the significant effect of *DIVER* for the whole period disappears for the post-crisis period.

#### 4.5. Ordered logit regression results on the determinants of FC vs. LC debt financing

The Tobit regression results in Table 6 reveal that several firm characteristics such as *TAN*, *SIZE*,

*PROFIT*, *DEP*, and *DIV* significantly affect a firm's usage of both FC debt and LC debt. A research question to follow up is then whether these *common* firm attributes affect the firm's usage of FC debt and LC debt equally. For example, in Table 6, *TAN* is positively and significantly related to both *FCD* and *LCD*. Does this result then imply that a firm with a higher tangible asset ratio is indifferent between FC debt and LC debt or that such a firm may still prefer one type of debt over another? This question cannot be answered in Tobit regressions where the dependent variables of *FCD* and *LCD* enter separately.

The ordered logit model in regression equation (2) is designed to explore this issue with three categories of firms based on their proportions of FC debt relative to LC debt. The ordinal dependent variable, *FCD3*, carries the value of 1 for firms with LC debt only, 2 for firms with less FC debt, and 3 for firms with more FC debt. Hence, the estimated regression coefficient's signs of each explanatory variable indicate that whether the probability of being firms with more FC debt increases or decreases.

Table 7 reports the estimation results from the ordered logit models. For the whole period, with regard to the similar explanatory variables in both FC and LC debt financing, *TAN* and *SIZE* carry positive and significant (at least at the 10% level) regression coefficients, and *PROFIT* and *DEP* carry negative and significant (at least at the 1% level) regression coefficients.

Compared to the regression estimates of Tobit models reported in Table 6, the regression estimates of ordered logit models in Table 7 provide differentiating evidence on the preferred choice between FC debt and LC debt associated with the five *common* firm attributes. While *TAN*, *SIZE*, *PROFIT*, *DEP*, and *DIV* are *common* firm attributes that are all significantly (positively or negatively) related to the usage of both FC debt and LC debt in Tobit models, the effects of these common firm characteristics are presented in a different fashion in Table 7. A firm with more tangible asset (*TAN*), lower profitability (*PROFIT*), larger size (*SIZE*), and less depreciation expense (*DEP*) is more likely to finance FC debt over LC debt, whereas a firm's dividend payout (*DIV*) does not differentiate between the two types of debt.

When the sample period is divided into pre-GFC and post-GFC periods, more pronounced effects of four explanatory variables are observed for the post-GFC period than for the pre-GFC period. For the post-GFC period, a firm with a higher tangible asset ratio (*TAN*) and/or greater asset growth (*ΔA*) is likely

to finance more FC debt, but a firm affiliated to a large business group and/or with greater product diversification is likely to use less FC debt. On the contrary, these firm attributes have little effect on the usage of either FC or LC debt for the pre-GFC period.

#### 4.6. *Implications of empirical results*

Taken together with the main results of Tobit and ordered logit regressions as reported in Tables 6 and 7, a firm with a higher tangible asset ratio, larger size, more exports, and higher asset growth is more likely to use FC debt financing rather than LC debt financing. On the contrary, a firm with higher profitability, more R&D investment, higher financing deficit, and higher depreciation expense is less likely to use FC debt financing but more likely to use LC debt financing.

In a situation where there are credit frictions and information asymmetry, larger firms, firms with more tangible assets, and firms with greater FC revenue would be better able to post collateral and thus are more likely to access FC debt. Drawing on a sample of 700 listed companies in Mexico prior to the 1994 peso devaluation, Gelos (2003) and Aquiar (2005) find that size and FC earnings are positively related to dollar-denominated debt. Similar evidence is offered in Allayannis et al. (2003) for large East Asian firms, in Brown et al. (2011) for small firms in transition countries in Europe, and in Mora et al. (2013) for small firms in Lebanon. For example, Allayannis et al. (2003) find that firms with more tangible assets have an easier access to FC debt.

These supply-side lender incentive variables increase the likelihood of financing with FC debt rather than LC debt by easing the information asymmetry of lenders. Unlike the R&D ratio that exposes investment risk and represents long-term investment, the asset growth variable ( $AA$ ) can be regarded as a proxy for short-term investment. Hence, when a firm is seeking funds for investment and a lender considers the recovery of the fund as priority, the lender would prefer to offer FC debt to a firm with higher asset growth. Several existing studies report that firms use FC debt mainly to hedge their foreign exchange risk associated with their FC revenues (Allayannis and Ofek, 2001; Keloharju and Niskanen, 2001; Elliott et al., 2003; Kedia and Mozumdar, 2003; Bae and Kwon, 2013; Mora et al., 2013). Hence, a firm with a

higher export ratio is more likely to borrow FC debt both for hedging purpose and for the higher value of collateral to the potential lenders.

In contrast, the LC debt financing is affected mainly by demand-side borrower incentives such as operating profitability, financing deficit and depreciation expense that reflect borrower's capital needs. Consistent with the pecking order theory, firms with higher operating profitability are related to both lower FC debt and lower LC debt due to an increase in the available internal funds in the Tobit analysis. When choosing between FC debt and LC debt, however, a firm with higher operating profitability is more likely to choose LC debt over FC debt as shown in the ordered logit analysis. These results suggest that a profitable borrower possesses higher free cash flows and in order to achieve the discipline effect of debt under the firm's necessity, the firm chooses LC debt that would allow potential domestic lenders to an easier monitoring. Similarly, a firm with higher depreciation expense tends to borrow less both in FC debt and in LC debt by increasing non-debt tax deductibility in the Tobit analysis, but is more likely to use LC debt over FC debt in the ordered logit analysis.

In sum, our results show that a firm's usage of FC debt and LC debt is determined by different firm-level factors. Our results further provide evidence that this difference leads to the separation of firms favoring FC debt and firms favoring LC debt. When choosing a debt financing between FC debt and LC debt, the FC debt financing is affected mostly by supply-side lender incentives, but the LC debt financing is influenced mostly by demand-side borrower incentives.

#### 4.7. *Robustness tests*

In order to ensure the robustness of our empirical results, we perform two robustness tests. Because the main research issue of our paper is the determinants of the usage of FC debt financing, relative to LC debt financing, we focus on the robustness tests that deal with this research issue.

In the first robustness test, we examine whether our regression results are sensitive to a different time specification. To this end, we estimate the regression equations (1) and (2) by excluding the GFC period of 2007 and 2008 years from the initial sample period of 2002-2012. This time specification would

allow us to avoid or minimize potentially contaminated effects, if any, of the GFC on firms' behaviors of financing between FC debt and LC debt.

Table 8 reports the estimation results from both Tobit models using *FCD* and *LCD* as dependent variables in regression equation (1) and ordered logit model using *FCD3* as ordinal dependent variable in equation (2). As expected, all three models in Table 8 employ a less number of observations (about 18% less) and exhibit lower F-value and Chi-square value than their corresponding figures in Tables 6 and 7. Looking first at the regression estimates of two Tobit models using *FCD* and *LCD* each as dependent variable, explanatory variables carry estimated regression coefficients similar to those reported in Table 6 with a few exceptions with regard to the significance level. The variations include significant regression coefficients of *INTTR*, *CHAEVOL* and *AA* for the Tobit model with *FCD* as dependent variable and *AA* for the Tobit model with *LCD* as dependent variable. Turning to the regression estimates of the ordered logit model using *FCD3* as dependent variable, the estimated regression coefficients of all explanatory variables remain qualitatively the same as those reported in Table 7 with regard to the signs and significance levels. The results in Table 8 confirm our earlier results on the determinants of firms' usage of FC debt financing and LC debt financing.

In the second robustness test, we employ an alternative measure of the ordinal dependent variable in the ordered logit model in order to check if our main results are vulnerable to a different model specification. The main criterion used to classify the sample firms into the three categories (more FC debt; less FC debt; and LC debt only) for *FCD3* is whether a firm's FC debt is more or less than 50% of its LC debt. This criterion is certainly subjective and may induce biased evidence mainly because the first two categories of firms (more FC debt and less FC debt) still contain a mixture of FC debt and LC debt, rather than FC debt only or LC debt only. As a cleaner alternative, we use *FCD3N* as the ordinal dependent variable, which assigns the value of 1 to firms with LC debt only, 2 to firms with both FC debt and LC debt, and 3 to firms with FC debt only. It is worth noting that while the total number of observations in the new ordered logit regression remains the same as that in Table 7, the third category of firms with FC debt only consists of a very small number of 128 observations.

Table 9 presents the regression results from ordered logit models for both the whole period and two subperiods of pre-GFC and post-GFC. For the whole period, the regression coefficients of all explanatory variables except for *CHAEBOL* are qualitatively the same as those reported in Table 7 with regard to the signs and significance levels. While *CHAEBOL* carries a negative but insignificant regression coefficient with *FCD3* in Table 7, its regression coefficient with *FCD3N* is negative and significant at the 5% level, indicating that a firm affiliated to a large business group is less likely to finance FC debt. Regarding the regression results for the two subperiods, the regression estimates are in general qualitatively identical to those reported in Table 7. The only notable difference is the positive and significant relationship of *DIVER* with *FCD3N* for the pre-GFC period, whose regression coefficient is positive but insignificant for the same pre-GFC period with *FCD3* in Table 7.

## 5. Summary and Conclusion

In this paper, we have analyzed what firm characteristics affect firms' usage of FC debt financing, relative to LC debt financing. For this purpose, we construct our test sample of firms with FC debt from non-financial firms in Korea during the 2002-2012 period and compare the characteristics of the sample firms to those of a control sample of firms with LC debt only. We examine these issues for two sub-periods surrounding the global financial crisis, as well as for the whole period.

Our regression results from Tobit models show that the determinants of FC debt financing and LC debt financing differ and vary by period of LC value relative to US dollar. While a firm's tangible asset ratio, operating profitability, dividend payout, firm size, and depreciation expense affect the firm's usage of both FC debt and LC debt, other firm characteristics such as export ratio, R&D expense, product diversification, intra-group transactions, experience in global capital markets, affiliation to a large business group, financing deficit, and asset growth affect the firm's usage of FC debt financing differently from that of LC debt financing. Additional analyses of these variables with the ordered logit regressions reveal the differentiating effect of firm attributes on the firm's preferred choice between FC debt and LC debt. A firm with more tangible asset, larger size, more export and higher asset growth is likely to finance FC debt over

LC debt, whereas a firm with high operating profitability, higher financial deficit, greater R&D expense, and greater depreciation expense is likely to use LC debt financing. On the contrary, a firm's other characteristics such as dividend payout, product diversification, intra-group transactions, experience in global capital markets, affiliation to a large business group do not differentiate between the two types of debt financing.

Undocumented in the existing literature, our results provide new evidence confirming our conjectures on the separation of firms favoring FC debt and firms favoring LC debt. The usage of LC debt is affected mainly by the demand-side borrower incentives such as operating profitability, R&D expense, financing deficit, and depreciation expense that reflect local borrowing firms' capital needs. In contrast, a firm's usage of FC debt is primarily affected by the supply-side lender incentives such as tangible asset ratio, firm size, and asset growth, as well as export ratio for the hedging role of FC debt, which foreign lenders would use to assess borrowers' credit conditions. This latter result suggests that due to the high degree of information asymmetry regarding borrowing firms' credits, foreign lenders weigh more heavily on firm attributes that represent the potential value of collateral to protect themselves from possible debt default.

We also find that while the usage of LC debt by Korean firms remained almost unchanged surrounding the global financial crisis, their usages of FC debt declined significantly after the global financial crisis. Our results further show that there are notable differences in the determinants of FC debt financing between two subperiods of the pre-GFC period of 2002-2006 and the post-GFC period of 2007-2012, whose periods were characterized by the changes in LC value of Korean won relative to US dollar in the opposite direction.

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**Table 1. Distribution of sample firms by year and type of currency on debt**

FC = foreign currency. LC = local currency. USD = US dollar. Firms with more FC debt includes firms with FC debt only and firms using substantially more FC debt than LC debt in such a way that a firm's FC debt is more than 50% of its LC debt. Firms with less FC debt include firms with substantially less FC debt than LC debt in such a way that a firm's FC debt is less than 50% of LC debt).

Year	Whole sample	FC debt		More FC debt	Less FC debt	LC debt		No debt	USD debt Only	USD & non-USD debt	Non-USD debt only
		FC debt	LC debt			LC debt only	LC debt only				
2002	543	289	503	31	258	221	221	33	145	119	25
2003	557	296	507	37	259	219	219	42	153	112	31
2004	560	282	490	41	241	219	219	59	148	103	31
2005	576	278	502	44	234	234	234	64	148	99	31
2006	576	281	494	40	241	218	218	77	153	97	31
2007	590	283	504	37	246	226	226	81	170	84	29
2008	606	301	532	52	249	243	243	62	184	88	29
2009	604	288	526	45	243	253	253	63	166	87	35
2010	611	272	522	47	225	273	273	66	156	85	31
2011	610	158	549	26	132	398	398	54	76	74	8
2012	627	158	543	28	130	395	395	74	71	74	13
Total	6,460	2,886	5,672	428	2,458	2,899	2,899	675	1,570	1,022	294

**Table 2. Definitions and measurements of variables**

Variables	Definitions	Measurement
FC (financial) debt-related variables		
<i>FCA_total</i>	Total FC assets ratio	FC assets / total assets
<i>FCD_total</i>	Total FC debt ratio	FC debt / total assets
<i>FinD_total</i>	Total (financial) debt ratio	Total financial debt / total assets
Dependent variables		
<i>FCD</i>	FC (financial) debt ratio	FC financial debt / total assets
<i>LCD</i>	LC (financial) debt ratio	LC financial debt in t / total assets
<i>FCD3</i>	FC (financial) debt level dummy	3 for firms with more FC debt; 2 for firms with less FC debt; and 1 for firms with LC debt only
Explanatory variables related to supply-side lender incentives		
<i>TAN</i>	Tangible asset ratio	Tangible assets / total assets
<i>SIZE</i>	Firm size	ln (sum of MVs of common and preferred stock + BV of debt)
<i>EXPORT</i>	Export ratio	Exporting amount / sales
$\Delta A$	Change in total assets	(Total assets in t – total assets in t-1)/total assets in t-1
<i>EXPER</i>	Experience in global capital markets	1 if a firm has experience in issuing deposit receipts (or global receipts) and 0 otherwise
Explanatory variables related to demand-side borrower incentives		
<i>PROFIT</i>	Profitability ratio	Operating margin = operating income / sales
<i>DEFICIT</i>	Financing deficit	$DEFICIT_t = (D_t + I_t + \Delta W_t - C_t) / \text{total assets}$ , where $D_t$ = cash dividends; $I_t$ = net investment; $\Delta W_t$ = change in net working capital; $C_t$ = cash flows after taxes and interest (see Frank and Goyal, 2003)
<i>RND</i>	R&D ratio	R&D expenses / sales
<i>DEP</i>	Depreciation ratio	Depreciation expense / sales
<i>DIV</i>	Dividend payout	Dividend amount / net income
<i>DIVER</i>	Product diversification	Caves' diversification index
<i>INTTR</i>	Intra-group transactions with foreign subsidiaries	Intra-group transaction amounts with foreign subsidiaries (sum of sales, purchases, profits and costs) / sales
<i>CHAEBOL</i>	Chaebol dummy	1 if a firm is affiliated to a large business group and 0 otherwise

**Table 3. Summary statistics and difference tests of variables by period**

The sample consists of firms financing FC and LC debt during 2002-2012. GFC = global financial crisis. See Table 1 for definitions and measurements of variables. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

Variables	Whole Period (2002-2012) (N=6,460)		Pre-GFC (2002-2006) (1) (N=2,812)		Post-GFC (2007-2012) (2) (N=3,648)		Difference Tests (2) - (1)	
	Mean	Median	Mean	Median	Mean	Median	t-stat	z-stat
<i>FCA_total</i>	0.052	0.017	0.049	0.017	0.054	0.016	2.348**	-0.584
<i>FCD_total</i>	0.060	0.021	0.061	0.023	0.059	0.019	-0.855	-2.646***
<i>FinD_total</i>	0.226	0.212	0.231	0.214	0.222	0.208	-2.026**	-1.900*
<i>FCD</i>	0.033	0.000	0.035	0.000	0.031	0.000	-2.739***	-7.010***
<i>LCD</i>	0.193	0.173	0.195	0.172	0.192	0.173	-1.112	-1.046
<i>TAN</i>	0.327	0.317	0.355	0.346	0.305	0.295	-10.609***	-10.138***
<i>SIZE</i>	19.387	19.042	19.083	18.759	19.622	19.258	13.539***	14.370***
<i>EXPORT</i>	0.249	0.087	0.282	0.155	0.224	0.052	-7.767***	-11.161***
<i>INTTR</i>	0.073	0.000	0.067	0.000	0.077	0.000	2.269**	5.023***
<i>EXPER</i>	0.046	0.000	0.044	0.000	0.048	0.000	0.735	0.735
<i>PROFIT</i>	0.042	0.046	0.034	0.047	0.048	0.045	3.328***	-0.581
<i>DEFICIT</i>	0.045	0.033	0.045	0.033	0.046	0.034	0.231	0.923
<i>RND</i>	0.015	0.004	0.012	0.004	0.016	0.004	6.256***	0.262
$\Delta A$	0.033	0.049	0.009	0.030	0.052	0.065	8.392***	12.471***
<i>DEP</i>	0.006	0.003	0.006	0.003	0.006	0.002	-0.630	-6.071***
<i>DIV</i>	0.185	0.120	0.195	0.135	0.177	0.108	-2.812***	-3.321***
<i>DIVER</i>	0.202	0.001	0.234	0.035	0.177	0.000	-7.374***	-9.230***
<i>CHAEVOL</i>	0.235	0.000	0.213	0.000	0.251	0.000	3.585***	3.581***

**Table 4. Difference tests of variables for firms financing foreign currency and local currency debt**

The sample consists of firms financing FC and LC debt during 2002-2012. See Table 1 for definitions and measurements of variables. \*\*\*, \*\*, \* and \* denote significance at the 1%, 5%, and 10% level, respectively.

Variables	Firms with more FC debt (N=428) (1)		Firms with less FC debt (N=2,458) (2)		Firms with LC debt only (N=2,899) (3)		Difference tests (1) – (3)		Difference tests (2) – (3)	
	Mean	Median	Mean	Median	Mean	Median	t-stat	z-stat	t-stat	z-stat
<i>FCA_total</i>	0.078	0.034	0.062	0.031	0.042	0.007	8.122***	11.350***	8.887***	18.850***
<i>FCD_total</i>	0.172	0.141	0.097	0.070	0.023	0.001	41.120***	29.368***	35.093***	46.273***
<i>FinD_total</i>	0.157	0.124	0.311	0.303	0.217	0.195	-7.563***	-7.277***	21.859***	21.379***
<i>FCD</i>	0.130	0.114	0.064	0.042	0.000	0.000	70.685***	57.490***	51.974***	68.856***
<i>LCD</i>	0.027	0.007	0.247	0.233	0.217	0.195	-24.861***	-27.471***	7.260***	8.677***
<i>TAN</i>	0.319	0.302	0.369	0.368	0.311	0.298	0.783	1.184	11.307***	11.431***
<i>SIZE</i>	19.334	18.998	19.620	19.203	19.275	18.964	0.719	0.603	7.759***	7.275***
<i>EXPORT</i>	0.350	0.273	0.313	0.242	0.194	0.026	10.464***	10.039***	14.848***	17.533***
<i>INTTR</i>	0.094	0.009	0.086	0.004	0.063	0.000	3.735***	6.748***	5.004***	10.523***
<i>EXPER</i>	0.037	0.000	0.068	0.000	0.037	0.000	0.084	0.084	5.157***	5.145***
<i>PROFIT</i>	0.042	0.043	0.033	0.040	0.034	0.046	0.834	-0.936	-0.336	-3.249***
<i>DEFICIT</i>	0.036	0.034	0.039	0.034	0.052	0.033	-2.108**	-0.635	-3.410***	-0.896
<i>RND</i>	0.009	0.002	0.013	0.004	0.016	0.004	-5.420***	-5.237***	-4.896***	0.027
$\Delta A$	0.050	0.049	0.038	0.047	0.031	0.050	1.711*	0.050	1.343	-0.644
<i>DEP</i>	0.003	0.002	0.004	0.002	0.007	0.003	-6.359***	-5.419***	-9.939***	-7.628***
<i>DIV</i>	0.204	0.145	0.168	0.100	0.179	0.113	1.829*	3.277***	-1.622	-2.158**
<i>DIVER</i>	0.190	0.005	0.231	0.025	0.194	0.000	-0.301	0.877	4.207***	5.287***
<i>CHAEVOL</i>	0.250	0.000	0.265	0.000	0.215	0.000	1.655*	1.654	4.316***	4.309***

**Table 5. Pearson correlation coefficients of select key variables**

The sample consists of 6,460 firm-year observations of firms financing FC and LC debt during 2002-2012. See Table 1 for definitions and measurements of variables. <sup>a</sup> denotes significance at least at the 5% level.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
<i>FCD</i>	(1)	1.00														
<i>LCD</i>	(2)	0.01	1.00													
<i>TAN</i>	(3)	0.10 <sup>a</sup>	0.16 <sup>a</sup>	1.00												
<i>SIZE</i>	(4)	0.04 <sup>a</sup>	0.05 <sup>a</sup>	0.05 <sup>a</sup>	1.00											
<i>EXPORT</i>	(5)	0.18 <sup>a</sup>	-0.00	0.03 <sup>a</sup>	0.05 <sup>a</sup>	1.00										
<i>INTTR</i>	(6)	0.07 <sup>a</sup>	-0.02	-0.11 <sup>a</sup>	0.03 <sup>a</sup>	0.43 <sup>a</sup>	1.00									
<i>EXPER</i>	(7)	0.02	-0.01	0.08 <sup>a</sup>	0.46 <sup>a</sup>	0.06 <sup>a</sup>	0.11 <sup>a</sup>	1.00								
<i>PROFIT</i>	(8)	-0.07 <sup>a</sup>	-0.19 <sup>a</sup>	-0.08 <sup>a</sup>	0.25 <sup>a</sup>	-0.10 <sup>a</sup>	-0.05 <sup>a</sup>	0.04 <sup>a</sup>	1.00							
<i>DEFICIT</i>	(9)	-0.02	0.03 <sup>a</sup>	-0.04 <sup>a</sup>	-0.03 <sup>a</sup>	0.04 <sup>a</sup>	0.02	0.01	-0.25 <sup>a</sup>	1.00						
<i>RND</i>	(10)	-0.10 <sup>a</sup>	-0.01	-0.11 <sup>a</sup>	-0.05 <sup>a</sup>	0.01	0.08 <sup>a</sup>	0.09 <sup>a</sup>	-0.13 <sup>a</sup>	0.06 <sup>a</sup>	1.00					
$\Delta A$	(11)	0.01	-0.07 <sup>a</sup>	-0.01	0.19 <sup>a</sup>	-0.00	-0.04 <sup>a</sup>	0.02	0.21 <sup>a</sup>	0.19 <sup>a</sup>	0.00	1.00				
<i>DEP</i>	(12)	-0.12 <sup>a</sup>	-0.04 <sup>a</sup>	0.06 <sup>a</sup>	0.03 <sup>a</sup>	-0.21 <sup>a</sup>	-0.05 <sup>a</sup>	0.09 <sup>a</sup>	-0.11 <sup>a</sup>	0.04 <sup>a</sup>	0.10 <sup>a</sup>	-0.05 <sup>a</sup>	1.00			
<i>DIV</i>	(13)	-0.05 <sup>a</sup>	-0.16 <sup>a</sup>	-0.02	0.05 <sup>a</sup>	-0.05 <sup>a</sup>	0.02 <sup>a</sup>	0.01	0.18 <sup>a</sup>	-0.04 <sup>a</sup>	-0.04 <sup>a</sup>	0.08 <sup>a</sup>	0.03 <sup>a</sup>	1.00		
<i>DIVER</i>	(14)	-0.02	0.05 <sup>a</sup>	-0.02	0.05 <sup>a</sup>	0.03 <sup>a</sup>	-0.01	-0.01	-0.06 <sup>a</sup>	0.01	0.04 <sup>a</sup>	0.00	-0.06 <sup>a</sup>	-0.01	1.00	
<i>CHAEVOL</i>	(15)	0.01	0.02	0.04 <sup>a</sup>	0.64 <sup>a</sup>	0.03 <sup>a</sup>	-0.02	0.32 <sup>a</sup>	0.14 <sup>a</sup>	-0.02	-0.03 <sup>a</sup>	0.06 <sup>a</sup>	0.09 <sup>a</sup>	0.04 <sup>a</sup>	0.09 <sup>a</sup>	1.00

**Table 6. Tobit regression results on determinants of foreign vs. local currency debt financing**

The sample consists of firms financing FC and LC debt during 2002-2012. The dependent variables of FC and LC debt ratio (*FCD* and *LCD*) are measured by FC or LC *financial* debt divided by total assets. Because the values of *FCD* and *LCD* are low-bounded to zero, Tobit regressions are estimated using robust standard errors. z-statistics are in parentheses. The second and third columns show the predicted relationships of firm characteristics with the usage of FC debt financing, relative to the usage of LC debt financing. +\* and -\* represent stronger relationships than + and -, respectively. See Table 1 for definitions and measurements of variables. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Predicted relationships		Whole period (2002-2012)		Pre-GFC (2002-2006)		Post-GFC (2007-2012)	
	<i>FCD</i>	<i>LCD</i>	<i>FCD</i>	<i>LCD</i>	<i>FCD</i>	<i>LCD</i>	<i>FCD</i>	<i>LCD</i>
<i>Constant</i>			-0.330*** (-12.286)	-0.105*** (-2.647)	-0.174*** (-4.643)	-0.183*** (-3.153)	-0.423*** (-11.050)	-0.080 (-1.525)
<i>TAN</i>	+*	+	0.044*** (5.045)	0.170*** (13.240)	0.022* (1.754)	0.139*** (6.863)	0.063*** (5.128)	0.189*** (11.210)
<i>SIZE</i>	+*	+	0.014*** (9.913)	0.015*** (6.978)	0.009*** (4.566)	0.018*** (5.627)	0.018*** (9.224)	0.013*** (4.634)
<i>EXPORT</i>	+	N/A	0.045*** (7.420)	-0.010 (-1.126)	0.043*** (5.022)	-0.021 (-1.527)	0.044*** (5.059)	-0.010 (-0.854)
<i>INTTR</i>	+,-	N/A	0.021** (2.155)	0.022 (1.538)	0.026* (1.729)	0.040 (1.614)	0.020 (1.493)	0.012 (0.691)
<i>EXPER</i>	+	N/A	-0.004 (-0.512)	-0.042*** (-3.990)	0.000 (0.041)	-0.037** (-2.283)	-0.007 (-0.732)	-0.046*** (-3.317)
<i>PROFIT</i>	+,-	+,-	-0.116*** (-8.218)	-0.216*** (-12.109)	-0.119*** (-4.656)	-0.256*** (-7.351)	-0.115*** (-6.615)	-0.200*** (-9.681)
<i>DEFICIT</i>	+	+	-0.062*** (-4.910)	0.000 (0.005)	-0.041** (-2.521)	-0.002 (-0.058)	-0.088*** (-4.599)	0.000 (0.015)
<i>RND</i>	-	-	-0.444*** (-5.749)	-0.126 (-1.126)	-0.599*** (-4.367)	-0.347* (-1.731)	-0.384*** (-4.108)	-0.056 (-0.485)
$\Delta A$	+	+	0.030*** (2.999)	-0.019 (-1.415)	0.010 (0.663)	-0.047** (-2.158)	0.044*** (3.054)	0.004 (0.225)
<i>DEP</i>	-	-	-2.242*** (-10.383)	-0.938*** (-4.152)	-2.422*** (-7.720)	-0.852** (-2.359)	-2.091*** (-7.169)	-1.061*** (-3.718)
<i>DIV</i>	-*	-	-0.015*** (-2.611)	-0.090*** (-9.015)	-0.005 (-0.673)	-0.101*** (-7.373)	-0.028*** (-2.924)	-0.080*** (-5.576)
<i>DIVER</i>	+	+	-0.004 (-0.703)	0.021*** (2.644)	0.008 (1.200)	0.025** (2.215)	-0.018*** (-2.200)	0.018 (1.606)
<i>CHAEVOL</i>	+,-	+,-	-0.016*** (-3.419)	-0.008 (-1.210)	0.001 (0.194)	-0.018* (-1.830)	-0.030*** (-4.493)	-0.001 (-0.079)
<i>IND, YEAR dummies</i>			Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>			6,460	6,460	2,812	2,812	3,648	3,648
<i>F-value</i>			19.46***	16.09***	10.71***	9.47***	15.20***	13.77***

**Table 7. Ordered logit regression results on determinants of foreign vs. local currency debt financing**

The sample consists of firms financing FC or LC debt during 2002-2012. The ordinal dependent variable of *FCD3* represents three categories of firms with the value of 3 for firms with more FC debt, 2 for firms with less FC debt, and 1 for firms with LC debt only. Ordered logit regressions are estimated using robust standard errors, and regression coefficients are ordered log-odds. t-statistics are in parentheses. The second and third columns show the predicted relationships of firm characteristics with the usage of FC debt financing, relative to the usage of LC debt financing. +\* and -\* represent stronger relationships than + and -, respectively. See Table 1 for definitions and measurements of variables. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Predicted relationships		Whole period (2002-2012)	Pre-GFC (2002-2006)	Post-GFC (2007-2012)
	<i>FCD</i>	<i>LCD</i>	<i>FCD3</i>	<i>FCD3</i>	<i>FCD3</i>
<i>TAN</i>	+*	+	0.264* (1.712)	0.018 (0.074)	0.491** (2.423)
<i>SIZE</i>	+*	+	0.215*** (8.210)	0.168 *** (4.063)	0.260*** (7.409)
<i>EXPORT</i>	+	N/A	0.741 *** (6.614)	0.862 *** (4.703)	0.645*** (4.478)
<i>INTTR</i>	+,-	N/A	0.063 (0.368)	-0.030 (-0.106)	0.119 (0.540)
<i>EXPER</i>	+	N/A	-0.053 (-0.408)	-0.100 (-0.479)	-0.030 (-0.180)
<i>PROFIT</i>	+,-	+,-	-0.958*** (-4.729)	-0.964 *** (-2.150)	-0.885*** (-3.904)
<i>DEFICIT</i>	+	+	-1.026*** (-5.042)	-0.886 *** (-3.078)	-1.278*** (-4.274)
<i>RND</i>	-	-	-5.308*** (-3.943)	-7.330 *** (-2.830)	-4.655*** (-2.985)
$\Delta A$	+	+	0.408*** (2.852)	0.334 (1.408)	0.445** (2.348)
<i>DEP</i>	-	-	-34.550*** (-9.508)	-42.737 *** (-7.593)	-28.490*** (-6.022)
<i>DIV</i>	-*	-	0.078 (0.714)	0.199 (1.250)	-0.057 (-0.358)
<i>DIVER</i>	+	+	-0.064 (-0.690)	0.192 (1.463)	-0.331*** (-2.416)
<i>CHAEBOL</i>	+,-	+,-	-0.137 (-1.575)	0.168 (1.266)	-0.373*** (-3.128)
<i>IND, YEAR dummies</i>			Yes	Yes	Yes
<i>N</i>			5,785	2,537	3,248
<i>Pseudo R<sup>2</sup></i>			0.0875	0.0805	0.0910
<i>Chi-square</i>			1,943.98***	348.86***	1,595.64***

**Table 8. Robustness test with a different time specification**

The sample consists of firms financing FC and LC debt during 2002-2012 excluding the global financial crisis period of 2007 and 2008 years. The dependent variables of *FCD* and *LCD* in Tobit regressions are measured by FC or LC *financial* debt divided by total assets. The ordinal dependent variable of *FCD3* in ordered logit regression represents three categories of firms with the value of 3 for firms with more FC debt, 2 for firms with less FC debt, and 1 for firms with LC debt only. All regressions are estimated using robust standard errors. The second and third columns show the predicted relationships of firm characteristics with the usage of FC debt financing, relative to the usage of LC debt financing. z-statistics in Tobit regressions and t-statistics in ordered logit regression are in parentheses. +\* and -\* represent stronger relationships than + and -, respectively. See Table 1 for definitions and measurements of variables. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Predicted relationships		Whole period without 2007 and 2008 years		
	<i>FCD</i>	<i>LCD</i>	<i>FCD</i>	<i>LCD</i>	<i>FCD3</i>
<i>Constant</i>			-0.209 *** (-7.582)	-0.146 *** (-3.561)	- -
<i>TAN</i>	+*	+	0.054 *** (5.641)	0.164 *** (11.792)	0.524*** (3.123)
<i>SIZE</i>	+*	+	0.009 *** (6.365)	0.016 *** (7.177)	0.136*** (4.902)
<i>EXPORT</i>	+	N/A	0.057 *** (8.560)	-0.008 (-0.871)	0.948*** (7.741)
<i>INTTR</i>	+,-	N/A	0.017 (1.605)	0.023 (1.403)	0.011 (0.062)
<i>EXPER</i>	+	N/A	0.007 (0.892)	-0.049 *** (-4.226)	0.107 (0.738)
<i>PROFIT</i>	+,-	+,-	-0.092 *** (-6.335)	-0.202 *** (-9.889)	-0.732*** (-3.135)
<i>DEFICIT</i>	+	+	-0.047 *** (-3.490)	0.003 (0.156)	-0.942*** (-4.217)
<i>RND</i>	-	-	-0.539 *** (-6.513)	-0.098 (-0.881)	-6.778*** (-4.727)
$\Delta A$	+	+	0.011 (0.981)	-0.050 *** (-3.263)	0.332* (1.957)
<i>DEP</i>	-	-	-2.179 *** (-9.218)	-1.045 *** (-4.127)	-32.953*** (-8.156)
<i>DIV</i>	-*	-	-0.011 * (-1.788)	-0.094 *** (-8.537)	0.136 (1.197)
<i>DIVER</i>	+	+	0.004 (0.657)	0.016 * (1.812)	0.086 (0.842)
<i>CHAEBOL</i>	+,-	+,-	-0.007 (-1.384)	-0.004 (-0.484)	-0.058 (-0.613)
<i>IND, YEAR dummies</i>			Yes	Yes	Yes
<i>N</i>			5,264	5,264	4,732
<i>Pseudo R<sup>2</sup></i>			-	-	0.0755
<i>F-value / Chi-square</i>			17.36***	14.91***	594.14***

**Table 9. Robustness test with a different ordinal dependent variable in ordered logit regressions**

The sample consists of firms financing FC or LC debt during 2002-2012. The ordinal dependent variable of *FCD3N* represents three categories of firms with the value of 3 for firms with FC debt only, 2 for firms with both FC debt and LC debt, and 1 for firms with LC debt only. Ordered logit regressions are estimated using robust standard errors, and regression coefficients are ordered log-odds. t-statistics are in parentheses. The second and third columns show the predicted relationships of firm characteristics with the usage of FC debt (*FCD*) financing, relative to the usage of LC debt (*LCD*) financing. +\* and -\* represent stronger relationships than + and -, respectively. See Table 1 for definitions and measurements of variables. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Predicted relationships		Whole period (2002-2012)	Pre-GFC (2002-2006)	Post-GFC (2007-2012)
	<i>FCD</i>	<i>LCD</i>	<i>FCD3N</i>	<i>FCD3N</i>	<i>FCD3N</i>
<i>TAN</i>	+*	+	0.489*** (3.023)	0.114 (0.433)	0.815*** (3.843)
<i>SIZE</i>	+*	+	0.244*** (8.664)	0.211*** (4.739)	0.280*** (7.499)
<i>EXPORT</i>	+	N/A	0.741*** (6.450)	0.846*** (4.539)	0.645*** (4.319)
<i>INTTR</i>	+,-	N/A	0.063 (0.350)	-0.020 (-0.068)	0.121 (0.527)
<i>EXPER</i>	+	N/A	-0.014 (-0.098)	-0.039 (-0.159)	-0.013 (-0.075)
<i>PROFIT</i>	+,-	+,-	-1.003*** (-4.820)	-1.055** (-2.359)	-0.915*** (-3.890)
<i>DEFICIT</i>	+	+	-1.032*** (-4.752)	-0.958*** (-3.055)	-1.226*** (-3.960)
<i>RND</i>	-	-	-4.613*** (-3.361)	-5.876** (-2.175)	-4.243*** (-2.694)
$\Delta A$	+	+	0.369** (2.464)	0.303 (1.233)	0.387* (1.950)
<i>DEP</i>	-	-	-34.551*** (-9.345)	-43.034*** (-7.499)	-28.325*** (-5.857)
<i>DIV</i>	-*	-	-0.011 (-0.095)	0.057 (0.352)	-0.098 (-0.583)
<i>DIVER</i>	+	+	-0.024 (-0.232)	0.296** (2.011)	-0.343** (-2.292)
<i>CHAEBOL</i>	+,-	+,-	-0.200** (-2.187)	0.110 (0.776)	-0.422*** (-3.409)
<i>IND, YEAR dummies</i>			Yes	Yes	Yes
<i>N</i>			5,785	2,537	3,248
<i>Pseudo R<sup>2</sup></i>			0.1028	0.0954	0.1058
<i>Chi-square</i>			1,801.46***	313.73***	1,707.34***