FDI and credit constraints: firm level evidence in China*

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June 2007

Abstract

In this paper, we assess the success of the ongoing financial system reforms in China through the investigation of the extent to which firms are financially constrained. We focus on the part played by Foreign Direct Investment (FDI) in funding Chinese corporate sector as we analyze whether incoming foreign investment in China plays an important role in alleviating domestic firms' credit constraints. Using firm-level data on around 2,000 domestic companies for the period 1999-2002 and splitting domestic firms into public and private firms, we find that public firms' investment

*We would like to thank Anne-Célia Disdier for her comments. We have also benefited from remarks from participants at the SIUTE Seminar of the Universities of Lille.

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decisions are not sensitive to debt ratios or the cost of debt. Nor is there any evidence that public firms are affected by foreign firms presence. We interpret this as evidence in support of the notion of a soft budget constraint for public firms. In contrast, private domestic firms appear more credit constrained than state-owned firms but their financing constraints tend to ease in a context of abundant foreign investment. Our results confirm that the development of cross-border relationships with foreign firms helps private domestic firms to bypass both the financial and legal obstacles that they face at home (Huang, 2003).

JEL Codes: E22, E44, G31, O16

Keywords: Financial constraint, Corporate finance, Foreign Direct Investment, China.

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1 Introduction

The Chinese banking sector has traditionally been considered by authorities as a substitute for state financing to ensure a continued flow of funding to its state-owned enterprises to preserve jobs. This structure inherited from the socialist planned economy deprived emerging private enterprises from access to external funding. During the mid-nineties, Chinese authorities took step to reform the financial system through recapitalization and transfer of non performing loans (NPL) to asset management companies. These reforms have been made necessary by China's WTO commitments of ending restrictions in the banking sector. The ability of the Chinese financial system to allocate capital more efficiently and to guarantee non-distortionary financial access to all companies, including private firms is therefore a key indicator to assess the success of the ongoing reform.

This issue is especially important as access to external finance is a crucial determinant of business expansion.[1] Businesses will invest in projects where the expected benefits exceed the costs. Efficient investment, however, can happen only when busi-

[1]Surveys suggest that financing constraints are an even more important deterrent to investment in developing countries. Firms often cite financing constraints as one of their primary obstacles to investment and to business expansion (Africa Competitiveness Report, 1998).

nesses do not face credit constraints unrelated to their own performance. Indeed, a great deal of research demonstrates the importance of well-developed financial markets for economic growth.[2]

In China, despite the fact that the country has a very large and deep pool of financial capital - an estimated US$4.5 trillion of assets - relatively few firms in China have access to formal finance (Hallward-Driemeier et al., 2003). Based on the World Business Environment Survey (WBES) on investment climate conduced in 80 countries during 1999-2000, 80% of private firms in China cite financing constraints as major obstacle.[3] This figure - twice the median figure of the sample (38.5%) - ranks China as the most financially constrained country in front of Haiti (74.4%) and Kyrgyz Republic (66.7%).

Approximately a quarter of the 2,400 firms interviewed in the World Bank investment climate survey (2003)[4] respond no to the question "Do you have a loan from a bank or financial institution?", and on average only about 25 percent of firms' working capital comes from bank loans. Boyreau-Debray and Wei (2005) investigate the main pitfalls of the Chinese state-dominated financial system. They evidence low capital mobility within China due to local government interference and

[2]Refer to Caprio, et al. (2001) for an extensive summary.

[3]The figure computed by Claessens and Tzioumis (2006) excludes firms with state or foreign ownership since they probably enjoy preferential access to finance.

[4]Enterprise surveys data can be accessed at http://www.enterprisesurveys.org/.

mis-allocation of capital.

Such distortions may force private Chinese firms to look for foreign investors (Huang, 2003). By establishing cross-border relationships with foreign firms, private domestic firms can bypass both the financial and legal obstacles that they face at home. Foreign Direct Investment (FDI) can in fact be seen as a form of equity financing (Harrison et al, 2004). Moreover, from the very beginning of economic reforms in China, foreign-invested firms were granted a superior legal status compared with private firms. It is therefore possible that, in the Chinese case, FDI provides capital to firms which would otherwise be constrained in their growth by the inability to obtain funds, due to distortions in the banking sector.

In this paper, we estimate a structural model based on the Euler equation for investment to investigate the extent to which firms are financially constrained and whether incoming foreign investment in China plays an important role in alleviating existing credit constraints. We rely on firm-level data on Chinese companies provided by the Enterprise Analysis unit from the World Bank (World Bank investment climate survey, 2003)[5] for the period 1999-2002. We test the following hypotheses: (1) domestic firms face different credit constraints depending on their

[5]The Enterprise Analysis unit provides Enterprise surveys data on the investment climate in 94 countries, based on surveys of over 60,000 firms.

size and private or state-owned status; and (2) direct foreign investment affects the credit constraints of domestic firms. Following Harrison and McMillan (2003), we modify the standard Euler investment model by introducing a borrowing constraint and then use as proxies for the shadow value of the constraint two measures of financial distress, the debt-to-asset and interest coverage ratios. In the absence of such constraints, these financial variables should not play a role in determining future investment.

The results suggest that only domestic private firms face credit constraints in China. When we split domestic firms into public (state-owned) and private firms, we find that public firms' investment decisions are not sensitive to debt ratios or to the cost of debt. Nor is there any evidence that public firms are affected by foreign firms presence. We interpret this as evidence in support of the notion of a soft budget constraint for public firms (Qian and Roland, 1998). In contrast, private domestic firms appear more credit constrained than state-owned or foreign firms but their financing constraints tend to ease in a context of abundant foreign investment.

Our contribution is twofold. First, we shed light on the impact of the ongoing financial sector reforms through the assessment of the importance of credit constraints in China estimated with a structural model. Doing so, we provide an additional test

of the approach used by Fazzari et al. (1988) to identify credit constraints. Second, this paper focuses on the part played by FDI in funding the Chinese corporate sector. More precisely we ask the following questions: does FDI ease or exacerbate domestic firms' credit constraints? and more crucially which type of firms is most likely to benefit from capital inflows?

The paper is organized as follows. The next section presents the specific context of China's financial and corporate sector and reviews the literature on financing constraints. Section 3 presents the structural model of firm investment that we use to estimate the impact of direct foreign investment on financing constraints of firms. Section 4 presents the firm-level data used in our empirical work. Section 5 discusses the results of our empirical work and undertakes several robustness checks. Section 6 concludes.

2 Literature review on financial constraints

This paper builds on two lines of research: 1) studies of firm financing constraints and their determinants; and 2) analyzes of distortions in China's financial system.

This piece of work builds upon several recent studies that similarly address issues on the impact of the direct foreign investment on credit constraints. Closely

related to our paper is the work by Harrison and McMillan (2003)[6] and Harrison et al. (2004)[7], which analyzes the relationship between financial development and financing constraints by estimating Euler equations using micro-data.

This paper provides an additional test of the approaches used in the body of literature pioneered by Fazzari et al. (1988) to identify credit constraints based on their impact on investment behavior.

2.1 Financing constraints in China

One of the striking feature of the Chinese financial system is the poor allocation of capital, partly due to the government distorting the financial system to achieve social ends, specifically to ensure a continued flow of funding to its many inefficient but massive state-owned enterprises to preserve jobs. These policies have similar unfortunate consequences: wasteful investments that yield negligible returns; restrictive funding for the private companies that are driving growth; pervasive state ownership of financial institutions which stifles competition and lowers their efficiency; and a feeble array of financial products for consumers.

[6]The authors combine a cross-country firm-level panel for 38 countries with time-series data on restrictions on international transactions and capital flows and find that different measures of global flows are associated with a reduction in firm-level financing constraints.

[7]Using firm-level data from the Ivory Coast for the period 1974-1987, the paper finds that domestic firms are significantly more credit constrained than foreign firms and that borrowing by foreign firms aggravates domestic firms' credit constraints.

Despite the very large and deep pool of financial capital, the majority of lending goes to less efficient state-owned enterprises, leaving healthy private enterprises without access to external funding. As evidenced by Dollar and Wei (2007), this also leads to a systematic dispersion in the returns to capital across locations and sectors[8].

Until 1998, the four state-owned commercial banks (SOCBs, i.e. the Bank of China, China Construction Bank, the Industrial and Commercial Bank of China, and the Agricultural Bank of China) were instructed to lend to state-owned enterprises (SOEs). The Chinese state enterprises submitted investment plans and funding requests that had to be approved at the provincial and central authority level. Based on this, lending quotas were issued to enterprises. Since private enterprises were excluded from submitting investment plans, they were, naturally, also excluded from lending quotas. In addition, there was also a legal bias against private domestic firms, which made it harder for them to collateralize their assets in order to obtain loans, and made it riskier for banks to lend them money (Huang, 2003). While China's private companies now produce more than half of its GDP, they only receive 27 percent of loans, and they are excluded from the country's nascent equity

[8]Bai et al. (2006) moderate somewhat this conclusion. They also find evidence of dispersion of the rate of return to capital, but their calculations suggest that it has fallen since the end of the seventies.

and corporate bond markets (Farrell and Lund, 2006).

The system was liberalized at the end of the 1990s, when the Chinese Constitution acknowledged the private sector to be an integral part of the economy. Theoretically, lending quotas are no longer in place. However, in practice, banks still consider private enterprises to be riskier than their public peers either due to their short credit history or lower chance of being bailed out by the government. Moreover, as discussed in Park and Sehrt (2001), lending by state banks is still determined by policy reasons, rather than by commercial motives.

In summary, a major problem in China's corporate sector is a political pecking order of firms which leads to the allocation of China's financial resources to the least efficient firms (state-owned enterprises), while denying the same resources to China's most efficient firms (private enterprises). Although they are the engine of growth in the Chinese economy[9], private firms are discriminated against in terms of access to external funding, property rights protection, taxation, and market opportunities. Such distortions may force private Chinese firms to look for foreign investors (Huang, 2003). By establishing cross-border relationships with foreign firms, private

[9]Allen et al. (2005) document that the private sector in China dominates the state and listed sectors, both in terms of output size and growth trend. Specifically, they show that between 1996 and 2002, the private sector grew at an annual rate of 14.3 percent, while the combined state and listed sector only grew at 5.4 percent. Using firm-level data over the 2002-2004 period, Dollar and Wei (2007) report that domestic private firms have higher (marginal and average) returns to capital than state-owned firms, respectively 151 percent versus 99 percent.

domestic firms can bypass both the financial and legal obstacles that they face at home. FDI can in fact be seen as a form of equity financing (Harrison et al., 2004). Moreover, from the very beginning of economic reforms in China, foreign-invested firms were accorded a superior legal status compared with private firms. China is now among the top FDI recipients in the world (Prasad and Wei, 2005).

Guariglia and Poncet (2006) provide a primary empirical confirmation of the fact that FDI is used to alleviate the costs associated with the inefficient banking sector. Relying on data for 30 Chinese provinces and a wide range of financial indicators over the period 1989-2003, they study the relationship between finance and economic growth. They find that the negative impact of financial distortions on economic growth tend to be weaker for high FDI recipients, suggesting that FDI may be used to alleviate the costs associated with the inefficient banking sector. These results indicate that in the Chinese case, FDI provides capital to firms which would otherwise be constrained in their growth by the inability to obtain funds, due to distortions in the banking sector.

The objective of this paper is to rely on firm-level data to understand how exactly the fast-growing private Chinese firms finance themselves and to verify whether private firms, which are generally discriminated against by the local financial system,

have been able to use foreign joint-ventures as a way to acquire capital necessary for investment.

2.2 Testing for Financing constraints: the literature

The central idea of the literature on financing constraints is that investment should not be determined by a firm's net worth or internal funds but only by the firms expected future profitability. The seminal work by Modigliani and Miller (1958) indeed suggests that in perfect capital and credit markets, the investment behavior of a firm is irrelevant to its financing decisions and vice-versa. However, in the presence of market imperfections, financing constraints will be reflected in firms' investment decisions. Empirically, financing constraints could be identified through the sensitivity of investment with respect to internal funds.[10] Studies typically compute the correlation between investment and measures of internal (cash flow) or external (debt) funds, after controlling for other factors, to identify credit constraints. Findings of a significant correlation are usually attributed to capital market imperfections and therefore suggest the presence of financing constraints.[11]

[10]This literature relies on the assumption that due to information asymmetries external finance is more costly than internal finance due to asymmetric information and agency problems, and that the "premium" on external finance is an inverse function of a borrower's net worth.

[11]Refer to surveys by Schiantarelli (1995), Blundell, Bond and Meghir (1996), Hubbard (1998) and Claessens and Tzioumis (2006).

Following Fazzari et al. (1988), hereafter FHP, it is usually assumed that there are cross-sectional differences in the effects of internal funds on firms' investment, so that the investment equation should hold across adjacent periods for *a priori* unconstrained firms but be violated for constrained firms. This has led to different *a priori* classifications of firms that have tried to distinguish financially constrained and not constrained firms. Previous studies typically focus on firms' characteristics that are associated with information costs as a criterion to select firms which are *a priori* likely to be credit constrained. Financially constrained firms are often thought to be the youngest, smallest, most indebted ones or the ones not paying dividends.[12]

Empirical tests are then used to determine whether these firms exhibit higher correlations between either investment and cash flow (FHP), or between investment and debt-to-asset ratios and interest coverage (Whited, 1992). The intuition is that investment-cash flow or investment-debt sensitivities are a reflection of a higher degree of financing constraints. Most studies on financing constraints since FHP have used the Q-theory of investment suggested by Tobin (1969) and Euler equations

[12]Several *a priori* criteria have been used: dividend policy (Fazzari et al., 1988), bond rating (Whited, 1992), age (Devereux and Schiantarelli, 1990) and firm size (Audretsch and Elston, 2002). However, the empirical application of a single criterion for classifying firms can be overly simplistic since financing constraints depend on many firm characteristics such as size, age, legal form and indebtness (Petersen and Rajan, 1994).

to study financing constraints. Both the Q-theory and Euler model of investment come from the same optimization problem.[13]

A series of recent papers have questioned the validity of using investment-cash flow sensitivities as a proxy for financing constraints. Based upon statements contained in annual reports, Kaplan and Zingales (1997) argue that firms identified in FHP as financially constrained are in fact not constrained.[14] However, numerous studies still support the use of investment-cash flow sensitivity as an indicator of credit constraints (Fazzari et al. (2000), Allayannis and Muzomdar (2003), and Chirinko and von Kalckreuth (2003)) while others question it (Gomes (2003), Moyen (2002), and Alti (2003)).[15] As explained by Harrison et al. (2004), most papers which question this methodology relate more directly to the Q-model of investment rather than an Euler equation model (although some criticisms apply to both models). In addition, none of the recent theoretical models that question this methodology was derived in a dynamic multi-period setting with investment adjustment costs (see Bond et al. (2003)). While it is true that no theoretical consensus

[13]Euler equations for investment have been estimated by numerous authors, with most studies concentrating on US firms. See Whited (1992), Hubbard and Kashyap (1992), Hubbard, Kashyap and Whited (1995), and Calomiris and Hubbard (1995) among others. The limited work utilizing international data includes Bond and Meghir (1994) for the UK; Jaramilo et al. (1996) for Ecuador; Harris, Schiantarelli, and Siregar (1994) for Indonesia; Gelos and Werner (1999) for Mexico; Bigsten et al. (2000) on African countries; Patillo (2000) for Ghana; and Harrison and McMillan (2003) for Ivory Coast.

[14]Kaplan and Zingales (1997)'s results have in turn been criticized (Fazzari et al., 2000).

[15]Alti (2003) and Gomes (2001) find that investment-cash flow sensitivities can be positive even in the absence of financial frictions.

has been reached and that the relationship between investment and cash flow sensitivities continues to be an important empirical question, numerous recent results and survey evidence support the intuition that investment-cash flow sensitivities are a reflection of a higher degree of financing constraints (Love, 2003; Beck et al., 2005).[16]

3 Theoretical framework

The dynamic model of the firm value optimization we rely on is similar to models used in previous studies presented in Section 2, and follows closely the specification in Harrison and McMillan (2003), which has the advantage of explicitly including credit constraints.[17]

We adopt the Euler equation methodology, used in recent contributions to the financing constraints literature (refer to footnote 11), which relies on less restrictive

[16]Love (2003) finds that firms in less financially developed countries exhibit higher investment-cash flow sensitivities, especially the small firms. Survey evidence (see for example Beck et al. (2002)) confirms that firms in countries with lower levels of financial development are more financially constrained, especially small firms.

[17]The primary advantage of explicitly introducing a borrowing constraint in the framework is that it is no longer necessary to reject the model in order to find evidence of credit constraints, nor is it necessary to assume that the rejection of the model implies the presence of credit constraints. The other advantage is that since the coefficient on cash flow is no longer the critical variable of interest for identifying credit constraints, the possibility that cash flow proxies for unobserved profit opportunities no longer poses a critical estimation problem (Harrison and McMillan, 2003).

assumptions than the Tobin Q.[18]

Using this framework, we focus on two basic questions: (1) are firms in China credit constrained, and (2) how does foreign direct investment affect the credit constraints of domestic firms. As in Harrison and McMillan (2003), both hypotheses can be nested in the same general specification. To test for the presence of credit constraints, we proxy for the shadow value of relaxing the borrowing constraint using two firm-level measures of financial distress, the debt-to-assets ratio (DAR) and the interest coverage ratio (COV). The basic idea is that, in the context of the Euler equation, these indicators of financial distress should not have any impact on future investment in a world of perfect information. If, however, there are information asymmetries which restrict borrowing, then firms that are financially distressed today will be forced to substitute investment tomorrow for investment today. Hence, the model predicts a positive relationship between the shadow value of the constraint and future investment. To test for a differential impact of ownership, we estimate our model separately for private and public firms. Finally, to test for the possibility of crowding out, we include interaction terms equal to our proxies for credit constraints multiplied by a proxy for foreign presence.

[18] As explained in the previous section, numerous recent papers highlight other problems with the Q-methodology, such as severe measurement error and identification problems (see Kaplan and Zingales (2000), Erikson and Whited (2000) and Bond and Cummins (2001)).

3.1 The model

We estimate a version of the Euler equation, combining insights from Whited (1992), Bond and Meghir (1994), Gilchrist and Himmelberg (1998), Love (2000) and Harrison and McMillan (2003). The model exploits the relationship between investments in successive time periods, derived from dynamic optimization in the presence of symmetric, quadratic costs of adjustment. According to the Euler equation model, a firm is assumed to maximize the present discounted value of current and future net cash flows. Firm i borrows at time t an amount given by B_{it}. The credit constraint is modeled either as a non-negative dividend constraint or as a ceiling on borrowing.

The Euler equation characterizing the optimal investment path relates marginal adjustment costs in adjacent periods. For a given level of adjustment costs today, the constrained firm behaves as if it had a higher discount rate. Ceteris paribus, constrained firms will then substitute investment tomorrow for investment today.

As evidenced by Harrison and McMillan (2003), the present value of the marginal adjustment cost of investing tomorrow is given by:

$$(1-\delta)\beta_{t+1}^{t} E\left[(1-\Omega_{i,t})\left(\frac{\partial R}{\partial I}\right)_{i,t+1}\right] = \left(\frac{\partial R}{\partial I}\right)_{i,t} + \left(\frac{\partial R}{\partial K}\right)_{i,t} \qquad (1)$$

where β_{t+1}^{t} is the nominal discount factor between period t and period $t+1$, δ denotes the rate of depreciation and $E_t(.)$ is the expectation operator conditional on information available in period t. The major challenge is to find empirical proxies for the derivative of net revenue R with respect to investment I and capital K, as well as to find proxies for $\Omega_{i,t}$ that corresponds to the shadow value of the financial constraint. We follow Bond and Meghir (1994) that show that the derivatives of net revenue with respect to I and K can be written as:

$$\left(\frac{\partial R}{\partial I}\right)_t = -\alpha_1 p_t \left(\frac{I}{K}\right)_t + \alpha_2 p_t - p_t^I \tag{2}$$

$$\left(\frac{\partial R}{\partial K}\right)_t = \alpha_3 p_t \left(\frac{Y}{K}\right)_t - \alpha_3 p_t \left(\frac{\partial F}{\partial L}\frac{L}{K}\right)_t + \alpha_1 p_t \left(\frac{I}{K}\right)_t^2 - \alpha_2 p_t \left(\frac{I}{K}\right)_t \tag{3}$$

where net output Y is assumed to be linearly homogeneous in capital K and labor L, $p_{i,t}^I$ is the price of the investment good, $p_{i,t}$ is the price of output.

If we assume that there are no credit constraints ($\Omega_{i,t}$=0), then substituting (2) and (3) into (1), and adding the subscripts c and k to denote city and industry, yields the following estimating equation:

$$\left(\frac{I}{K}\right)_{i,ck,t+1} = \beta_1 \left(\frac{I}{K}\right)_{i,ck,t} - \beta_2 \left(\frac{I}{K}^2\right)_{i,ck,t} + \beta_3 \left(\frac{Y}{K}\right)_{i,ck,t} - \beta_4 \left(\frac{CF}{K}\right)_{i,ck,t}$$
$$+\beta_5 U_{i,ck,t} + \eta_{ck} + \lambda_t + \epsilon_{i,ck,t+1} \quad (4)$$

where $CF_{i,ck,t} = p_{i,ck,t}F(K_{i,ck,t}, L_{i,ck,t}) - p_{i,ck,t}G(I_{i,ck,t}, K_{i,ck,t}) - w_{i,ck,t}L_{i,ck,t}$, with $F(K, L)$ being the production function gross of adjustment costs and $G(I, K)$ the adjustment cost function.

I denotes gross investment in fixed assets; K denotes the capital stock at the beginning of the period; CF stands for cash flows; $Y = F$ - G denotes net output; $U_{i,ck,t}$ is the real user cost of capital; i, c, k and t denote the firm, city, industry and time period, respectively; η_{ck} and λ_t capture city-industry and time specific effect, respectively, and $\epsilon_{i,ck,t}$ is the error term.

Equation (4) highlights that expected future investment (proxied by actual future investment) is positively related to current investment and negatively related to the square of current investment. Future investment is negatively related to current cash

flow[19] and positively related to the user cost of capital $U_{i,ck,t}$ which is a function of the interest rate and the specific downgrading factor, and to current $\frac{Y}{K}$.

3.2 Testing for Credit Constraints using the Euler Specification

We follow Harrison and McMillan (2003) in order to modify Equation(1) to test for credit constraints. We can take $\Omega_{i,t}$ to the right-hand side of Equation(1) by linearizing (using a Taylor expansion) the product of (1-$\Omega_{i,t}$) and next period's derivative of net revenue with respect to investment.[20]

We will empirically proxy for $\Omega_{i,t}$, the shadow value of the financial constraint with a firm-level measure of financial distress. We rely on two firm-level financial distress indicators: the ratio of total debt-to-assets (DAR) and a measure of interest coverage (COV) which is defined as interest payments divided by cash flows plus interest payments. In absence of credit constraints, these measures should have no impact on investment since the latter should only depend on the expected future profitability of investment. If, however, there are information asymmetries which

[19]Harrison and McMillan (2003) explain the negative association between current cash flow and future investment in the following way. A high level of current cash flow implies lower net marginal adjustment costs today. Because in equilibrium, marginal adjustment costs are equated across periods in expectation, this implies lower expected marginal adjustment costs and hence lower expected investment tomorrow.

[20]Refer to Harrison and McMillan (2003) for more detail.

restrict borrowing, then firms that are financially distressed today will be forced to substitute investment tomorrow for investment today. Hence, these two measures will be positively related to future investment. Firms that are financially distressed are more likely to be up against their borrowing constraints and are hence more likely to postpone investment.

To test for a differential impact of ownership, we split our sample between private and state-owned companies. Finally, to test for the possibility that FDI alleviates financial constraints, we include a variable that measures the importance of foreign investment by city and industry and interaction terms with our proxies for credit constraints.

$$\left(\frac{I}{K}\right)_{i,ck,t+1} = \beta_1 \left(\frac{I}{K}\right)_{i,ck,t} - \beta_2 \left(\frac{I}{K}^2\right)_{i,ck,t} + \beta_3 \left(\frac{Y}{K}\right)_{i,ck,t} - \beta_4 \left(\frac{CF}{K}\right)_{i,ck,t}$$
$$+\beta_5 U_{i,ck,t} + \beta_6 \Omega_{i,ck,t} + \beta_7 FDI_{ck,t} + \beta_8 \Omega_{i,ck,t} \times FDI_{ck,t}$$
$$+\eta_{ck} + \lambda_t + \epsilon_{i,ck,t+1} \qquad (5)$$

Equation 5 is estimated separately for private[21] and state-owned[22] firms. Firms with more than an average of 49% private ownership over the sample period are considered private, otherwise, they are state-owned. A dummy η_{ck} is also included in order to control for unobservable characteristics by city (c) and industry (k). We also allow for year fixed effects (dummy λ_t).

4 Data and indicators

We use firm-level data from the World Bank's 2003 Investment Climate Survey[23]. This survey was run in collaboration with the Chinese National Bureau of Statistics and is part of a World Bank's larger project to study the business environment at the firm-level in Africa, Latin America, and South and East Asia. A total of 2,400 firms were interviewed in 2003 in 18 Chinese cities in 15 provinces- Dalian, Benxi (Liaoning), Changchun (Jilin), Haerbin (Heilongjiang), Hangzhou, Wenzhou (Fujian), Nanchang (Jiangxi), Zhengzhou (Henan),Wuhan (Hubei), Changsha (Hunan), Shenzhen, Jiangmen (Guangdong), Nanning (Guangxi), Chongqing (Chongqing), Guiyang (Guizhou), Kunming (Yunnan), Xian (Shaanxi), Lanzhou (Gansu)- by

[21] As considered by the World Bank survey, Private owners include domestic top manager or family, other domestic individuals, domestic institutional investors, domestic firms, domestic banks.

[22] As considered by the World Bank survey, public owners include national government, state/provincial government, local/municipal government, other government, including cooperatives and collective enterprises.

[23] Enterprise surveys data can be accessed at http://www.enterprisesurveys.org/.

members of the Enterprise Survey Organization of the Chinese National Bureau of Statistics. The surveyed unit is the main production facility of a firm. The data include accounting information on sales, inputs, labor, stock of capital, investment and several other expenditures; and broader information such as ownership structure, characteristics of the labor force, relations with competitors, clients and suppliers, innovation, and market environment and investment climate.

Around 1,800 of these firms correspond to 14 different 3-digit and 4-digit level industries in the Manufacturing sector[24], while the other 600 correspond to Services.[25] The 14 industries were selected non-randomly with the purpose of focusing on the main sectors in China and on those with high growth and innovation rates. Within these groups, firms were chosen randomly and their composition is therefore representative of the population.

Firms were interviewed only once in 2003 but were asked to provide some information for each year between 2000 and 2002. As a result some indicators (such as sales, profits, investment...) are available annually; while others (such as the ownership structure) apply to the entire 3-year period. We focus on the section "Questions

[24]They include Garment & leather products, Electronic equipment, Electronic parts making, Household electronics, Auto & auto parts, Information technology, Food processing, Chemical products & medicine, Biotech products & Chinese medicine, Metallurgical products (manuf. & tools), Transportation equip. (incl. telecom. & ship-building).

[25]Services include Accounting & non-banking financial serv., Advertisement & marketing, Business services.

for the Firm's Accountant and/or Personnel Manager". The latter includes all relevant information related to ownership, finances and accounting. The accounting information on sales and input usage is annual. For these particular entries the data are equivalent to a 3-year panel with no entry and exit of firms. The questions on finance and accounting (investment, cash flows, liabilities) are answered annually.

We have 9,600 theoretical observations representing 2,400 every year. Out of the 2,400 firms, we restrict our attention to the 2,198 that are considered to be domestic[26]. We further eliminate firms undergoing restructuring and/or bankruptcy by including firms with positive values of total sales and total assets (Cleary, 1999).

For consistency, we also decided to drop firms displaying negative interest payments and debt, as well as negative or null investment and sales. This leaves us with 4,301 exploitable observations (around 1,300 firms over 3 years), among which 75% correspond to private firms.

Equation (5) is estimated over the 2000-2002 period. The main firm-level variables are investment, sales, profits, interest payments, borrowing, ownership shares and cash flows, all scaled by the beginning of the period capital for consistency. We supplement the firm-level data with city and industry-level data on foreign firm

[26]We define a firm as foreign when foreign participation in its capital is at least 49 percent, otherwise, it is defined as domestic.

presence computed as the aggregation of firm-level information.[27]

Following Whited (1992) and Harrison and McMillan (2003), DAR is computed as the ratio of the market value of the firm's debt to the value of the firm's fixed assets. It can therefore be interpreted both as a measure of a firm's lack of collateral and as a measure of a firm's current demand for borrowing relative to its capacity to borrow. The other indicator of firm-level financial distress used to proxy for the shadow value of the constraint interest coverage ratio, COV, is defined as the ratio of the firm's interest expense to the sum of the firm's interest expense plus cash flow. A higher value of COV today means that a firm is exhausting relatively more resources on servicing its debt and is likely to be closer to its debt capacity.

The real user cost of capital, U, is typically unobservable. The survey however reports the loan's approximate annual rate of interest by firms for their most recent loan or overdraft.[28] The lack of this kind of data is certainly a limitation in the related studies of Bond and Meghir (1994) and Harrison and McMillan (2003) who proxy for the user cost of capital using firm dummies.[29]. Furthermore, this approach

[27]Indicators of foreign presence at the city and industry level are computed as to include all the firms of the city and industry. We verified that the results on the financing constraints of firm i remain the same when the foreign presence is computed excluding the foreign presence in firm i.

[28]When the information for a specific firm is missing, we rely on the average value computed on responding firms in the same city and same industry.

[29]In our case, data limitations (data is reported for only 3 years) prevent us from accounting for firm fixed effects. Our estimations will account for time-invariant specific effects at the city-industry level.

provides us with a fourth indicator (besides COV, DAR and $\frac{CF}{K}$) that can be used to assess firms' credit constraints.

Our main foreign investment variable is importance of foreign capital, which we scale by sales (SALES) and alternatively by debt (DEBT). Therefore, we measure the importance of foreign investment at the city and industry level as:

$$FDI_{ck,t} = \frac{\sum_i SALES_{i,ck,t} * FDI\_Firm_{i,ck,t}}{\sum_i SALES_{i,ck,t}} \tag{6}$$

$$FDI_{ck,t} = \frac{\sum_i DEBT_{i,ck,t} * FDI\_Firm_{i,ck,t}}{\sum_i DEBT_{i,ck,t}} \tag{7}$$

with $FDI\_Firm_{i,ck,t}$ the share of foreign equity participation at the plant level, varying between 0 and 100 percent.

Table A in Appendix provides descriptive statistics. Since we want to contrast the financial constraints of private and public firms, we divide the full sample according to ownership. The 49% cut-off used to differentiate between public and private firms as well as to define domestic firms appears to be appropriate since in

our data a small proportion of firms have in fact a mixed ownership structure. A majority of the firms reports an ownership structure either almost fully state-owned or fully private owned. An average of 88% of the firms defined as domestic state-owned in our sample have a 100% state ownership. The average public share for those firms is 96.7% while the average foreign share is below 1%. The situation is very similar for the sub-sample of firms defined as private: An average of 96% of the firms defined as domestic private in our sample have a 100% private ownership. The average private share for those firms is 98.8% while the average foreign share is around 2%. In our empirical analysis, we successfully verified that our results did not depend on the level of the ownership cut-off.

The table also presents mean, median, standard deviation, minimum and maximum values of each variable for both categories of firms. Private firms appear to be significantly smaller in size as proxied by total fixed assets. As a consequence our empirical analysis will control for size. They however turn out to be significantly more profitable as measured by the ratio of total profits over total fixed assets.

5 Empirical Results

5.1 Investment Equation Estimates

The model includes fixed effects by city & industry in order to account for unobservable characteristics by city and industry level. We also allow for year fixed effects. We anticipate that most elements of financial development and institutional reforms will be captured through these fixed effects. The structure of our data however confronts us with the problem of clustering of errors. It is to be expected that observable and unobservable characteristics of the firms within the same city and industry are correlated.

In this paper we correct for clustering using the Rogers' correction (Rogers, 1993). We therefore correct for the correlation of errors between firms within a specific city and industry.

Our approach of investigating the impact of city-industry level FDI level on firm level investment should alleviate the potential problem of endogeneity of FDI since it is unlikely that a shock on a firm translates into a change in city-industry level FDI.[30] However, since we want to ensure that our results are free from any estimation bias,

[30]When the dependent variable is at the finest level possible, shocks in the error term will be less likely to affect right-hand side variables. Moreover, if the explanatory variables are more aggregated, endogeneity is again less likely since shocks to individual variables affect regional variables only slightly.

we also use the generalized instrumental variables estimation procedure. Similar to prior studies, we use lagged values (by two periods) of current period regressors as instruments, known as the two-stage least squares (2SLS) estimation.[31]

Table 1 reports the results from estimating Equation 4. We distinguish between domestic private firms and public firms. As mentioned earlier, a private firm is defined as one for which more than 49% of the equity is owned by private investors.

We systematically check the validity of our instruments with the Hansen's J test of overidentifying restrictions. Insignificant test statistics indicate that the orthogonality of the instruments and the error terms cannot be rejected, and thus that our choice of instruments is appropriate.[32] In all cases, the overidentifying restrictions are accepted.

The next step is to perform the Davidson-McKinnon test, which tests for the endogeneity of the market access indicator in a regression estimated with IV.[33] Both test statistics are reported in the last four lines of the estimation table. Since the Davidson-McKinnon test does not reject the null hypothesis of exogeneity of the

[31] The 2SLS estimation is a special case of the Generalized Method of Moments (GMM) approach (Verbeek, 2004). Contrary to studies that account for firm-level specific effects, our estimations do not suffer from the systematic bias in the lagged dependent variable, which is traditionally solved by taking a within transformation, and then applying instrumental variables (IV) estimation or Generalized Method of Moments (GMM) estimation (Harrison and McMillan, 2003).

[32] Significance is judged at the 10% confidence level.

[33] The rejection of the null hypothesis (at the 10% confidence level) that an OLS estimator of the same equation would yield consistent estimates means that endogenous regressors have a statistically relevant effect on coefficients and we have to rely on the IV estimation.

market access (at the 10% confidence level), we report OLS estimates. Indeed, they are more efficient than IV estimates (Pagan, 1984).

We also want to ensure that our results are not biased due to a low number of firms in some of the city-industry clusters. Considering that the average number of firms by cluster is 60, we run our estimations excluding cases for which the number of firms is below 30. This leads to almost identical results both qualitatively and quantitatively.

Finally, in order to ensure that our standard errors are free form any bias due to autocorrelation, we also rerun each regression using the Newey-West correction for autocorrelation and heteroskedasticity. The degrees of significance of this alternative set of results is very similar to the ones presented below, excepted two cases which will be subsequently discussed (cf. *infra*, discussion on Table 2, column (4) and on Table 3, column (3)).

The basic specification, reported in columns (1) and (2), does not include debt or interest coverage. As in Harrison and McMillan (2003), the restrictions imposed by the model are most of the time accepted: the coefficient on lagged investment is positive, the coefficient on squared (lagged) investment is negative and the coefficient on Y/K is positive. However, the coefficient on cash flow is negative (and

highly significant) only for private companies, meaning that a higher cash flow today will incite companies to substitute investment tomorrow for investment today. Conversely, public companies are not sensitive to the level of cash flow. This is a first indication that private and public companies do not behave the same way regarding investment decisions. Columns (3) through (6) add successively and then concomitantly (Columns (7) and (8)) the two proxies for credit constraint, the measure of interest coverage (COV) and the ratio of total debt-to-assets (DAR). The coefficients on COV and DAR are significant and positive for private companies and interestingly, it is also the case for our proxy for the user cost of capital U. Conversely, these coefficients are close to zero in magnitude and insignificant for public companies. This means that private companies are credit constrained and care about the cost of funds, while public companies are not concerned by any of these problems.

In a second step, we want to check if our results on credit constraints are related (or not) to firms specific characteristics. We start by controlling for the size of firms in Table 2, using the value of total fixed assets as a proxy. If firms' size has an influence, it is to be expected that credit constraints decrease with the value of fixed assets. In a world of imperfect financial markets with information asymmetries, a

bigger firm will have an easier access to credit since it has more collateral to warrant it. Columns (1) and (2) of Table 2 simply add the value of total fixed assets to the model with COV and DAR. The coefficient on total fixed assets has the expected negative sign (i.e., a greater amount of fixed assets tends to increase investment today and consequently, to decrease investment tomorrow), but it is not significant. The coefficients on the other variables are almost identical to the ones presented in the columns (7) and (8) of Table 1. We subsequently check for a direct impact of size on credit constraints by adding two interactive terms, COV interacted with total fixed assets and DAR interacted with total fixed assets. The results are presented in columns (3) through (8) of Table 2. For private companies, while coefficients on U, COV and DAR remain positive and significant, the coefficients on the two interactive terms are both negative, indicating that a greater size tends to alleviate credit constraints. However, as evidenced in Column 7, only the coefficient on the interaction of DAR with total fixed assets is significant, at the 10% level. More importantly, even if private firms characterized by larger fixed assets seem to be less credit constrained all else equal, the two firm-level financial distress indicators remain positive and significant.

Conversely, no evidence of size impact or credit constraints can be found for

public companies, except a counter-intuitive positive coefficient on the amount of total fixed assets. The latter is no longer significant, however, when applying the Newey-West correction on standard errors. Overall, the evidence in favor of size impact is not overwhelming. Eventually, we also test for the possibility of reputation effects by introducing the age of firms in a similar fashion, first by adding the age alone, then including interactive terms[34]. The intuition is that older firms should be less credit constrained than younger ones, since the latter must prove their viability by getting and keeping market shares, and generally have a higher probability of bankruptcy. However, we did not find any evidence of such effects either for private companies or public ones.

5.2 Testing for the impact of FDI

A major question addressed in this paper is the one of FDI impact on domestic firms' credit constraints. More precisely, we want to know if FDI ease or exacerbate domestic firms' credit constraints. We test for a differential impact of ownership in Tables 3 and 4. They present estimated equations including two additional interaction terms, alternatively equal to COV and FDI and to DAR times FDI, with

[34]Results are not reported in order to save space, but remain available upon request to the authors.

FDI being scaled by sales (Equation 6). As a robustness check, Table 4 relies on FDI being scaled by debt.

Both specifications suggest that FDI ease Chinese private firms' credit constraints when comparing estimates from the specification including only COV and DAR, recalled in columns (1) and (2). Indeed, the coefficient on DAR is slightly smaller in magnitude and less significant. Contradictory evidence is obtained for the user cost of capital U, close to zero and non-significant for the specification using Share Foreign Sales but still positive and significant for the one including Share Foreign Debt. The coefficients on COV*Share Foreign Sales and COV*Share Foreign Debt, negative and significant, respectively at the 5% and the 1% level for private firms, suggest that the presence of foreign firms reduces credit constraints. Conversely, no convincing evidence of crowding-out could be found. While the coefficient on Share Foreign Debt is insignificant, the one on Share Foreign Sales is positive and significant at the 10% level.[35] Those findings are in line with the ones of Harrison et al. (2004) obtained on a cross-country firm-level panel which emphasize that global flows are associated with a reduction in firm-level financing constraints. However they contrast with the findings of Harrison et McMillan (2003) on Ivory Coast where the presence of foreign firms crowds local firms out of domestic capital

[35]However, this significance is not robust to the Newey-West correction for autocorrelation.

markets. These diverging results highlight the differences of financial sector organization and practices: the scope of crowding out is much more limited in China because of the lack of incentives of most banks to lend to non state-owned companies.

Our results regarding private firms contrast strongly with those on public firms. We find again that public firms' investment decisions are not sensitive to debt ratios or the cost of debt. Nor is there any evidence that public firms are affected by foreign firms presence. We interpret this as evidence in support of the notion of a soft budget constraint for public firms (Qian and Roland, 1998).

Finally, we check the robustness of our results using dummy variables taking the value of 1 when the Share Foreign Sales (or Share Foreign Debt) is higher than the yearly median among the different industries and 0 otherwise. Results are very similar in terms of magnitude and identical regarding significance.

5.3 Robustness checks

One potential criticism to our approach is that the impact of FDI indicators found previously may actually be due to omitted factors. Besides capital, FDI is expected to bring additional benefits (innovation, new management techniques...). Moreover, FDI may flow to sectors displaying specific characteristics. Typically, more FDI

could be found in sectors exhibiting higher profitability, labor intensity or greater outward orientation. So, it may be sensible to check if the relaxation of financial constraint does not actually come from one of these factors, instead of being related directly to FDI. Therefore, we perform additional estimations including new variables accounting for profitability, labor intensity, productive innovation and export orientation, and their interactions with our proxies for financial constraint.

Results are displayed in tables 5 and 6. In Table 5, FDI is scaled by sales while in table 6, it is scaled by debt. Columns (1) and (2) test for the possibility that the correlation observed between credit constraints indicators and the foreign sector share for private firms derives from higher profitability. The latter is defined as the ratio of operating profits (1) or business profits (2) over sales. Column (3) addresses the same concerns, but related to labor intensity, defined as the ratio of the number of employees over fixed investment. Column (4) introduces the interaction between credit constraints and the share of new products in exports. Eventually, column (5) tests a possible impact of export orientation, measured by the value of exports over total sales. Similarly to the computation strategy of the FDI indicators, those variables are computed as average by industry and city in order to alleviate the potential problem of endogeneity. If foreign investment is simply a proxy for those

potential specificities, the relaxation of credit constraints highlighted in the last section should disappear. Conversely, if foreign investment truly alleviates credit constraints, its negative interactions with the proxies for credit constraints should remain statistically significant. The results strongly suggest that it is the case.

The introduction of interactive terms between credit constraints (COV and DAR) and indicators of profitability, labor intensity, share of new products in exports or outward orientation respectively leaves the results basically unchanged. Some interactions (COV interacted with profitability and DAR interacted with innovation) enter with a significant and negative sign providing some evidence that profitable and innovative practices help to alleviate credit constraints for private firms in China. However these additional controls do not affect the findings of negative and significant interactions between FDI and credit constraints proxied by COV.

6 Conclusion

Using firm level panel data across Chinese cities, we estimate a dynamic investment model to study the presence of financing constraints for Chinese domestic firms. Our results shed light on the impact of ongoing financial sector reforms designed to

improve the capital allocation efficiency. They suggest a striking difference between the credit constraints faced by domestic private and state-owned firms. We find that our two firm-level measures of financial distress (debt-to-asset ratio and interest coverage) do significantly affect investment for domestic private firms, indicating that they are credit constrained. Investment of state-owned firms on the opposite does not seem to significantly respond to these indicators. Nor is there any evidence that it is significantly affected by FDI inflows.

The results however suggest that FDI inflows are associated with a reduction in financing constraints for private domestic firms. FDI inflows appear to reduce the imperfections that private domestic firms face when dealing with financial markets. They confirm the general argument that the development of cross-border relationships with foreign firms helps private domestic firms to bypass both the financial and legal obstacles that they face at home (Huang, 2003). Besides our findings are in line with the strand of literature that considers a demand perspective in addition to the traditional supply view to explain the massive inward foreign investment in China. FDI to Chinese provinces is not only the consequence of good policies, but also results from certain distortions in the banking market and in state investment policies (Havrylchyk and Poncet, 2006).

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Tables

Table A: Summary statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Private firms: Observation nb: 1865				
Average foreign share	2.17	8.06	0	48
Average public share	1.21	6.63	0	48
Investment over Capital	0.26	0.47	0.00	10.00
Squared Investment over Capital	0.29	2.97	0.00	100.00
Sales over Capital	3 609	129 749	0.00	5 464 201
User cost of Capital	5.39	1.58	0.08	25.50
Total profits (cash flows)	0.33	3.87	-29	137
COV interest exp./(Cash flows+ interest exp.) (N=1741)	0.09	3.02	-107	40
DAR Total debt to asset	5.48	26.34	0.00	552
FDI scaled by foreign sales	0.10	0.18	0.00	0.96
FDI scaled by foreign debt	0.09	0.17	0.00	1.00
state-owned firms: Observation nb: 640				
Average foreign share	0.41	3.52	0	39
Average public share	96.65	10.55	51	100
Investment over Capital	0.14	0.26	0.00	4.01
Squared Investment over Capital	0.09	0.66	0.00	16
Sales over Capital	1.76	4.59	0.00	82
User cost of Capital	5.70	2.25	0.08	25
Total profits (cash flows)	0.03	0.33	-1.66	4.25
COV interest exp./(Cash flows+ interest exp.) (N=608)	0.32	11	-50	271
DAR Total debt to asset (Obs nb= 635)	1.69	2.05	0.00	21.58
FDI scaled by foreign sales	0.07	0.13	0.00	0.95
FDI scaled by foreign debt	0.06	0.12	0.00	0.83

Table 1: Baseline specification

Explained variable	Investment over Capital (IoverK) t+1							
	1	2	3	4	5	6	7	8
	private	state-owned	private	state-owned	private	state-owned	private	state-owned
IoverK	0.34***	0.41***	0.30***	0.39***	0.31***	0.42***	0.28***	0.39***
	(0.04)	(0.12)	(0.04)	(0.13)	(0.04)	(0.12)	(0.04)	(0.13)
IoverK^2	-0.03***	-0.09***	-0.02***	-0.08***	-0.03***	-0.09***	-0.02**	-0.08***
	(0.01)	(0.02)	(0.01)	(0.03)	(0.01)	(0.02)	(0.01)	(0.03)
YoverK	0.001***	0.01***	0.001	0.01***	0.001***	0.01***	0.001	0.01***
	(0.0001)	(0.001)	(0.001)	(0.00)	(0.0001)	(0.002)	(0.0001)	(0.001)
User cost of capital	0.005	0.001	0.01	0.001	0.008	0.001	0.016**	0.001
	(0.007)	(0.005)	(0.008)	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)
Cash Flows	-0.001***	0.02	0.01*	0.02	-0.001***	0.02	0.002	0.02
	(0.0001)	(0.02)	(0.003)	(0.02)	(0.001)	(0.02)	(0.004)	(0.02)
COV Interest coverage			0.002*	-0.001			0.002*	-0.001
			(0.001)	(0.001)			(0.001)	(0.001)
DAR Total debt					0.002***	-0.001	0.002***	0.001
to asset					(0.001)	(0.005)	(0.001)	(0.005)
Constant	0.11***	0.06	0.07	0.04	0.09**	0.03	0.04	0.03
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Observations Nb	1865	640	1741	608	1853	635	1732	605
Fixed effects	year							
Fixed effects	city & sector							
City & sector nb.	148	99	144	95	148	99	144	95
R^2	0.21	0.39	0.10	0.37	0.22	0.39	0.11	0.38
Hansen J-stat	0.02	3.64	2.84	3.33	0.65	8.71	1.29	6.84
p-value	.96	.162	0.58	.50	.72	.03	.86	.14
Davidson-McKinnon	1.03	.19	.27	.04	.68	.30	.47	.30
p-value	.36	.82	.76	.95	.56	.82	.75	.87

Heteroskedastic consistent standard errors in parentheses, with ***, ** and * denoting the significance at 1, 5 and 10% level.
Rogers (1993) correction for city-sector cluster correlation.

Table 2: Investigation of size dependency

Explained variable	Investment over Capital (IoverK) t+1							
	1	2	3	4	5	6	7	8
	private	state-owned	private	state-owned	private	state-owned	private	state-owned
IoverK	0.28***	0.39***	0.30***	0.39***	0.31***	0.42***	0.28***	0.39***
	(0.04)	(0.13)	(0.04)	(0.13)	(0.04)	(0.12)	(0.04)	(0.13)
IoverK^2	-0.03**	-0.09***	-0.03***	-0.09***	-0.03***	-0.10***	-0.03**	-0.09***
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
YoverK	0.001	0.010***	0.001	0.01***	0.001***	0.01***	0.001	0.010***
	(0.0001)	(0.002)	(0.001)	(0.002)	(0.0001)	(0.002)	(0.001)	(0.002)
User cost of capital	0.02**	0.001	0.01	0.03	0.008	0.001	0.02**	0.001
	(0.007)	(0.006)	(0.008)	(0.03)	(0.007)	(0.006)	(0.007)	(0.006)
Cash Flows	0.002	0.029	0.007*	0.001	-0.001***	0.028	0.001	0.029
	(0.004)	(0.028)	(0.004)	(0.006)	(0.0001)	(0.026)	(0.004)	(0.027)
COV Interest coverage	0.002**	-0.001	0.002**	0.001			0.002**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)			(0.001)	(0.001)
COV interacted with			-0.001*	-0.001			-0.001	0.001
Fixed assets			(0.0007)	(0.001)			(0.001)	(0.001)
DAR Total debt	0.002***	0.001			0.002***	0.001	0.002***	0.001
to asset	(0.001)	(0.004)			(0.0001)	(0.004)	(0.0001)	(0.004)
DAR interacted with					-0.001**	-0.001**	-0.001*	-0.0001
Fixed assets					(0.0001)	(0.0001)	(0.001)	(0.0001)
Fixed assets	-0.001	-0.001	-0.001*	0.001	-0.001	0.001*	-0.001	0.001
	(0.001)	(0.001)	(0.0007)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.05	0.04	0.08	0.06	0.10***	0.04	0.05	0.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
Observations Nb.	1732	605	1741	608	1853	635	1732	605
Fixed effects	year							
Fixed effects	city & sector							
City & sector nb.	144	95	144	95	148	99	144	95
R^2	0.11	0.38	0.11	0.38	0.22	0.39	0.1	0.38

Heteroskedastic consistent standard errors in parentheses, with ***, ** and * denoting the significance at 1, 5 and 10% level.
Rogers' (1993) correction for city-sector cluster correlation.

Table 3: Investigation of FDI impact (1) FDI scaled by sales

Explained variable	Investment over Capital (IoverK) t+1							
	1	2	3	4	5	6	7	8
	private	state-owned	private	state-owned	private	state-owned	private	state-owned
IoverK	0.28***	0.39***	0.31***	0.39***	0.32***	0.42***	0.28***	0.39***
	(0.04)	(0.13)	(0.05)	(0.13)	(0.05)	(0.13)	(0.05)	(0.14)
IoverK^2	-0.03**	-0.08***	-0.03***	-0.09***	-0.03***	-0.10***	-0.03**	-0.09***
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
YoverK	0.001	0.01***	0.001	0.01***	0.001***	0.01***	0.02**	0.010***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.0001)	(0.002)	(0.007)	(0.002)
User cost of capital	0.016**	0.001	0.01	0.001	0.01	0.001	0.001	0.001
	(0.007)	(0.006)	(0.01)	(0.006)	(0.01)	(0.01)	(0.001)	(0.006)
Cash Flows	0.002	0.03	0.01*	0.03	-0.001***	0.03	0.002	0.03
	(0.004)	(0.03)	(0.004)	(0.03)	(0.0001)	(0.03)	(0.004)	(0.03)
COV Interest coverage	0.002*	-0.001	0.003*	0.001			0.003*	0.001
	(0.001)	(0.001)	(0.001)	(0.001)			(0.001)	(0.002)
COV interacted with			-0.04***	-0.001			-0.03***	-0.001
share of foreign sales			(0.01)	(0.003)			(0.01)	(0.003)
DAR total debt	0.002***	0.001			0.002**	0.001	0.002*	0.002
to asset	(0.0005)	(0.005)			(0.009)	(0.01)	(0.0008)	(0.006)
DAR interacted with					0.001	-0.002	0.002	-0.005
share of foreign sales					(0.004)	(0.02)	(0.004)	(0.02)
Share of foreign sales			0.22**	0.10	0.12	0.09	0.19*	0.12
over total sales			(0.10)	(0.26)	(0.09)	(0.27)	(0.10)	(0.27)
Constant	0.04	0.04	0.05	0.03	0.09**	0.03	0.03	0.03
	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
Observations	1732	605	1741	608	1853	635	1732	605
Fixed effects	year							
Fixed effects	city & sector							
City & sector nb.	144	95	144	95	148	99	144	95
R^2	0.11	0.38	0.10	0.37	0.22	0.39	0.10	0.37

Heteroskedastic consistent standard errors in parentheses, with ***, ** and * denoting the significance at 1, 5 and 10% level.
Rogers' (1993) correction for city-sector cluster correlation.

Table 4: Investigation of FDI impact (2) FDI scaled by debt

Explained variable	Investment over Capital (IoverK) t+1							
	1	2	3	4	5	6	7	8
	private	state-owned	private	state-owned	private	state-owned	private	state-owned
IoverK	0.28***	0.39***	0.31***	0.39***	0.31***	0.42***	0.28***	0.39***
	(0.04)	(0.13)	(0.05)	(0.13)	(0.04)	(0.13)	(0.04)	(0.14)
IoverK^2	-0.03**	-0.08***	-0.03***	-0.08***	-0.03***	-0.09***	-0.03**	-0.09***
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
YoverK	0.01	0.010***	0.001	0.01***	0.001***	0.01***	0.001	0.01***
	(0.01)	(0.002)	(0.001)	(0.002)	(0.0001)	(0.002)	(0.001)	(0.002)
User cost of capital	0.02**	0.001	0.01	0.001	0.009	0.001	0.02**	0.001
	(0.007)	(0.006)	(0.01)	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)
Cash Flows	0.002	0.029	0.007*	0.03	-0.001***	0.03	0.002	0.03
	(0.004)	(0.027)	(0.004)	(0.03)	(0.0001)	(0.03)	(0.004)	(0.03)
COV Interest coverage	0.002*	-0.001	0.002**	0.001			0.002**	0.01
	(0.0009)	(0.001)	(0.001)	(0.002)			(0.001)	(0.01)
COV interacted with			-0.04**	-0.002			-0.03**	-0.01
share of foreign debt			(0.02)	(0.004)			(0.01)	(0.01)
DAR total debt	0.002***	0.001			0.002**	-0.001	0.002*	0.01
to asset	(0.0006)	(0.005)			(0.001)	(0.01)	(0.001)	(0.01)
DAR interacted with					-0.001	0.01	0.001	0.01
share of foreign debt					(0.002)	(0.03)	(0.002)	(0.03)
Share of foreign debt			0.25	0.44	0.09	0.18	0.20	0.40
over total debt			(0.17)	(1.04)	(0.18)	(0.99)	(0.17)	(1.04)
Constant	0.04	0.04	0.05	0.02	0.09*	0.03	0.03	0.02
	(0.04)	(0.04)	(0.05)	(0.07)	(0.04)	(0.07)	(0.05)	(0.07)
Observations	1732	605	1741	608	1853	635	1732	605
Fixed effects	year							
Fixed effects	city & sector							
City & sector nb.	144	95	144	95	148	99	144	95
R^2	0.11	0.38	0.10	0.37	0.22	0.39	0.11	0.37

Heteroskedastic consistent standard errors in parentheses, with ***, ** and * denoting the significance at 1, 5 and 10% level.
Rogers' (1993) correction for city-sector cluster correlation.

Table 5: Robustness checks (1) FDI scaled by sales. Private firms subsample

Explained variable	Investment over Capital (IoverK) t+1					
	1	2	3	4	5	6
IoverK	0.29***	0.29***	0.28***	0.28***	0.28***	0.29***
$IoverK^2$	-0.03**	-0.03**	-0.03**	-0.03**	-0.03**	-0.03**
YoverK	0.01	0.01	0.01	0.01	0.01	0.01
User cost of capital	0.02**	0.02**	0.02**	0.02**	0.02**	0.02**
Cash Flows	0.01	0.01	0.01	0.01	0.01	0.01
COV Interest coverage	0.01*	0.01*	0.01***	0.01*	0.01**	0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
COV interacted with share of foreign sales	-0.03***	-0.04***	-0.04***	-0.03**	-0.03**	-0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
DAR total debt to asset	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
DAR interacted with share of foreign sales	0.01	0.01	0.01	0.01	0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Share of foreign sales over total sales	0.18*	0.18*	0.16	0.19**	0.16	0.17*
	(0.10)	(0.10)	(0.11)	(0.09)	(0.10)	(0.10)
COV interacted with profitability		-0.01**	-0.01			
		(0.00)	(0.00)			
DAR interacted with profitability		-0.01	0.01			
		(0.00)	(0.00)			
Profitability		0.01	-0.01**			
		(0.00)	(0.00)			
COV interacted with labor intensity				-0.01		
				(0.00)		
DAR interacted with labor intensity				-0.01		
				(0.00)		
Labor intensity				-0.01		
				(0.00)		
COV interacted with innovation					-0.01	
					(0.00)	
DAR interacted with innovation					-0.01	
					(0.00)	
Innovation					-0.01	
					(0.00)	
COV interacted with outward orientation						-0.01
						(0.02)
DAR interacted with outward orientation						-0.01
						(0.01)
Outward Orientation						-0.08
						(0.65)
Constant	0.03	0.03	0.03	0.04	0.02	0.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.07)
Observations	1732	1732	1732	1732	1667	1732
Fixed effects	year					
Fixed effects	city & sector					
City & sector nb.	144	144	144	135	144	144
R^2	0.11	0.11	0.11	0.11	0.11	0.11

Heteroskedastic consistent standard errors in parentheses,
with ***, ** and *denoting the significance at 1, 5 and 10% level.
Rogers' (1993) correction for city-sector cluster correlation.

Table 6: Robustness checks (2) FDI scaled by debt. Private firms subsample

Explained variable	Investment over Capital (IoverK) t+1					
	1	2	3	4	5	6
IoverK	0.29***	0.29***	0.29***	0.28***	0.28***	0.29***
$IoverK^2$	-0.03**	-0.03**	-0.03**	-0.03**	-0.03**	-0.03**
YoverK	0.01	0.01	0.01	0.01	0.01	0.01
User cost of capital	0.02**	0.02**	0.02**	0.02**	0.02**	0.02**
Cash Flows	0.01	0.01	0.01	0.01	0.01	0.01
COV Interest coverage	0.01**	0.01*	0.01***	0.01*	0.01*	0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
COV interacted with share of foreign debt	-0.03**	-0.04**	-0.03**	-0.03**	-0.03*	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
DAR total debt to asset	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
DAR interacted with share of foreign debt	0.01	0.01	0.01	0.01	0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Share of foreign debt over total debt	0.21	0.21	0.21	0.22	0.18	0.17
	(0.17)	(0.17)	(0.17)	(0.16)	(0.17)	(0.18)
COV interacted with profitability		-0.01**	-0.01			
		(0.00)	(0.00)			
DAR interacted with profitability		0.01	0.01*			
		(0.00)	(0.00)			
Profitability		-0.01	-0.01**			
		(0.00)	(0.00)			
COV interacted with labor intensity				-0.01		
				(0.00)		
DAR interacted with labor intensity				-0.01		
				(0.00)		
Labor intensity				-0.01		
				(0.00)		
COV interacted with innovation					-0.01	
					(0.00)	
DAR interacted with innovation					-0.01*	
					(0.00)	
Innovation					-0.01	
					(0.00)	
COV interacted with outward orientation						-0.02
						(0.02)
DAR interacted with outward orientation						-0.01
						(0.01)
Outward Orientation						-0.05
						(0.66)
Constant	0.03	0.03	0.03	0.04	0.03	0.04
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.07)
Observations	1732	1732	1732	1732	1667	1732
Fixed effects	year					
Fixed effects	city & sector					
City & sector nb.	144	144	144	135	144	144
R^2	0.11	0.11	0.11	0.11	0.11	0.11

Heteroskedastic consistent standard errors in parentheses,
with ***, ** and *denoting the significance at 1, 5 and 10% level.
Rogers' (1993) correction for city-sector cluster correlation.