Can the presence of Foreign Investment Affect the Capital Structure of Domestic Firms?

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Abstract

Based on the existing literature, this paper argues that an increase in foreign presence can affect the leverage of domestic firms. We develop a simple theoretical model in which the presence of foreign firms leads to a productivity spillover effect to domestic firms. This spillover effect can be negative, positive or zero. The model is used to show that an increase in foreign presence increases (decreases) the level of debt, as well as the level of investment of domestic firms, if the productivity spillover effect is positive (negative). We apply the model to explore the link between foreign presence and leverage with firm-level panel data from China. The empirical estimation, using Instrumental Variable Tobit regression, reveals that, in overall terms, the impact of foreign presence on the leverage of domestic firms in China's manufacturing sector is negative. We find that the negative impact on the leverage of privately owned firms is large relative to state-owned firms. Furthermore, we find that the impact of foreign presence on leverage varies from industry to industry, which is consistent with the presence of heterogeneity in the productivity spillover effect.

Keywords: Presence of foreign firms; capital structure; panel data analysis; China

1. Introduction

International business researchers, such as Dunning (1988), argue that foreign firms possess significant advantages over domestic firms and hence foreign direct investment (FDI) in a country can affect the output of domestic firms. FDI affects the output of domestic firms directly as well as indirectly through FDI-linked spillover effects. The entry of foreign firms increases competition in the domestic market which can affect the profitability of domestic firms. Increased competition can also restrict the growth opportunities of domestic firms.[1] Profitability and growth opportunities are important determinants of firm capital structure (Céspedes, González and Molina, 2010; Margaritis and Psillaki, 2010 and Kayo and Kimura, 2011).[2] Brander and Lewis (1986) made an important contribution to the related literature by demonstrating that the output and financial structure decisions of firms are interconnected. Recent studies, such as Campello (2006), have emprically evaluated the link between firm product market performance and financing decisions. Campello argues that debt financing does not always hurt a firm's product market performance; moderate debt can contribute to an increase in market share.

Given that (i) the output and financial structure decisions of firms are interconnected and (ii) firm output is affected by FDI, it can be argued that the presence of foreign firms in a country, through the related spillovers, can also affect firm capital structure. For example, due to an increase in foreign presence, domestic firms may shift to debt financing because raising equity is too difficult. In other words, based on the finance and international business/economics literature, there seems to be a clear link between the presence of foreign

[1] A large number of studies including Görg and Greenaway (2004), Branstetter (2006), Buckley, Clegg and Wang (2007), Haskel, Pereira and Slaughter (2007), Liu (2008) and Meyer and Sinani (2009) support this view.

[2] Chung, Na and Smith, R. (2013) argue that attractive growth opportunities can contribute to an increase in leverage.

firms and the capital structure of domestic firms. However, none of the existing studies has formally explored this link.

This paper makes two distinct contributions to the existing literature. First, using a simple theoretical model, where firms aim to maximize their value and the presence of foreign firms gives rise to productivity spillovers to domestic firms, we show that the presence of foreign firms can also affect the capital structure of domestic firms. Second, using firm level panel data from China's manufacturing sector, the link between foreign presence and the capital structure of domestic firms is empirically evaluated. Specifically, we show that an increase in foreign presence increases both the optimal debt level and investment of domestic firms, only if the productivity spillover effect is positive. However, in the presence of a negative productivity spillover effect, an increase in foreign presence decreases the optimal debt level as well as investment. Because foreign presence can increase (or decrease) both debt and investment, its impact on the leverage of domestic firms cannot be unambiguously determined. We explore this link by means of an empirical study. Based on the theoretical model, an empirical model is specified. The empirical model is estimated making use of firm level panel data over the period 2000-2007 from China.

Our empirical work is focused on China because China is one of the largest recipients of FDI and the Chinese economy is rapidly growing. Since the opening up of the Chinese economy in the late 1970s, the Chinese capital market has gone through significant changes. As noted by Chen (2004), compared to most western firms, Chinese firms make greater use of retained earnings for business finance. Recent figures suggest a shift away from this in favor of equity finance and hence our empirical study is based on a relatively recent dataset. In 2011, 282 new companies listed on the stock market raising US$45.3 billion in new equity funds (which represents a sharp decrease as compared to US$76.3 billion raised in 2010 but a

big improvement over 2009 when only 99 companies were listed raising US$29.6 billion).[3] Private equity is emerging as an important source of funds for China's small and medium-sized companies (Perkowski, 2012). China's economic landscape is rapidly changing. For example, China has recently allowed a number of foreign institutions to invest in its capital market. The new rules allow selected international fund managers to invest a combined total of US$80 billion in China. China has also decided to extend Chinese currency loans to some emerging nations. The success of this and related measures depends on strong banks. The Chinese banking system, with a cap on deposit rates, guarantees significant profits. Chinese banks are state-owned and a strong banking system cannot be established unless steps are taken to reduce the monopoly power of state-owned banks (Financial Times, 2012 & Pierson, 2012).

Chen (2004), Chen and Strange (2005), Huang and Song (2006), Qian, Tian and Wirjanto (2009), Li, Yue and Zhao (2000), among others, have considered the determinants of capital structure in China.[4] However, none of these studies has considered the impact of the presence of foreign firms. The empirical analysis presented in this study is based on a comprehensive dataset that covers over 85 per cent of the total industrial output of China. Such an extensive dataset allows one to appropriately measure the presence of foreign firms. One of the reasons why the earlier studies have not empirically examined the impact of the presence of foreign firms on firm capital structure may be that the dataset available was not sufficiently large. Earlier studies on China have suggested that the financing decisions of private and state-owned firms can be very different. Accordingly, we also separately examine the impact of foreign presence on the capital structure of (a) privately owned and (b) state and

[3] Keister (2004) suggests that economic transition in China forced a large number of Chinese firms to reduce their reliance on loans from state-owned banks. An (2012) argues that taxation can also affect firm capital structure.

[4] Li, Yue and Zhao (2009) show that state ownership has a positive effect on leverage and firm access to long-term debt, whereas the impact of foreign ownership on leverage is negative.

collectively owned firms. As financing decisions may vary across Chinese industry sectors, this paper also separately considers the case of the (i) textile industry, (ii) transportation equipment manufacturing industry, (iii) electrical machinery and equipment manufacturing industry and (iv) communication equipment, computer and other electronic equipment manufacturing industry. The choice of these industries is mainly dictated by data availability. The empirical results are based on Tobit and Instrumental Variable Tobit estimations. Our empirical analysis suggests that foreign presence decreases the leverage of domestic firms in China's manufacturing sector. We find that the negative impact on the leverage of privately owned firms is relatively large. Furthermore, the impact of foreign presence on the leverage of domestic firms varies from industry to industry.

The rest of the paper is organized as follows. A theoretical model that shows the link between the presence of foreign firms and firm capital structure is presented in section 2. Based on the theoretical model, an empirical model is specified in Section 3. This section also includes a discussion of the data. The empirical results are presented in Section 4 and Section 5 contains some concluding remarks.

2. Firm Leverage and Foreign Presence: A Theoretical Model

By making use of a simple theoretical model that combines elements of finance theory and international business, the aim of this section is to establish a link between the presence of foreign firms and firm capital structure.

Consider an industry where γ is the proportion of foreign firms. A representative domestic firm with wealth W raises debt (D) to finance an investment I at time 0, which is used in production at time 1. As everything is measured in real values and the magnitude of investment depends on the size of debt, debt indirectly enters as an input into the production

process. $f(I) = Ae^{\beta\gamma}I$ is the firm production function, where $e^{\beta\gamma}$ captures the size of foreign presence and the resulting spillovers to domestic firms. Specifically, $\gamma = 0$ means that there are no foreign firms in the industry and hence there is no productivity spillover effect, whereas $\gamma = 1$ implies that all firms are foreign. As this paper focuses on the impact of foreign presence on the leverage of domestic firms and the dataset used in our empirical analysis contains a large number of foreign firms, we assume that $0 < \gamma < 1$. In other words, there is foreign presence but not all firms in the industry are foreign. As discussed earlier, the presence of foreign firms leads to productivity spillovers to domestic firms. The parameter β captures the sign of such spillovers. $\beta > 0$ implies the presence of positive spillovers, whereas $\beta = 0$ means that the presence of foreign firms does not generate any spillovers to domestic firms. $\beta < 0$ captures the idea of negative spillovers, where the presence of foreign firms reduces the productivity of domestic firms. In other words, the sign of β captures the heterogeneity of the impact of foreign presence on domestic firms located in different industries. The degree of this impact depends on a number of factors, including the distance to the world technology frontier. Acemoglu, Aghion and Zilibotti (2006) and Aghion et al. (2009), among others, show that domestic firms in industries that are far away from the technological frontier are negatively affected by the entry of foreign firms, while firms in industries that are closer to the frontier enjoy positive productivity spillover effects. In our theoretical model, a positive value of β suggest that the presence of foreign firms is a source of positive externality (i.e., as the proportion of foreign firms increases, the domestic firms experience a higher level of positive externality). The positive externality arises from spillovers that result from, among other things, the introduction of new technology and superior management skills. The parameter *A* captures the impact of other factors that enter into (and affect) the production process, such as the level of domestic technology, etc.

At time 2, a random cash flow *x* is realized and the debt (*D*) is payable. The randomness of cash flow *x* is due to market uncertainty and *x* is uniformly distributed over the support $(0, a)$. If the firm defaults, a deadweight cost of *C* is incurred. The firm's problem is to choose the level of debt (*D*) and investment (*I*) to maximize its value, as follows:

$$\text{Maximise } Ae^{\beta\gamma} I + \int_{D}^{a} \left(\frac{x - D}{a} \right) dx \text{ with respect to } I \ \& \ D$$

$$\text{Subject to } I - W = \int_{0}^{D} \left(\frac{x - C}{a} \right) dx + \int_{D}^{a} \left(\frac{D}{a} \right) dx$$

By solving the above optimization problem[5], the optimal level of debt can be derived as follows:

$$D = \frac{Ae^{\beta\gamma}(a - C) - a}{Ae^{\beta\gamma} - 1} = a - \left[\frac{Ae^{\beta\gamma}}{Ae^{\beta\gamma} - 1} \right] C \qquad (1)$$

Equation (1) shows that, irrespective of the value of β, there is a one-to-one and positive relationship between debt and the uncertain cash flow. In other words, as the maximum possible cash flow $(\text{i.e., } a)$ increases, domestic firms are more likely to opt for a higher level of debt. Investment decisions are based on potential cash flows. As the maximum possible cash flow increases, investors would be more willing to take on extra debt. Equation (1) also shows that an increase in the debt default cost $(\text{i.e., } C)$ discourages debt since if $\beta \geq 0$, $A > 1$ and if $\beta < 0$, $A > e^{-\beta}$. If the debt default cost is zero then the optimal debt equals the maximum possible cash flow $(\text{i.e., as } C \to 0,\ D \to a)$. Because $\frac{Ae^{\beta\gamma}}{Ae^{\beta\gamma} - 1}$ is always greater than one, the optimal debt is positive only if $a > C$.[6] In other words, the debt default cost cannot be greater than (or equal to) the maximum possible cash flow.

[5] We assume that if $\beta \geq 0$, $A > 1$ and if $\beta < 0$, $A > e^{-\beta}$ such that the second order sufficient condition holds.

[6] In other words, in the presence of a positive spillover effect, $A > 1$ and $a > C$ are necessary conditions for the optimal debt to be positive.

Equation (1) can be used to establish a relationship between foreign presence and the optimal debt of a domestic firm as follows:

$$\frac{\partial D}{\partial \gamma} = \frac{\beta A e^{\beta\gamma} C}{\left(Ae^{\beta\gamma} - 1\right)^2} \tag{2}$$

Equation (2) shows the impact of an increase in foreign presence on the optimal debt of a domestic firm depends on the sign of productivity spillover effect $\left(\text{i.e., } \beta\right)$. An increase in foreign presence in the industry increases the optimal debt of a domestic firm only if productivity spillover effect is positive $\left(\text{i.e., } \beta > 0\right)$. Equation (2) also suggests that the debt default cost plays a crucial role. If the debt default cost was lower, foreign presence would lead to a smaller increase in optimal debt provided that $\beta > 0$. A positive productivity spillover effect implies that an increase in foreign presence leads to an increase in the productivity of the domestic firms, which improves profitability. A large number of existing studies, such as Meyer and Sinani (2009), have confirmed the presence of such a positive productivity spillover effect. An increase in profitability also increases the firm's capacity to take on extra debt. However, in the presence of a negative productivity spillover effect, an increase in foreign presence reduces the productivity of domestic firms which contributes to a decrease in their ability to take on debt. Finally, equation (2) suggests that in the absence of productivity spillover effect, an increase in foreign presence would have no effect on the optimal debt of domestic firms.

We now turn our attention to the impact of foreign presence on investment of domestic firms. Using the constraint $\left(\text{i.e., } I - W = \int_0^D \left(\frac{x - C}{a}\right) dx + \int_D^a \left(\frac{D}{a}\right) dx\right)$, the relationship between debt and investment can be written as follows:

$$I = W - \frac{D^2}{2a} + \frac{a - C}{a} D \tag{3}$$

By differentiating equation (3) with respect to γ, the relationship between foreign presence and optimal investment can be derived as follows:

$$\frac{\partial I}{\partial \gamma} = \left[\frac{(a-C)-D}{a}\right]\left[\frac{\partial D}{\partial \gamma}\right] = \left[\frac{C}{a\left(Ae^{\beta\gamma}-1\right)}\right]\left[\frac{\partial D}{\partial \gamma}\right] = \left[\frac{\beta Ae^{\beta\gamma}}{a\left(Ae^{\beta\gamma}-1\right)^{3}}\right]C^{2} \quad (4)$$

Given that $A>1$ and $\beta>0$ (namely the productivity spillover effect is positive), equation (4) suggests that an increase in foreign presence increases firm investment. However, in the presence of negative productivity spillovers, an increase in foreign presence decreases firm investment. Because, foreign presence increases (or decreases) both debt and investment, the impact on firm leverage $\left(\text{i.e.,}\frac{D}{I}\right)$ is not immediately clear.

The link between foreign presence and leverage of domestic firms can be further explored by re-writing equation (4) in terms of percentage change as

$$\left[\frac{\partial I}{\partial \gamma}\right]\left[\frac{\gamma}{I}\right] = \left[\frac{(a-C)-D}{a}\right]\left[\frac{\partial D}{\partial \gamma}\right]\left[\frac{\gamma}{D}\right]\left[\frac{D}{I}\right]$$

The above expression is the elasticity of investment with respect to foreign presence. Using equation (1), the impact of a change in foreign presence on firm leverage in percentage terms can be written as

$$\begin{aligned}\left[\frac{\partial\left(\frac{D}{I}\right)}{\partial \gamma}\right]\left[\frac{\gamma}{\left(\frac{D}{I}\right)}\right] &= \left[\left(\frac{\partial D}{\partial \gamma}\right)\left(\frac{\gamma}{D}\right)\right]-\left[\left(\frac{\partial I}{\partial \gamma}\right)\left(\frac{\gamma}{I}\right)\right] \\ &= \left[1-\left\{\frac{a-C-D}{a}\right\}\left\{\frac{D}{I}\right\}\right]\left[\frac{\partial D}{\partial \gamma}\right]\left[\frac{\gamma}{D}\right] \quad (5) \\ &= \left[1-\left\{\frac{C}{a\left(Ae^{\beta\gamma}-1\right)}\right\}\left\{\frac{D}{I}\right\}\right]\left[\frac{\partial D}{\partial \gamma}\right]\left[\frac{\gamma}{D}\right]\end{aligned}$$

Equation (5) shows that the impact of an increase in foreign presence on firm leverage depends on the debt default cost, maximum possible cash flow and other factors. From equation (5), we can characterize the impact of foreign presence on domestic firms' leverage in the following proposition:

Proposition 1: (a) If there exists no productivity spillovers from foreign investment (namely $\beta = 0$), foreign investment does not affect domestic firms' optimal leverage (namely $\frac{\partial\left(\frac{D}{I}\right)}{\partial\gamma} = 0$); (b) If foreign investment positively affects domestic firms' productivity (namely $\beta > 0$), it also positively affects domestic firms' optimal leverage if firm productivity is sufficiently high (namely $\frac{\partial\left(\frac{D}{I}\right)}{\partial\gamma} > 0$, if A > 2)[7]; (c) If there exists negative productivity spillovers, the foreign investment negatively affects domestic firms' optimal leverage, given that firm productivity is sufficiently high (namely $\frac{\partial\left(\frac{D}{I}\right)}{\partial\gamma} < 0$, if A > $2e^{-\beta}$).

Proof: Equation (5) suggests that the sign of $\frac{\partial\left(\frac{D}{I}\right)}{\partial\gamma}$ depends on two terms: $1-\left\{\frac{C}{a\left(Ae^{\beta\gamma}-1\right)}\right\}\left\{\frac{D}{I}\right\}$ and $\frac{\partial D}{\partial\gamma}$. For case (a) where $\beta = 0$, equation (2) indicates that $\frac{\partial D}{\partial\gamma} = 0$. Therefore $\frac{\partial\left(\frac{D}{I}\right)}{\partial\gamma} = 0$. For case (b) where $\beta > 0$, $\frac{\partial D}{\partial\gamma} > 0$ from equation (2). Let $f\left(\frac{D}{I}\right) \equiv 1-\left\{\frac{C}{a\left(Ae^{\beta\gamma}-1\right)}\right\}\left\{\frac{D}{I}\right\}$. Note that the function f is a decreasing function of $\frac{D}{I}$,

[7] Note we assume $a > C$ such that debt is positive.

where $0 \le \frac{D}{I} \le 1$. Thus

$$f\left(\frac{D}{I}\right) \ge f(1) = 1 - \left\{\frac{C}{a\left(Ae^{\beta\gamma}-1\right)}\right\} = \frac{a\left(Ae^{\beta\gamma}-1\right)-C}{a\left(Ae^{\beta\gamma}-1\right)} > \frac{Ae^{\beta\gamma}-2}{Ae^{\beta\gamma}-1} \ge \frac{A-2}{Ae^{\beta\gamma}-1}$$, where second

inequality is obtained by applying the condition of $a > C$, and the third inequality is obtained by the fact that $\beta > 0$, $0 \le \gamma \le 1$, and the term $e^{\beta\gamma}$ is an increasing function of γ. Hence, if $A > 2$,

$f\left(\frac{D}{I}\right) > 0$, which together with $\frac{\partial D}{\partial \gamma} > 0$ suggests $\frac{\partial\left(\frac{D}{I}\right)}{\partial \gamma} > 0$. Regarding case (c) where $\beta <$

0, equation (2) indicates $\frac{\partial D}{\partial \gamma} < 0$. Similar to case (b),

$$f\left(\frac{D}{I}\right) \ge f(1) = 1 - \left\{\frac{C}{a\left(Ae^{\beta\gamma}-1\right)}\right\} = \frac{a\left(Ae^{\beta\gamma}-1\right)-C}{a\left(Ae^{\beta\gamma}-1\right)} > \frac{Ae^{\beta\gamma}-2}{Ae^{\beta\gamma}-1} \ge \frac{Ae^{\beta}-2}{Ae^{\beta\gamma}-1}$$, where the third

inequality is obtained by the fact that $\beta < 0$, $0 \le \gamma \le 1$, and the term $e^{\beta\gamma}$ is a decreasing function

of γ. Subsequently if $A > 2e^{-\beta}$, $\frac{\partial\left(\frac{D}{I}\right)}{\partial \gamma} < 0$.

Given Proposition 1, the next step is to estimate this relationship using data from a real economy. In this paper, we use firm level panel data from China to empirically evaluate the relationship between firm leverage and foreign presence.

Using equations (1) and (3), the optimal value of firm leverage can be written as follows:

$$\frac{D}{I} = \frac{\left(Ae^{\beta\gamma}-1\right)\left[Ae^{\beta\gamma}(a-C)-a\right]}{-\left(\frac{1}{2a}\right)\left[Ae^{\beta\gamma}(a-C)-a\right]^2 + \left(\frac{a-C}{a}\right)\left(Ae^{\beta\gamma}-1\right)\left[Ae^{\beta\gamma}(a-C)-a\right] + W\left(Ae^{\beta\gamma}-1\right)^2}$$

(6)

Equation (6) suggests that there is a relationship between foreign presence and firm leverage and this relationship is sensitive to fluctuations in factors that include the maximum cash flow and debt default cost. As all of these factors and the parameters of the production function cannot be observed in real life, we empirically evaluate the relationship between foreign presence and leverage by means of an empirical model.

The theoretical results presented in the above are based on an analysis of a representative (or an average) firm. In the presence of positive FDI-linked spillover effects, Proposition 1 suggests that an increase in the presence of foreign investment leads to an increase in the optimal leverage if domestic firms are sufficiently productive. If domestic firms are not productive enough (namely A <2), the impact of foreign investment can be negative. In particular, an increase in foreign presence increases the productivity of domestic firms, which increases their profitability. An increase in profitability encourages other domestic firms to enter the industry, which increases the level of competition for debt and hence the impact on leverage can be negative if domestic firms themselves are not strong enough (i.e. less productive)[8]. As in equation (5), the impact of a change in the level of foreign investment on the capital structure of domestic firms (depending on the size of foreign investment-linked spillover effects and its impact on profitability) can vary from industry to industry. Accordingly, the empirical analysis presented in this paper also considers the link between foreign presence and firm capital structure in different industries.

[8] Meanwhile, increase in foreign presence also increases competition in the domestic market, which reduces firm profitability. A decrease in firm profitability can force some domestic firms to exit the industry, which reduces the demand for debt and hence the overall impact on firm leverage can also be positive. Our model does not explicitly capture this effect.

In order to empirically evaluate the impact of foreign presence on the leverage of domestic firms, using Taylor's expansion, we linearize equation (6) at $(A_0, C_0, W_0, \gamma_0)$ which yields equation (7) as follows: [9]

$$leverage = \alpha_0 + \alpha_1 A + \alpha_2 C + \alpha_3 W + \alpha_4 \gamma \quad (7)$$

where $\alpha_0 = y(A_0, C_0, W_0 - \gamma_0) - A_0\alpha_1 - C_0\alpha_2 - W_0\alpha_3 - \gamma_0\alpha_4$, $\alpha_1 = \left.\frac{\partial y}{\partial A}\right|_{A_0, C_0, W_0}$,

$\alpha_2 = \left.\frac{\partial y}{\partial C}\right|_{A_0, C_0, W_0, \gamma_0}$, $\alpha_3 = \left.\frac{\partial y}{\partial W}\right|_{A_0, C_0, W_0, \gamma_0}$, $\alpha_4 = \left.\frac{\partial y}{\partial \gamma}\right|_{A_0, C_0, W_0, \gamma_0}$, and *y* denotes the functional form of equation (6).

Based on equation (7), the following empirical model can be specified, where fp_{it} is foreign presence in industry i at time t.

$$leverage_{it} = \lambda_0 + \lambda_1 X_{it} + \lambda_2 fp_{it} + \lambda_3 dindustry_i + \lambda_4 dyear_t + \varepsilon_{it} \quad (8)$$

Equation (8), which is based on equation (7), suggests that *A*, *C*, and *W* depend on a set of firm characteristics (X). As we plan to estimate the model by using firm level panel data, industry dummies (*dindustry*) and year dummies (*dyear*) have been included in equation (7). Finally, we also add an error term (ε_{it}) to capture the impact of all omitted variables. The error term is assumed to be *i.i.d*. normal. Equation (8), which is our empirical model, is further discussed in the following section.

3. Empirical Model and Data

[9] Since a number of existing studies, such as Liu (2008), have confirmed the presence of a positive spillover effect to domestic firms in China's manufacturing sector, in order to focus on the impact of a change in foreign presence on leverage, we do not explicitly estimate *β*.

The theoretical model presented in Section 2 shows that firm capital structure depends on a number of factors including foreign presence. Equation (7) includes X which is a vector of control variables. These control variables consist of other determinants of firm capital structure that have been identified in previous studies. These variables include firm size, firm age, collateral value of assets, growth opportunities, non-debt tax shields, profitability, business risk and ownership structure; *dindustry* is a set of two-digit industry dummies that control for industry fixed effects; *dyear* is a set of year dummies that captures the time variant effects. *fp*, which is the main variable of interest, captures the presence of foreign firms. The degree of foreign presence *fp* is the share of the assets of foreign firms within the four-digit industry classification as follows:[10]

$$fp = \frac{\sum_{i \in F} y_i}{\sum_{j \in J} y_j}$$

where y is the firm's total assets, F is the set of foreign firms in the industry whereas J is the set of all firms in the industry; F is a subset of J (i.e., $F \subseteq J$).[11]

In order to address the issue of omitted variable bias, eight variables are included in the vector of control variables. These variables are selected in an attempt to take into account the agency and other costs arising from asymmetric information faced by stakeholders (i.e., the debt holders, equity holders and firm managers).

The first control variable is firm size, which is measured by the natural logarithm of number of employees. Firm size can also be measured by the natural logarithm of firm

[10] A firm is designated as a foreign firm if it has foreign capital. Such firms are also characterized as foreign-invested firms (see Meyers and Sinani, 2009 and references therein). In our sample, the share of foreign capital in more than 85% of the designated foreign firms is greater than 30 per cent. Furthermore, the proportion of foreign capital in over 75 per cent of the designated foreign firms is greater than 50 per cent.

[11] Foreign presence can also be measured in other ways. In section 4.1, we discuss alternative methods.

assets.[12] Compared with smaller firms, large firms tend to diversify their business and therefore have a lower risk of default (Ferri and Jones, 1979; Rajan and Zingales, 1995), which suggests a positive relationship between firm size and leverage. A number of theoretical studies (Harris and Raviv, 1990; Narayanan, 1988; Noe, 1988; Poitevin, 1989; Stulz, 1990) have suggested that firm leverage increases with firm size. Empirical studies also tend to support this positive relationship, for example de Jong, Kabir and Nguyen (2008), Wu and Yue (2009) and Kayo and Kimura (2011).

Firm age can also affect leverage. It has been suggested that older firms are likely to have lower debt-related agency costs (Frank and Goyal, 2009), which leads to a higher leverage ratio. Akhtar and Oliver (2009) report a positive relationship between firm age and leverage, indicating that the former effect outweighs the latter (i.e., information asymmetry) effect.

Just like firm age, the collateral value of assets (the tangibility of assets) exerts two contrasting effects on firm leverage. Tangible assets can serve as collateral against external loans (Scott, 1977). An increase in tangible assets can reduce the scope of asset substitution (Bradley et al., 1984; Harris and Raviv, 1991; Titman and Wessels, 1988) and have a higher liquidation value than intangible assets in case of bankruptcy (Fattouh et al., 2008; Huang and Song, 2006). Accordingly, firms with higher tangible assets tend to have lower default costs and fewer debt-related agency problems (Akhtar and Oliver, 2009), which in turn suggests a positive relationship between tangible assets and leverage. Huang and Song (2006), Fattouh, Harris, and Scaramozzino (2008) and Akhtar and Oliver (2009) found a positive relationship between tangible assets and leverage. However, in the case of Chinese firms, Li, Yue and Zhao (2009) reported a negative relationship between the two variables.

[12] Céspedes, González and Molina (2010) used logarithm of sales as a measure of size.

Growth opportunities represent non-collateralisable assets. Owing to the asset substitution effect, a firm faced with high growth opportunities may find it hard to access credit (Bradley et al., 1984; Titman and Wessels, 1988). Growth opportunities also affect firm leverage through changing the agency costs. This effect arises from the conflict of interest between debt and equity holders. Myers (1977) has suggested that firms with high growth opportunities also experience high agency cost. A high growth firm may not issue debt and thus have a low leverage ratio. In other words, the relationship between leverage and growth opportunities can be negative (see Berens and Cuny, 1995). A number of existing empirical studies have found a negative relationship between leverage and growth opportunities (for example see de Jong, Kabir and Nguyen, 2008, Akhtar and Oliver, 2009 and Kayo and Kimura, 2001). However, Wu and Yue (2009) and Céspedes, González and Molina (2010) found a positive relationship between growth opportunities and leverage.

Taxation is another factor that affects a firm's choice of capital structure. DeAngelo and Masulis (1980) show that non-debt tax shields substitute for the tax benefits of holding higher debts and therefore a firm with higher non-debt tax shields tends to have lower leverage. This negative relationship is confirmed by a majority of empirical studies; for example, see Wald (1999) and Huang and Song (2006). Bradley, Jarrell and Kim (1984) found the relationship between non-debt tax shields and leverage to be positive. The empirical evidence provided by de Jong, Kabir and Nguyen (2008) is mixed; the relationship between the average tax rate and leverage is positive in the case of some countries and negative in the case of others.

Firm profitability is expected to affect leverage, but existing theories provide contradictory predictions concerning the direction of the relationship (see Céspedes et al., 2010).[13] The pecking order theory (Myers, 1984) suggests that firms will first resort to

[13] An excellent review of theories of capital structure can be found in Brounen, de Jong and Koedijk (2006).

internally generated funds for financing investment and hence more profitable firms tend to have a lower level of leverage. The tax-based models (DeAngelo and Masulis, 1980; Leland, 1994; Ross, 1977) suggest that highly profitable firms can borrow more to shield income from corporate taxes, which predicts a positive relation between profitability and leverage. Based on agency theories, it can be argued that debt can act as a disciplining device that restrains the manager's behavior (Jensen, 1986; Williamson, 1988) and hence highly profitable firms should have more debt. On the other hand, treating the corporate capital structure as a mechanism to alleviate the problem associated with the separation of ownership from control, Chang (1999) shows that the optimal contract between the corporate insider and outside investors can be interpreted as a combination of debt and equity and highly profitable firms tend to have less debt. In contrast to these contradictory theoretical predictions, empirical studies appear to have found a consensus. Studies such as Fattouh, Harris, and Scaramozzino (2008), de Jong, Kabir and Nguyen (2008), Li, Yue and Zhao (2009) and Kayo and Kimura (2011) found a significant negative relationship between profitability and leverage.

The existing literature has also suggested that business risk (or the volatility of earnings) can also affect capital structure. Generally speaking, it is expected that business risk negatively affects the level of leverage (Booth et al., 2001; Burgman, 1996; Chen et al., 1997; Demsetz and Lehn, 1985; Titman and Wessels, 1988).

The last variable included in the vector of control variables X is ownership; whether a firm is privately owned or state and collectively owned. Jensen and Meckling (1976) identify two types of conflicts of interest, namely the conflicts between shareholders and managers and those between shareholders and debtholders, and therefore the ownership structure is expected to affect the level of leverage. Zeckhauser and Pound (1990), Chen and Strange

(2005) and Huang and Song (2006), among others, found the relationship between ownership and leverage to be statistically significant.[14]

3.1 The Data

We utilize a comprehensive data set from China's National Bureau of Statistics. This dataset accounts for over 85 per cent of China's total industrial output from 2000 to 2007. Similar datasets from the same source have been used by a number of existing studies. For example Hu, Jefferson, and Qian (2005) have considered the issue of R&D and technology transfer; Jefferson, Thomas, and Zhang (2008) have considered productivity growth and Sun (2009) has considered the issue of export spillovers arising from FDI. We first clean the dataset by excluding firms that (1) employ fewer than eight workers as they may not have reliable accounting systems (Jefferson et al., 2008); (2) report negative net values of fixed assets, negative employee wages, negative long term debt, negative total equity, negative total assets, and negative annual depreciation; (3) report a long term debt to total assets ratio higher than 1.[15] Our aim is to avoid extreme outliers. In 2002-03, the Chinese Government revised its industrial classification method. In order to remove this inconsistency from the original dataset, we applied the 2002-03 industrial classification to the data prior to 2003.

Based on the cleaned dataset, we construct the dependent and explanatory variables. Following Doukas and Pantzalis (2003) and Mitto and Zhang (2008), the dependent variable, i.e., leverage, is computed as the ratio of long term debt to total debt and equity. Firm size is measured by the natural logarithm of the number of employees. Firm age is the number of years the firm has been operational. Following Friend and Lang (1988), the collateral value of

[14] Margaritis and Psillaki (2010) have highlighted the importance of the links among capital structure, ownership structure and firm performance. Céspedes, González and Molina (2010) focused on the link between ownership structure and firm capital stucture in Latin America. Furthermore, the recent work of Paligorova and Xu (2012) on determinants of leevrage also highlights the importance of firm ownership strucuture.

[15] Debt to total assets can be greater than 1 if the book value of equity is negative. This occurs if the firm has had negative profits for a while.

assets is calculated as the ratio of tangible assets to total assets. Following, Fattouh et al. (2008), growth opportunities are measured by the annual percentage change in total assets. Non-debt tax shields are defined as the total annual depreciation scaled down by total assets (Bradley et al., 1984; Titman and Wessels, 1988). We measure profitability by the ratio of a firm's total profits to its total assets, and its standard deviation in the four digit industries is used to proxy for business risk. Ownership is a dummy variable that takes a value of 1 if a firm is privately owned. As indicated earlier, the presence of foreign firms is measured by the share of the assets of foreign firms in the four digit industry[16].

<insert Table 1 & 2 about here>

Table 1 presents the descriptive statistics for the entire sample. The correlation matrix for the entire sample is presented in Table 2. The estimated correlation coefficients among explanatory variables appear to be reasonably low.

4. Empirical Results and Discussion

In this section we present the estimation results. Since the dependent variable (i.e., leverage), is censored between 0 and 1, the Tobit regression method was used to estimate equation (7). The model was estimated by making use of pooled data over a period of eight years, clustered by firm to accommodate the problem of potential heteroskedasticity and unspecified serial correlation within firms. However, it is possible that foreign firms tend to enter an industry where firms have low leverage, or firms with low leverage are more likely to be acquired by the foreign firms. In both cases, the presence of foreign firms in equation (7) may be endogenous. To address the possible endogeneity issue, we employ the Tobit model with instrumental variables, using Newey's minimum chi-squared estimator with the

[16] Note a firm is defined to be foreign owned if it receives foreign investment. According to this definition, in a four digit industry on average 18.36 per cent of firms are foreign owned, with standard deviation being 11.57 per cent?

one-year lagged presence of foreign firms and the number of firms in the four digit industries as the instruments.[17]

The estimated results are reported in Table 3. In order to facilitate a comparison, estimated results from three estimation techniques are reported: (i) ordinary least square (OLS), (ii) Tobit and (iii) instrumental variables Tobit (IV-Tobit). Except for the estimated coefficient of foreign presence, the Tobit and the IV-Tobit estimation results are quite similar. However, as far as magnitude of the estimated coefficients is concerned, the OLS results are very different from the Tobit and IV-Tobit estimation. We tested the foreign presence variable for exogeneity. The estimated value of the Wald statistic for exogeneity is 69.13 (with a *p*-value of 0.000). Based on the estimated *p*-value, it is possible to reject the null hypothesis of exogeneity with a very high degree of confidence. Accordingly, it can be argued that IV-Tobit estimation is more appropriate and the discussion presented below is based on the third estimation technique.

The estimated coefficient of foreign presence reported in Table 3 is negative and highly significant suggesting that an increase in foreign presence reduces the leverage of domestic firms in China's manufacturing sector, which could be attributed to increased competition for funds in the domestic market. Massive foreign investment in China has resulted in expansion of the private sector which has in overall terms increased the level of competition for loanable funds and hence there is a negative relationship between foreign presence and firm leverage.

<insert Table 3 about here>

[17] As indicated by, among others, Nowak-Lehmann, et al. (2012), in the presence of persistent autocorrelation, lagged variables do not always serve as good instruments. Given that this paper utilizes panel data from 2000 to 2007, autocorrelation is not a serious concern. The statistical analysis found the instruments used in this paper to be valid. In addition, a number of sensitivity tests were conducted (see section 4.1 for further details). These tests suggest that the main empirical results presented in this paper are robust.

The signs and magnitudes of the coefficients of the rest of the determinants of capital structure are largely consistent with other studies. Firm size significantly and positively affects leverage, confirming that bigger firms tend to diversify their business which reduces the default risks and hence increases their leverage level (Ferri and Jones, 1979; Rajan and Zingales, 1995).[18] Older firms are found to have higher leverage, indicating that the positive effect of lower debt-related agency costs (Frank and Goyal, 2009) outweighs the negative effect of a lower information asymmetry on the leverage level (Akhtar and Oliver, 2009). Ownership plays a significant role and privately owned firms have a lower leverage level than their state and collectively owned counterparts, which occurs due to the fact that the state and collectively owned firms have better access to credit (especially bank loans from the state-owned banks). The coefficient of the collateral value of assets is significantly negative, which implies that tangible assets act as credible collateral to reduce information asymmetries and therefore lower the leverage level; this follows from the fact that reduction in information asymmetries makes equity less costly (Akhtar and Oliver, 2009). Li, Yue and Zhao (2009) found the impact of ownership structure on leverage in China to be negative. Business risk appears not to significantly affect the leverage level, which is consistent with the work of de Jong, Kabir and Nguyen (2008) on China. The impact of profitability on leverage is negative, which supports the predictions of the pecking order theory and the agency theories that treat debt as a disciplining device. This result is also consistent with Li, Yue and Zhao (2009)'s work on China. The estimated results concerning the impact of growth opportunities and profitability are also consistent with de Jong, Kabir and Nguyen (2008) and Kayo and Kimura (2011). The impact of non-debt tax shields and growth opportunities on the leverage level is statistically insignificant.

[18] Chen (2004) argues that in the case of China, the long run relationship can also be negative.

The existing literature, such as the work of Chen (2004), suggests that debt is not freely available to all firms in China. Li, Yue and Zhao (2009) found that non state-owned firms tend to have lower debt as compared to state-owned firms. The empirical results presented in Table 3 also suggest that ownership structure has a significant impact on leverage. In order to further explore this issue, the sample was split into (i) state and collectively owned and (ii) privately owned domestic firms. The results of IV-Tobit estimation for each of these two groups are reported in Table 4.

<insert Table 4 about here>

The estimated results presented in Table 4 suggest that, in overall terms, the presence of foreign firms negatively affects the leverage of both state and collectively owned and privately owned domestic firms. As compared to state and collectively owned firms, the negative impact on the leverage of privately owned domestic firms is stronger. This result is not surprising as most banks in China are state-owned.

While in overall terms, the impact of leverage on firm capital structure in China's manufacturing sector is negative, this result may not hold across all industries within the manufacturing sector. In the rest of this paper, we consider the case of China's (i) textile industry, (ii) transportation equipment industry, (iii) electrical machinery and equipment industry and (iv) communication equipment, computer and other electronic equipment industry. In relative terms, the textile industry does not rely on advanced technology and, like the transportation equipment industry, the textile industry also caters for a high level of domestic demand. The last two industries are relatively more export oriented and these industries also have a higher level of foreign presence. The estimated results for each of the four industries are reported in Tables 5 to 8.

<insert Tables 5 to 6 about here>

Table 5 shows that presence of foreign firms has a negative impact on the leverage of textile firms. It is interesting to note that the estimated coefficient is smaller than the one reported in Table 3. This suggests that, as compared to the overall impact on the manufacturing sector, that presence of foreign firms has a stronger effect on leverage of domestic firms in China's textile industry. Table 6 shows that, in the case of China's transportation equipment industry, the impact of foreign presence on leverage is positive which appears to suggest that foreign presence in this industry creates stronger competition in the domestic market. The empirical results presented in this paper are based on data collected from 2000 to 2007. In recent years there have been some changes in government policies concerning foreign investment in China's transportation sector. The new policies are designed to substantially reduce foreign presence in the domestic car industry.

Table 7 shows that presence of foreign firms has a negative effect on firm leverage in China's electrical machinery and equipment manufacturing industry. In addition, as compared to its overall effect on the manufacturing sector, the impact on firm leverage in this industry is smaller. However, Table 8 shows that the impact of foreign presence on firm leverage in China's communication equipment, computer and other electronic equipment industry is statistically insignificant. It is interesting to note that the negative impact of profitability on leverage in this industry is the strongest.

<insert Tables 7 to 8 about here>

In summary, the empirical results presented in this paper suggest that (i) in overall terms, foreign presence is an important determinant of firm leverage in China's manufacturing sector and (ii) the impact of foreign presence on firm leverage varies from industry to industry.

4.1 Sensitivity analysis

The empirical model has been estimated by using three different estimation techniques; OLS, Tobit and IV-Tobit and the main conclusions concerning the link between foreign presence and firm capital structure highlighted in this paper remain robust to the choice of estimation procedure. In addition, we conducted a number of other robustness checks.

First, we dropped the industry dummies (as they may be collinear with the foreign presence variable) and re-estimated the model. Second, the presence of foreign investment is measured by the number of foreign firms as a proportion of the total (i.e., number of foreign plus domestic firms). But in our empirical exercise, we measure foreign presence as the proportion of foreign firm assets to the total in the four digit industry classification. In order to examine whether this affects our empirical results, we re-estimated equation (8), using the proportion of the number of foreign firms in the four digit industry as a measure of foreign presence. Third, one could argue that firm size can be better measured by the logarithm of firm assets instead of the number of employees and hence we re-estimated the model using this variable. Fourth, in our previous empirical exercises, a firm is defined to be foreign firm if it receives foreign investment. An alternative definition is that a firm is foreign firm only if it is 100 per cent foreign invested[19]. Using this definition, we re-constructed the measurement of foreign investment presence[20] and re-estimated equation (8).

In each of the four cases, our main empirical findings were unaffected. In order to save space, these results are not presented in this paper; however we would be happy to provide these results to interested readers upon request.

[19] We thank the reviewer for pointing this out.
[20] The average foreign presence in a four digit industry with this definition is 14.25 per cent.

5. Concluding Remarks

The existing literature on foreign direct investment, such as the work of Meyer and Sinani (2009), suggests that domestic firms in host countries experience positive spillovers from the presence of foreign firms. Acemoglu, Aghion and Zilibotti (2006) and Aghion et al. (2009), among others, suggest that, depending on the distance from the world technology frontier, entry of foreign firms can reduce the output of domestic firms. In other words, the foreign investment related productivity spillover effect can also be negative. A strand of the existing literature on capital structure, such as the seminal work of Brander and Lewis (1986), suggests that the output and capital structure decisions of firms are interdependent. It can therefore be argued that the presence of foreign investment can also affect the firm capital structure. However, none of the available studies has explicitly examined the link between the presence of foreign investment and firm capital structure.

By making use of a simple theoretical model where (a) the presence of foreign investment results in productivity spillovers to domestic firms that can be non-positive and (b) domestic firms select their optimal debt by maximizing their value, this paper shows that there is a link between firm capital structure and foreign presence. We show that in the presence of positive productivity spillover effects from foreign to domestic firms, there is a positive relationship between foreign presence and firm debt. An increase in foreign presence also increases the optimal level of investment, as long as the productivity spillover effect is positive. In the presence of negative productivity spillovers, an increase in foreign presence decreases both debt and investment of domestic firms. As foreign presence can increase (or decrease) both debt and investment, its impact on leverage of domestic firms is only clear under certain conditions (see Proposition 1).

We explore the link between foreign presence and firm leverage by making use of firm level panel data from China. Based on the theoretical model, an empirical model is

specified, which includes foreign presence and a number of control variables as determinants of the firm leverage. The empirical model is estimated by using firm level panel data from China's manufacturing sector over the period 2000-2007. The model is estimated for domestic firms by means of OLS, Tobit and Instrumental Variable Tobit regressions. The empirical model is also estimated after disaggregating firms into (i) state and collectively owned and (ii) privately owned domestic firms. As the link between the firm leverage and foreign presence can vary across industries within the manufacturing sector, the model is also estimated for 4 separate manufacturing industries. The empirical results reported in this paper are found to be fairly robust.

The empirical results presented in this paper suggest that presence of foreign investment has a negative and significant effect on the leverage of domestic firms in China's manufacturing sector.[21] The presence of a statistically significant relationship between leverage and foreign presence validates the theoretical relationship. Not surprisingly, we find that the negative impact of foreign presence on the leverage of privately owned domestic firms is relatively strong. This could be attributed to the fact that domestic banks in China are state-owned and hence they tend to favour state and collectively owned firms. Our empirical results suggest that the impact of foreign presence on the leverage of domestic firms in China's textile industry is negative and significant. We also found that the impact on the leverage of domestic firms in the textile industry is much stronger compared to its overall impact on the manufacturing sector which suggests that, in relative terms, Chinese banks are not keen to support the local domestic textile industry. The impact of foreign presence on the leverage of domestic firms in the electrical machinery and equipment manufacturing industry is negative but smaller than the overall impact on the manufacturing industry. On the other

[21] While this paper focuses on the impact of a change in foreign presence on capital structure of domestic firms, the entry of domestic firms with foreign firms like characteristics can also result in productivity spillovers to the rest of the domestic firms. We are grateful to an anonymous reviewer for bringing this point to our attention.

hand, the impact of foreign presence on the leverage of domestic firms in China's transportation equipment manufacturing industry is positive. The Chinese government is keen to protect its domestic automobile industry from foreign competition and, by increasing the availability of credit to domestic firms in the transportation industry, the Chinese banks appear to be simply following government directions. Finally, we found that the impact of foreign presence on the leverage of domestic firms in China's communication equipment, computer and other electronic equipment manufacturing industry is statistically insignificant.

While this paper deals with the impact of foreign investment on domestic firms in China's manufacturing sector, recent studies, such as Doytch and Uctum (2011), highlight the implications of the shift of foreign investment from the manufacturing to the services sector. It would be interesting to examine the impact of fluctuations in foreign presence on leverage of services sector firms. Due to unavailability of data, we were unable to examine this link in China's services sector. Nevertheless, it is a significant subject for a future research. Besides, as mentioned earlier, this paper can also be extended by exploring the entry of domestic firms on the leverage of other domestic firms.

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Table 1: Manufacturing Sector Summary Statistics					
Variable	Observations	Mean	Standard. Deviation	Minimum	Maximum
Leverage	164118	0.12	0.21	0	1
ln(firm size)	164216	-1.70	1.09	-4.83	5.09
Collateral	164216	0.97	0.07	0.07	2
business risks	164215	1.03	31.04	0.0047	1158.72
Profitability	164216	0.08	0.21	-1.99	17.38
NDTS	164216	0.03	0.04	0	1.77
growth opportunities	143689	0.21	4.75	-1	1210.05
foreign presence	164216	0.33	0.17	0	1
Ownership	164216	0.34			
Source: NBS, Beijing, 2000-2007 Notes: Firm size is measured as the natural log of number of employees in thousands. Accordingly, an average firm size of -1.7 implies 0.1826 thousand employees.					

Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets.

Table 2: Correlation Matrix of the Variables (the Manufacturing Sector)

	ln(firm size)	age	ownership	collateral	business risks	profitability	NDTS	growth opportunities	foreign presence
ln(firm size)	1								
age	0.28	1							
ownership	-0.16	-0.25	1						
collateral	-0.07	-0.04	0.01	1					
business risks	-0.003	-0.01	-0.01	0.001	1				
profitability	-0.07	-0.08	0.08	0.08	-0.002	1			
NDTS	0.02	-0.02	0.03	0.03	-0.001	0.07	1		
growth opportunities	0.0001	-0.01	0.005	-0.0004	0.0003	0.005	-0.01	1	
foreign presence	-0.06	-0.13	0.10	0.02	-0.004	0.01	-0.02	0.005	1
Source: NBS, Beijing, 2000-2007									

Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets.

Table 3: Manufacturing Sector Estimation Results						
	IV Tobit		Tobit		OLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
ln(firm size)	0.07***	0.001	0.07***	0.002	0.02***	0.001
Age	0.003***	0.0001	0.003***	0.0002	0.001***	0.0001
Ownership	-0.03***	0.002	-0.03***	0.005	-0.01***	0.002
Collateral	-0.38***	0.02	-0.38***	0.03	-0.15***	0.02
business risks	-0.00004	0.00004	-0.00005	0.00003	-0.00003**	0.00001
Profitability	-0.10***	0.01	-0.10***	0.01	-0.05***	0.005
NDTS	-0.02	0.03	-0.02	0.04	0.01	0.02
growth opportunities	-0.0002	0.0002	-0.0002	0.0003	-0.0001	0.0001
foreign presence	-0.18***	0.01	-0.13***	0.02	-0.05***	0.01
industry dummies	yes		yes		yes	
year dummies	yes		yes		yes	
Constant	0.44***	0.02	0.43***	0.03	0.34***	0.02
Number of obs	143500		143500		143500	
F	12864.61(w)		92.08		58.72	
R-squared	n.a.		0.09		0.06	

Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets. ***, **, * denote significance at the 1%, 5% and 10% level respectively; (w) is the Wald chi2 statistic; The estimated value of the Wald statistic for exogeneity of foreign presence is 69.13 with a *p*-value of 0.000, which rejects the null hypothesis of exogeneity of foreign presence.

Table 4: IV Tobit Estimation Results by Ownership within the Manufacturing Sector				
	Privately Owned		State and Collectively Owned	
	Coefficient	Standard Error	Coefficient	Standard Error
ln(firm size)	0.06***	0.002	0.07***	0.001
Age	0.004***	0.0002	0.003***	0.0001
Collateral	-0.48***	0.03	-0.34***	0.02
business risks	-0.00009	0.00011	-0.00002	0.00004
Profitability	-0.08***	0.01	-0.11***	0.01
NDTS	0.03	0.05	-0.04	0.03
growth opportunities	-0.0045	0.0028	-0.0002	0.0002
foreign presence	-0.23***	0.02	-0.15***	0.01
industry dummies	yes		yes	
year dummies	yes		yes	
Constant	0.49***	0.03	0.41***	0.02
Number of obs	51498		92002	
Wald	2477.59		9145.97	

Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets. ***, **, * denote significance at the 1%, 5% and 10% level respectively; Both regressions are IV Tobit; The estimated value of the Wald statistics for exogeneity of foreign presence is the case of privately owned firms is 22.83. The corresponding value in the case of state and collectively owned firms is 43.23. In both cases, the estimated *p*-values are 0.000 and hence we can reject the null hypothesis of exogeneity of foreign presence.

Table 5: Estimation Results for Textile Industry						
	IV Tobit		Tobit		OLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
ln(firm size)	0.07***	0.004	0.08***	0.008	0.02***	0.004
Age	0.003***	0.0004	0.003***	0.0006	0.001***	0.0004
Ownership	-0.08***	0.010	-0.08***	0.018	-0.03***	0.008
Collateral	-0.45***	0.07	-0.43***	0.13	-0.19***	0.07
business risks	0.04	0.05	0.04	0.05	0.03	0.02
Profitability	-0.16***	0.03	-0.16**	0.07	-0.06***	0.014
NDTS	0.08	0.10	0.08	0.14	0.08	0.06
growth opportunities	-0.0121	0.0081	-0.0129	0.0085	-0.009***	0.0031
foreign presence	-0.35***	0.04	-0.31***	0.06	-0.12***	0.03
year dummies	yes		yes		yes	
Constant	0.53***	0.07	0.50***	0.13	0.36***	0.07
Number of obs	10190		10443		10443	
F	1051.4(w)		24.3		17.43	
R-squared	n.a.		0.10		0.07	
Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets. ***, **, * denote significance at the 1%, 5% and 10% level respectively; (w) is the Wald chi2 statistic; The estimated value of the Wald statistic for exogeneity of foreign presence is 10.01 with a *p*-value of 0.002, which rejects the null hypothesis of exogeneity of foreign presence.						

Table 6: Estimation Results for Transportation Equipment Manufacturing Industry						
	IV Tobit		Tobit		OLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
ln(firm size)	0.07***	0.004	0.07***	0.007	0.02***	0.004
Age	0.003***	0.0002	0.003***	0.0004	0.002***	0.0003
Ownership	0.01	0.010	0.02	0.018	0.01*	0.008
Collateral	-0.49***	0.07	-0.50***	0.10	-0.20***	0.06
business risks	0.03	0.03	0.04	0.03	0.03**	0.02
Profitability	-0.21***	0.04	-0.19***	0.06	-0.07***	0.021
NDTS	-0.25*	0.15	-0.26	0.17	-0.14**	0.07
growth opportunities	-0.0165**	0.0078	-0.02**	0.0087	-0.009***	0.0030
foreign presence	0.18***	0.03	0.16***	0.05	0.08***	0.02
year dummies	yes		yes		yes	
Constant	0.34***	0.07	0.36***	0.11	0.30***	0.06
Number of obs	8523		8973		8973	
F	866.47(w)		19.78		12	
R-squared	n.a.		0.10		0.06	
Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets. ***, **, * denote significance at the 1%, 5% and 10% level respectively; (w) is the Wald chi2 statistic. The estimated value of the Wald statistic for exogeneity of foreign presence is 0.52 with a *p*-value of 0.47, which fails to reject the null hypothesis that foreign presence is exogenous.						

Table 7: Estimation Results for Electrical Machinery and Equipment Manufacturing Industry						
	IV Tobit		Tobit		OLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
ln(firm size)	0.06***	0.004	0.06***	0.007	0.01***	0.003
Age	0.004***	0.0003	0.004***	0.0006	0.002***	0.0003
Ownership	0.003	0.009	0.004	0.016	0.001	0.006
Collateral	-0.36***	0.07	-0.36***	0.12	-0.14**	0.06
business risks	-0.006	0.00678	-0.007	0.00678	-0.001	0.00221
Profitability	-0.29***	0.04	-0.26***	0.07	-0.07***	0.020
NDTS	-0.08	0.11	-0.06	0.15	-0.02	0.05
growth opportunities	0.0031	0.0065	0.0041	0.0063	-0.0009	0.0027
foreign presence	-0.11***	0.04	-0.11*	0.05	-0.03	0.02
year dummies	yes		yes		yes	
Constant	0.27***	0.07	0.26***	0.12	0.26***	0.06
Number of obs	9876		10415		10415	
F	661.97(w)		17.05		10.19	
R-squared	n.a.		0.07		0.04	
Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets. ***, **, * denote significance at the 1%, 5% and 10% level respectively; (w) is the Wald chi2 statistic; The estimated value of the Wald statistic for exogeneity of foreign presence is 0.03 with a *p*-value of 0.87, which fails to reject the null hypothesis that foreign presence is exogenous.						

Table 8: Estimation Results for Communications Equipment, Computers and Other Electronic Equipment Manufacturing Industry						
	IV Tobit		Tobit		OLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
ln(firm size)	0.06***	0.006	0.06***	0.010	0.02***	0.005
Age	0.006***	0.0006	0.005***	0.0009	0.003***	0.0006
Ownership	-0.05***	0.016	-0.06**	0.026	-0.02	0.010
Collateral	-0.77***	0.13	-0.73***	0.25	-0.38**	0.17
business risks	0.006	0.04	0.006	0.04	0.01	0.02
Profitability	-0.36***	0.07	-0.35***	0.11	-0.14***	0.034
NDTS	-0.53**	0.25	-0.52*	0.32	-0.14	0.13
growth opportunities	-0.005	0.0145	-0.02	0.0105	-0.0002***	0.0000
foreign presence	0.05	0.05	0.06	0.07	0.04	0.03
year dummies	yes		yes		yes	
Constant	0.68***	0.14	0.66**	0.26	0.45***	0.17
Number of obs	2794		3058		3058	
F	443.21(w)		10.53		8.12	
R-squared	n.a.		0.17		0.12	
Note: NDTS is the non-debt tax shield. Collateral is the collateral value of assets. ***, **, * denote significance at the 1%, 5% and 10% level respectively; (w) is the Wald chi2 statistic. The estimated value of the Wald statistic for exogeneity of foreign presence is 0.32 with a *p*-value of 0.57, which fails to reject the null hypothesis that foreign presence is exogenous.						