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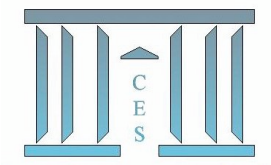

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FDI and credit constraints: firm level evidence in China

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Abstract

In this paper, we analyze whether incoming foreign investment in China plays an important role in alleviating domestic firms' credit constraints. Access to external finance is a crucial determinant of business expansion. Using firm-level data on 2,200 domestic companies for the period 1999-2002, we investigate the extent to which firms are financially constrained and whether direct foreign investment relaxes financing constraints of firms. When we split domestic firms into public and private firms, we find 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. 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.

JEL Codes: E22, E44, G31, O16

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

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1 Introduction

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 businesses 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 (McKinsey Global Institute)- 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 2,200 domestic firms interviewed in the World Bank investment climate survey (2003)[4] have neither a bank loan or a loan from any other financial institution, and on average only about 25 percent of firms' working capital comes from bank loans.

One of the striking feature of the Chinese financial system is the poor allocation

[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).

[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/.

of capital, due in parts 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 stateowned enterprises, in order to preserve jobs. 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 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. Using firm-level data on Chinese domestic companies for the period 1999-2002, we test the following hypotheses: (1) domestic firms face different credit constraints depending on their size and private or state-owned status (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 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 assess based on a structural model the importance of credit constraints in China. Doing so, we provide an additional test of the approach used by Fazzari et al. (1988) to identify credit constraints. Second, this paper sheds light on important questions in development economics: does FDI ease or exacerbate domestic firms' credit constraints? and more crucially which types of firms are most likely to benefit from capital inflows?

The paper is organized as follows. The next section reviews the literature on financing constraints and presents the specific context of China's financial and corporate sector. 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) studies on distortions in China's financial system.

This study 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)[5] and Harrison et al. (2004)[6], 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), hereafter FHP, to identify credit constraints based on their impact on investment behavior.

2.1 Testing for Financing constraints: the literature

The central idea of this literature is that investment should not be determined by a firm's net worth or internal funds but only by the firm's expected future profitability. The seminal work by Modigliani and Miller (1958) indeed suggests that in perfect

[5]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.

[6]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.

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, any financing constraints will reflect on firms' investment decisions. Empirically, financing constraints could be identified through the sensitivity of investment with respect to internal funds.[7] 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.[8]

Following FHP, it is usually assumed that there are cross-sectional differences in 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 a firm's characteristics that are associated with information costs as a criterion to select firms which are *a priori* likely to be credit constrained. Financial constrained firms are often thought to be the youngest, smallest, most indebted ones or the ones not paying dividends.[9]

[7]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.

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

[9]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 singular 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).

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 to study financing constraints. Both the Q-theory and Euler model of investment come from the same optimization problem.[10]

A series of recent papers have questioned the validity of using investment-cash flow sensitivities as a proxy for financing constraints. The debate started by Kaplan and Zingales (1997), who argue based upon statements contained in annual reports, that firms identified in FHP as financially constrained are in fact not constrained.[11] The debate was continued by numerous studies some of which 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)).[12] As

[10]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.

[11]Kaplan and Zingales (1997)'s results have in turn been criticized. First, the sample used may be too homogeneous to provide reliable results (FHP). Second, as argued by Fazzari et al. (2000), the empirical classification system is flawed in identifying both whether firms are constrained and the relative degree of constraints across firm groups since most financially constrained are actually observations from years when firms are financially distressed.

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

explained by Harrison et al. (2004), most papers which question this methodology relate more directly to the Q-model of investment[13] rather than an Euler equation model[14] (although some criticisms apply to both models).[15] In addition, none of the recent theoretical models that question this methodology were derived in a dynamic multi-period setting with investment adjustment costs (see Bond et al. (2003)). While it is true that no theoretical consensus 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]

2.2 Empirical evidence on factors influencing firms' access to finance

Recent evidence links financial market liberalization to investment and financing constraints across countries. For example, utilizing the investment-cash-flow sen-

[13]Hayashi (1982) argues that average Q may be an imprecise proxy for the unobservable marginal Q. In this case, internal funds could be a proxy for the profitability of investment and the positive sensitivity cannot solely be interpreted as capital and credit market imperfections but rather as firms with better liquidity also attaining superior investment possibilities (Hoshi et al., 1991; Schiantarelli, 1996).

[14]The Euler equation uses a structural model to capture the influence of current expectations of future profitability on current investment decisions. Unlike the Q-model, the Euler-equation approach measures how internal funds indirectly affect investment via a Lagrange multiplier and does not use the market value of Q. The advantage of this is that future profitability, i.e. marginal Q, does not need to be specified or observed.

[15]Both models assume a geometric depreciation rate and convex adjustment costs. Moreover they rely on strong theoretical assumptions, which in the event they are not met, render the models misspecified.

[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.

sitivity approach, Laeven (2003) shows that financial liberalization in developing countries relaxes financing constraints of firms, particularly smaller ones. Love (2003), employing a sample of 36 countries, verifies that financial development affects firms' investment by increasing the availability of external finance. This effect is stronger for financially constrained firms in countries with low levels of financial development. Galindo, Schiantarelli and Weiss (2001) find that financial reform has led to an increase in the efficiency with which investment funds are allocated. Bekaert and Harvey (2001) and Henry (2000) find that the cost of equity capital decreases significantly after financial liberalizations.[17]

Harrison et al. (2003) combine cross-country firm-level panel with time-series data on restrictions on international transactions and capital flows and find that while restrictions on capital account transactions negatively affect firms' financing constraints, DFI inflows are associated with lower sensitivity of investment to cash flow for firms without foreign assets and for domestically owned enterprises.

Regarding firm-specific characteristics, Shin and Park (1999) and Hoshi et al. (1991) find that business group affiliation in Korea and Japan, respectively, enhances access to finance because these firms have access to the group's internal capital market and are more likely to have close financial ties to large banks. Relying on survey data from developing and transition economies, Clarke et al. (2001) find that foreign bank penetration improves financing conditions of firms. Also using survey data, Beck et al. (2004) show that higher levels of property rights protection

[17]These findings based on cross-country findings have been confirmed by several country-specific studies about the effects of financial liberalization on financing constraints in developing countries: Harris, Schiantarelli and Siregar (1994) for Indonesia, Jaramillo, Schiantarelli and Weiss (1997) for Ecuador, Gelos and Werner (1999) for Mexico, and Gallego and Loayza (2000) for Chile.

enhance access to external finance, even more so for small firms. Also, Beck et al. (2006), illustrate that larger, older firms and foreign-owned firms enjoy increased access to finance. They also confirm earlier results by Demirg and Maksimovic (1998) regarding the impact of institutional arrangements particularly the quality of the legal system in reducing financing constraints. Specifically investigating creditor protection, Love and Mylenko (2003) find that the presence of private credit registries in a country is associated with lower financing constraints and a higher share of bank financing.

2.3 Financing constraints in China

One of the striking feature of the Chinese financial system is the poor allocation of capital, due in parts 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, and, as we have noted, minimal growth in corporate bond markets.

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 - 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[18].

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

The system was liberalized at the end of 1990s, when the China Constitution acknowledged the private sector to be an integral part of the economy. Theoretically, lending quotas are not in place any more. 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.

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

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[19], 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 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 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

[19]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 vs. 99 percent.

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 are discriminated against by the local financial system and whether the abundance of FDI has helped them to alleviate the constraint to access capital necessary for investment.

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.[20]

We adopt the Euler equation methodology, utilized by more recent contributions to the financing constraints literature (refer to footnote 10) and which has less restrictive assumptions than the previous.[21].

Using this framework, we focus on two basic questions: (1) are firms in China

[20]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 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).

[21]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), Bond and Cummins (2001)).

credit constrained, and (2) how does foreign direct investment affect the credit constraints of domestic firms. As in Harrison and McMillan (2003), both of these 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 include interaction terms equal to our proxies for credit constraints multiplied by ownership. Finally, to test for the possibility of crowding out, we include a variable that measures the overall level of foreign borrowing by city and industry and a variable that measures the overall level of foreign sales by city and industry.

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 and has the advantage that it does not

require explicit use of future values. According to the Euler equation model, a firm is assumed to maximize the present discounted value of current and future net cash flows. The firm 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. The constrained firm behaves as if it has a higher discount rate and for a given level of adjustment costs today, will require a higher rate of return on investment today relative to investment tomorrow. Ceteris paribus, constrained firms will intertemporally substitute investment tomorrow for investment today.

As evidenced by Harrison and McMillan (2003), it gives the following equation for the present value of the marginal adjustment cost of investing tomorrow:

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

where β_{t+1}^{t} is the nominal (that is, the predictable part) discount factor between period t and period $t+1$, δ denotes the rate of depreciation and $E_t(.)$ is the expectations 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:

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

so that

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

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

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

$$\begin{aligned}\frac{I}{K}_{i,ck,t+1} = {} & \beta_1 \frac{I}{K}_{i,ck,t} - \beta_2 \frac{I}{K}_{i,ck,t}^{\,2} + \beta_3 \frac{Y}{K}_{i,ck,t} - \beta_4 \frac{CF}{K}_{i,ck,t} \\ & + \beta_5 U_{i,ck,t} + \eta_{ck} + \lambda_t + \epsilon_{i,ck,t+1}\end{aligned} \tag{4}$$

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 the investment in fixed assets; K denotes the capital stock at the beginning of the period; CF stands for the 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[22] and positively related to the user cost of capital 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(4) to test for credit constraints. We can take $\Omega_{i,t}$ to the right-hand side of Equation(4) 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.[23]

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 debt. 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.

[22]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.

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

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, 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.

$$\frac{I_{i,ck,t+1}}{K_{i,ck,t}} = \beta_1 \frac{I}{K}_{i,ck,t} - \beta_2 \frac{I}{K}^2_{i,ck,t} + \beta_3 \frac{Y}{K}_{i,ck,t} - \beta_4 \frac{CF}{K}_{i,ck,t} + \beta_5 U_{i,ck,t} \tag{5}$$
$$+ \sum_{O=p}^{s} [\beta_6^O \Omega_{i,ck,t} + \beta_7^O FDI_{ck,t} + \beta_8^O \Omega_{i,ck,t} \times FDI_{ck,t}] + \eta_{ck} + \lambda_t + \epsilon_{i,ck,t+1}$$

Where O stands for ownership, p is private[24] and s is state-owned[25]. 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).

[24] 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.

[25] 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.

4 Data and indicators

We use firm-level data from the World Bank's 2003 Investment Climate Survey. 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 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[26], while the other 600 correspond to Services.[27] The 14 industries were selected non-randomly with the purpose of focusing

[26]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).

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

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.

The data span the period 1999-2002, however, firms were interviewed only once, in 2003. As a result some questions are answered annually; while other answers involve information for the entire 3-year period. We focus on the section "Questions 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[28]. 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 5,684 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

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

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 presence computed based on firm-level information.

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. When the information is missing, we rely on the average value computed on responding firms in the same city and same industry. In any case, we believe it is a better proxy for U than the firm fixed effects used in most comparable studies, like Bond and Meghir (1994) and Harrison and McMillan (2003)[29]. Fur-

[29]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. Harrison and McMillan (2003) verify that their results are robust to the use, as a proxy for the user cost of capital, of the coefficient of variation of real profits relative to other firms in the same industry. This choice of proxy for the user cost of capital was based on recent work by Minton and Schrand (1999) who find that cash flow volatility is generally associated with lower average levels of investment and a higher cost of accessing external capital. One possible critique of this approach is however that the user cost of capital only accounts for one component of differences across firms (which are fixed over time).

thermore, this includes in the framework a fourth indicator (besides COV, DAR and $\frac{CF}{K}$) that can be directly interpreted when assessing the extent to which public and private firms investment behavior differ.

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:

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

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

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 private 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 moreover 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. They however turn out to be significantly more profitable as measured by the ratio of total profits over total fixes assets (Profits).

5 Empirical Results

5.1 Investment Equation Estimates

The model is estimated using the Within estimator method. Fixed effects by city & industry are introduced 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. At the

statistical level, the issue is that the variance of our errors is no longer spherical and failure to account for this will lead to biased estimates of standard errors and erroneous inferences. Moulton (1986, 1990) emphasizes that the typical OLS measures of variance could understate errors by a potentially large factor, leading to poor inferences.

In this paper we correct for clustering using the Moulton correction. 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-level FDI.[30] However, since we want to ensure that our results are free from any estimation-bias, 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

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

[31] The 2SLS estimation is a special case of the Generalized Method of Moments (GMM) approach (Verbeck, 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).

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

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 the private companies, meaning that a higher cash flow

[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.

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. Column (3) and (4) add the two proxies for credit constraint, the ratio of total debt to assets (DAR), and the measure of interest coverage (COV). The coefficients on DAR and COV 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 that spirit, it is also worth noticing that the coefficient on cash flow turned insignificant for private companies, while it was negative and significant in the base specification (columns 1 and 2). This can be interpreted as follows: cash flow is not anymore a relevant variable for investment decisions for private companies when credit constraints are too strong, the latter systematically inducing a delay of investment projects in the future.

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 the scale variable. 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. More generally, the coefficients on the other variables are almost identical to the ones presented in the columns (3) and (4) 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) and (4) 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 not anymore 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. The latter present estimated equations including two additional interaction terms, alternatively equal to COV and FDI and to DAR times FDI, with 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

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

Debt, negative and significant, respectively at the 5% and the 1% level for private firms, suggest that the presence of foreign firms has a positive impact on present investment. More precisely, the more foreign capital is present in the city and industry of a firm, the more credit constraints as represented by COV impact on future investment are alleviated. 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] The contrast with public firms is striking. 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.

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 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

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

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. These results are large and robust to alternative model specifications.

This finding seems to 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).

Although we believe that our study adds to the recent literature, it has one major limitation: the lack of evidence for causality between FDI and their consequent positive effect on financing constraints. Although a reverse causality running from aggregate FDI inflows to measures of firm level financing constraints is not very likely, it is plausible that high FDI at the city and industry level serves as a proxy for better financial markets (for example better regulation and supervision of state-owned Banks). We would however argue that most elements of financial development are already captured through the city and industry fixed effects.

Therefore, the investigation of the possible sources for these positive spillover effects seems an interesting path to follow.

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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	0.33	3.87	-29	137
COV Int. cov./Fixed Assets (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	0.03	0.33	-1.66	4.25
COV Int. cov./Fixed Assets (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

	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)
Total profits	-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
Within R^2	0.04	0.20	0.03	0.19	0.05	0.20	0.04	0.19
Hansen J-stat	0.002	3.640	2.841	3.325	0.648	8.712	1.291	6.842
p-value	.96	.162	0.58	.50	.72	.03	.86	.14
Davidson-McKinnon	1.03	.19	.27	.04	.68	.30	.47	.30
p-value	.3556	.8191	.7586	.9548	.5585	.8238	.7526	.8728

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

Table 2: Investigation of size dependency

	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)
Total profits	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
Within R^2	0.04	0.19	0.03	0.19	0.05	0.20	0.04	0.19

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

Table 3: Investigation of FDI impact (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)
Total profits	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
Within R^2	0.04	0.19	0.03	0.19	0.05	0.20	0.04	0.19

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

Table 4: Investigation of FDI impact (2)

	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)
Total profits	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	0.039	0.05	0.017	0.09*	0.03	0.03	0.02
	(0.04)	(0.039)	(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
Within R^2	0.04	0.19	0.03	0.19	0.05	0.20	0.04	0.19

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