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Access to Credit and Investment Decisions of SMEs in China: size matters

by

Paulo José Regis

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Paulo José Regis*

Xi'an Jiaotong-Liverpool University

China

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Abstract:

Financial constraints are common in developing countries where financial systems are underdeveloped. Chinese firms report access to finance is the most important obstacle in the business environment and this seems to be related to firms which fail to gain access to the credit market. We examine the likelihood of access to credit of Chinese firms where the firm size and whether the firm is an exporter seem to be key characteristics of the firm to consider. Credit constraint is significant in investment decisions. Together with firm size, access to credit is among the firm characteristics with the largest impact in the likelihood to invest.

Keywords: access to finance, investment decision, Small and Medium-sized Enterprises, China

JEL code: E22, G21, G30, O16

Abstract: 104

Abstr: 104, Intro: <800, Stats: <1400, Theoretical B <1200, Econometric B: <1000, Results <2600, Concl: <230
Total with tables: <9800

*: corresponding author, BB440, Business Building, Xi'an Jiaotong-Liverpool University 111, Ren'ai Road, Dushu Lake Higher Education Town, SIP, Suzhou 215123, P.R. China,

email: paulo.regis@xjtlu.edu.cn, tel: +86 (0)512 8816 1705

1. Introduction

Financial constraints as an obstacle to the firms are an extended challenge in developing countries to the generation of employment and sustained growth. Financial services and the availability of credit in particular are crucial for the efficient realization of the investment possibilities of the firm. Aware of the deficiencies of the financial sector in a country in transition towards a market oriented economy, the Chinese government has been very proactive to reform and modernize the banking and other financial sectors in the last 15 years.

This study is part of the literature of institutions and economic growth, and the importance of financial development as a facilitator of growth in particular. However, China is usually considered to be a counter example in cross country studies. The Chinese financial system remains underdeveloped while the economy grows at remarkably high speed. The empirical literature has gone beyond country level comparisons to look at firm level data to compliment the macroeconomic results with micro-level evidence. In the last ten years, this literature has evolved into looking at the role of external factors in the business environment in the performance of the firm, such as growth, productivity and employment. Further, in some particular topic, the heterogeneity across firms is perhaps of central interest and may help to design the empirical approach of the study. For example, firm heterogeneity have been be very informative if the objective were to estimate the different effect of multinational firms in labour productivity. This is also the case of the study of whether credit constrained firms invest less than unconstrained ones, a research question central to this paper.

We contribute to previous studies of access to finance of Chinese firms. Hallward-Driemeir et. al. (2006) and Ayyagari et al (2010) make use of the 2003 China Enterprise Survey. This is the first version of the World Bank survey in China and designed to look at access to finance in detail. Here, we will make use of the most recent survey in 2012 to study the firm characteristics more closely associated with access to finance. In comparison, the information on access to finance of the remaining 2005 survey is relatively poor and has not been used before. We define access to finance as having a loan and find firm size is among the most important

factors to consider in the likelihood of gaining access to credit in the financial sector. Small firms with less than 20 employees have a particularly low likelihood of having credit while the gains from having a large firm are diminishing, especially for very large size firms (above 1,000 employees).

We also contribute to the literature that relates access to finance with investment decisions of the firm. Surprisingly, the existing literature is not large and usually departs from the decision of the firm to invest (or not) and, if decided to invest, whether the investment is at least partially funded by the financial sector (or not). Given the second outcome may only happen if the firm invests, Bigsten et al. (2003) and Ayyagari et al (2010) have relied on estimation models with sample selection. Instead, our paper proxies financial constraints of the firm by access to credit (i.e. financially constrained firms would not have access to credit), which is one of the firm characteristics taken into consideration. Therefore, sample selection is not an issue and estimation may proceed as normal. However, we do allow for the estimation of the two equations, the credit and investment equations, simultaneously.

As often when the "does size matter?" question is made, the answer here is "yes". Firm size is among the most important characteristic when determining access to finance and investment decisions. Small firms have particularly low probability to gain access to the financial market. Small firms also tend not be less likely to invest; however, the effect here is less strong than with access to credit. Access to credit itself is very important for firms to invest while being an exporter increases the chances to have access to credit. One distinguishing characteristic of the dataset is some of the most relevant variables are qualitative, truncated or censored, including the dependent variables. To handle limited and censored dependent variables, we make use of Probit and Tobit models.

The remaining of the paper is organized as follows. Section 2 revises some of the relevant literature in access to finance, its influence in the performance of the firms, the decision to invest in particular. Section 3 develops a theoretical framework to put the relationship between investment and access to finance in context. Section 4 introduces the econometric framework where the decisions of the firm to take credit

and invest are modelled according to some firm's characteristics. Our main results can be found in section 5 while section 6 presents the conclusions.

2. Access to finance: literature and measurement

Measuring access to finance of small and medium enterprises (SMEs) have been especially difficult in developing countries; however, there have been some important efforts to collect firm level data since late 1990's, of which the most important has been the World Bank Enterprise Survey. This survey includes information on internal and external financing, among other firm's characteristics. Identified as one of their most important constrains of by the firms themselves, the literature has focused on two complimentary directions: the analysis of the financial constraints and the impact of those constrain in the firm's performance.

In the literature of the determinants of access to finance, size is one of the firm characteristics considered. Beck, et. al. (2005) regress an ordinal firm level indicator of financial access (from 1, financing is no obstacle, to 4, financing is a major obstacle) on some firm-level and country-level characteristics, including firm size. They find that small firms have significantly higher financial obstacles than large firms. Aterido et. al. (2007) also find that small firms have significantly less access to finance even when controlling for other firm characteristics (such as age, export status and ownership). Likewise, small firms tend to finance much less of their investment from the formal financial sector. Bigsten et al. (2003) describes that almost two-thirds of firms with five or less employees in Africa are credit constrained, compared to only 10 percent of firms with 100 or more employees. Their estimates suggest that the likelihood of a successful loan application is positively related with firm size.

The identification of financial constraint has led to studies to measuring the importance of these constraints in the performance of the firms. Beck, et. al. (2005) regress firm sales growth on financial obstacles and a number of controls, with most of their financial obstacles proxies having a negative and significant effect. Aterido et al (2007), using the proportion of either investment or working capital financed

externally as proxy of access to finance[1], find there is a positive impact in employment growth. Hallward-Driemeir et. al. (2006), a study of 1,400 Chinese firms, find no significant link association a variety of firm performance indicators and access to credit (i.e. having a loan). The authors argue this is not surprising given the fact that most banks are state owned and provide loans mainly to inefficient state-owned firms; however, all the firms in their sample are not state-owned firms. Hallward-Driemeir, et. al. (2006) make use of city-industry averages to avoid endogeneity at the firm level which mean that rather than a dummy variable (1 if having a loan, 0: otherwise), the proxy for access to credit is the proportion of firms with a loan. Ayyagari et al (2010) revises the financing pattern of the same sample of 1,400 Chinese firms[2], with investment financed by banks varying across firm size: 30% in very large firms, 21-22% in large and medium firms and 15% in small and very small firms. They observe that higher growth (in sales) is positively associated with access to finance (measured by access to credit: a dummy variable that takes the value of 1 if the firm states that it has a bank overdraft facility or line of credit and that it currently has a bank loan).

Studies of the influence of access to finance in investment are more rare. They mostly focus on the decision to invest of firms and whether they may finance this investment, at least partially, from the formal financial sector. This requires a bivariate framework where investment and investment financed by banks are a function of firm characteristics (and, potentially, country characteristics also). A common concern is the endogeneity of the bank financing decision since this variable can never be observed when the firm decides not to invest. The bivariate probit model with sample selection (i.e the Heckman model) has been the appropriate framework to deal with this endogeneity. Bigsten et al. (2003) for the African countries and Ayyagari et al (2010) for China both have followed this framework.

[1] The authors argue computing averages at each combination of location, industry and firm size to replace the firm level variable helps to deal with any endogeneity bias. However, this raises the issue of aggregation bias given that what is true for the location-industry-firm size aggregate may not be true for the individual firm. Further, financed investment and working capital are both censored at zero which, arguably, makes average values harder to interpret. For example, if the average were replaced by the median, the location-industry-firm size would be zero in many cases.

[2] The 2003 survey has extra information regarding formal and informal finance and this is the main interest of these authors.

2.1. Measuring access to financial services of the firm

Previous studies have looked at both subjective and objective indicators of access to finance. Two subjective perception variables of access to finance from the survey have been summarized in Table 1. First, the firms are presented with 15 external obstacles from the business environment and asked to select the most important. In "biggest obstacle", we can find two columns with the number and percentage of firms which declare this is the biggest obstacle. Second, the firm is asked to state how severe each obstacle is, from 0 (no obstacle) to 4 (very severe obstacle). The "ordinal mean" is the average response of all the firms while “degree (intensity) of obstacle” is the percentage of firms at each level. When asked the biggest obstacle, access to finance was selected by 21% of the firms, seconded by inadequate education force, practices of competitors in the informal sector and tax rates, each with around 16%. These are the most important declared constraints, with access to finance at the top by an important margin. Likewise, the ordinal mean shows access to finance, competition from informal firms and tax administration are the most dominants obstacles.

Having a loan is an objective indicator of access to credit available in the survey. Access to credit is a specific type of access to finance[3], it is at the core of the services of the financial market to the firm. Around 31% of the firms have access to credit. Table 2 suggests that the fact financial access is reported as the main obstacle by a large number of Chinese firms may be related to access to credit in particular. When comparing the sample for which access to finance is the top obstacle to the sample with the rest of the firms, the former group makes more than 10% more loan applications than the latter one (34.1% compared to 22.3%) suggesting these companies are more active at seeking access to finance than the average company. In addition, when comparing the firms that did not apply for a loan, their main reason is not because the firm did not need the loan. Quite the opposite, only 21.8% of the firms that report access to finance is the most important obstacle and did not seek access to credit also declare they do not need a loan, compared to 65.1% of the rest of the firms. Instead these firms declare more than 41.5% of the times the firm does not make an

[3] Being the other deposits: 95% of the firms have a checking or saving account. Chinese firms seem not to be constrained by access to a bank account.

application because either the cost (interest rates) or the requirements of collateral is too high. This is a threefold increase compared to only 13.1% of the sample of firms for which Access to Finance is not the main obstacle. Likewise, the number of firms that declare the size or maturity of the loan was insufficient (12.3%) more than doubles the figure of the second sample (5.2%). These three factors together explain more than half of the cases where the firm did not apply for a loan although access to finance is its main obstacle.

Table 1. Obstacles of the business environment

	Biggest obstacle		Ordinal	Degree (intensity) of obstacle (%)				
	Obs	(%)	Mean	0: None	1: Mi Nor	2: Mo derate	3: Ma jor	4: Very severe
Do not know / Does not apply	101	3.74						
Access to finance	566	20.96	0.81	43.30	37.01	15.31	3.71	0.67
Access to land	128	4.74	0.62	53.84	34.05	9.21	1.86	1.04
Business licensing and permits	20	0.74	0.34	72.39	22.55	3.87	0.86	0.33
Corruption	31	1.15	0.31	75.12	20.27	3.62	0.72	0.26
Courts	6	0.22	0.27	76.49	20.33	2.83	0.23	0.11
Crime, theft and disorder	16	0.59	0.28	76.28	20.56	2.49	0.26	0.41
Customs and trade regulations	42	1.56	0.26	77.96	18.45	3.05	0.42	0.12
Electricity	129	4.78	0.49	62.92	27.85	7.49	1.00	0.74
Inadequately educated workforce	434	16.07	0.77	44.53	37.12	15.50	2.45	0.41
Labour regulations	49	1.81	0.51	59.64	30.91	8.19	1.07	0.19
Political instability	20	0.74	0.28	78.24	17.19	3.51	0.76	0.30
Practices of competitors (informal sector)	427	15.81	0.87	40.40	37.33	17.75	3.67	0.86
Tax administration	108	4.00	0.89	46.21	27.71	18.16	6.65	1.26
Tax rates	420	15.56	0.72	52.01	28.13	16.48	2.79	0.60
Transport	203	7.52	0.52	60.81	29.14	7.78	1.53	0.74
Total	2,700	100.0						

Notes: The "biggest obstacle" makes reference to the global question "what is the biggest obstacle from the business environment?", and presents two columns: number of firms and percentage that have chosen each obstacle. The "ordinal mean" is the average response of the ordinal question to each obstacle where firms assign a degree of difficulty: from 0 (no obstacle) to 5 (very severe obstacle). The "degree of obstacle" provides more detailed information: it is the percentage of firms which responded each level of difficulty.

Table 2. Access to Credit

	Access to Finance is main obstacle sample		Rest of sample	
A. Did the firm apply for any loan?				
	Obs	(%)	Obs	(%)
Do not know	16	2.83	93	4.36
Yes	193	34.1	477	22.3
No	357	63.0	1,564	73.2
Total	566		2,134	
B. Main reason not to apply for a loan?				
	Obs	(%)	Obs	(%)
Do not know	2	0.56	19	1.21
No need for a loan	78	21.8	1,019	65.1
Complicated application procedures	44	12.3	168	10.7
Interest rates are not favourable	74	20.7	116	7.42
Too high collateral requirements	74	20.7	89	5.69
Insufficient loan size and maturity	44	12.3	82	5.24
Did not think it would be approved	30	8.40	52	3.32
Other	11	3.08	19	1.21
Total	357		1,564	

Notes: Question B (main reason not to apply for a loan?) is only relevant for firms that replied "No" in question A (did the firm apply for a loan?). A small proportion of firms do not report any of these answers and choose to declare "do not know". Firms are divided in two samples: the sample of firms which state its main obstacle is access to finance and the sample of firms for which the main obstacle is other than access to finance.

3. Theoretical framework

The dominant theoretical models to test financial constraints in investment have focused on three possibilities[4]. First, the structure of the tax system with specific rates to different types of financing (Bond and Meghir, 1994, and Desai and Goolsbee, 2004). Second, asymmetric information of subscribers of new shares (equity finance) and lenders of new bonds and loans (debt finance) who require a premium rate against the risk of the firm being a lemon (Myres and Majluf, 1984, and Shyam-Sunder and Myers, 1999). The third case is bankruptcy risk and the introduction of bankruptcy cost, (Bond and Meghir, 1994, and Gilchrist et al, 2014).

We follow this third approach. The model assumes symmetric information and risk neutral lenders. Taxes are excluded. The firm cannot issue new equity and investment must be financed by retained earnings (internal funding) and loans from the financial sector (external funding), represented by R_t and L_t. The risk to banks of providing loans L_t to the firm is represented by the probability of bankruptcy in period s perceived in period t (q_s^t). A positive cost of bankruptcy ($\bar{L}_t$) pushes the financial sector to charge an interest rate on loans of i_t, which is higher than the risk free rate of r_t (where $\beta_{t+1}^t = 1/(1 + r_t)$). If the firm goes bankrupted, ownership is transferred to the lenders.

The model departs from the net present value of the firm at time t:

$$V(K_t) = max\left\{\Pi_t + E_t\left[\sum_{s=1}^{\infty}\beta_{t+s}^t\Pi_{t+s}\right] - E_t\left[\sum_{s=1}^{\infty}\beta_{t+s}^t(q_{t+s}^{t\pm s-1}\bar{L}_{t+s})\right] - (1+i_{t-1})L_{t-1}\right\} \quad (1)$$

The firm is risk neutral and the capital stock (K_t) is constrained to evolve according to law of motion $K_t = (1-\delta)K_{t-1} + I_t$ where δ is the depreciation rate. The key variable to observe is investment (I_t). Investment decisions are forward looking, involving the expectations operator ($E_t[.]$), which takes into account all information available at period t (i.e. rational expectations), and the discount factor from period

[4] In some cases, the model may mix some of these three possibilities.

$t+s$ to period t (β_{t+s}). The function $\Pi(.)$ can be interpreted as a normal profit function with only one productive factor (K_t) or a restricted profit function which has been already optimized with respect to other factors (e.g. labour). It is common to include in $\Pi(.)$ an adjustment cost function for investment $C(I_t, K_t)$; however, this is not necessary to introduce the financial constraints in the investment equation and it may not fit our empirical framework since our data is cross-sectional. Neoclassical models relying on the Modigliani-miller theorem, which postulates the firm's financial structure does not affect its market value in perfect capital markets, would set $\bar{L}_{t+s} = 0$ and avoid making any distinction R_t and L_t (since it would not affect the outcome of the model). Therefore, terms three and four in (1) would not be necessary.

Maximization of the value of the firm function is constrained to law of motion of capital and the additional restriction retained earnings in any period cannot be larger than profits ($\mathrm{R}_t \leq \Pi_t$). The multiplier of this constraint is λ_t and it could also be expressed as nonnegativity constraint on dividends ($0 \leq \mathrm{D}_t$) since $\mathrm{R}_t + \mathrm{D}_t = \Pi_t$. Following Bond and Meghir (1994), both q_t^s and i_t depend on the ratio L_t/K_t while $\bar{L}_t$ is a function of L_t only. The optimal path of investment is obtained from the Euler equation, combining the first order conditions for investment and capital. This would provide an empirical specification of the investment function to be tested. Empirically, the Euler equation commonly takes the form

$$\frac{I_t}{K_t} = I\left(\frac{I_{t-1}}{K_{t-1}}, \frac{PF_{t-1}}{K_{t-1}}, \frac{L_{t-1}}{K_{t-1}}, \frac{\Delta VA_{t-1}}{K_{t-1}}, Z_{t-1}\right) \tag{2}$$

where PF_t is a measure of cash flow or profitability, ΔVA_t is the change in value added and vector Z_t groups other factors that may affect investment (e.g. firm's age and size). Usually, additional assumptions are put in place to obtain a linear function with an additive error term. Negative coefficients of PF and L may reflect the negative effect of financial constraints.

Previous studies that have relied on a similar framework to estimate a formal single investment equation with credit constraints includes Bond and Meghir (1994), Gilchrist and Himmelberg (1998), Love (2003) and Poncet, et al. (2010). This

framework favours the use of time series since equation (2) requires the use of lagged values of some of the variables of interest, including the dependent variable. Most firm-level studies usually rely on dynamic panel data models with short T. However, there are two important data limitations to consider. First, lagged variables are not generally available in our dataset, including investment in particular. Second, the stock of capital (measured by total assets or some other proxy of capital) is not available, at least for the sample of firms in the services sector. Therefore, the Euler equation may not be the best suited approach to our needs. Instead we can focus on the steady state solution of capital (K_t^*). Solving the model and assuming the firms mostly are near their steady state, investment is the movement from the old to the new steady state ($I_t = K_t^* - K_{t-1}^*$). Therefore, investment is determined by the determinants of the steady state which are contemporary values. This approach omit the adjustment process to the new equilibrium and neglects the time required to make that adjustment. However, this is the approach that fits our data. This is a common limitation of the World Bank Enterprise Survey. In few countries the same firm has been observed in more than one period, China not being one of them. The investment function becomes

$$I = I(L, PF, \Delta VA, Z) \tag{3}$$

where the time subscript is omitted since the main advantage of the new specification is dynamic effects are excluded.

So far we have modelled the investment of the firm and next look at access to credit. From the first order conditions, it is also feasible to obtain a demand of loans for investment. However, this would not be general enough since there are other reasons for the firm to demand loans than to invest. Instead, the market for loans is represented by a reduced from equation which includes variables from the demand and supply side. The demand for loans $L^d(i, I, X^d)$ is a function of the interest rate i, investment and other firm characteristics grouped in vector X^d. The supply of loans $L^s(i, coll, profit, growth, size, age\ , X^s)$ would depend, in addition to the interest

rate i, on the firm's collateral availability ($coll$), credit worthiness and some additional firm characteristics. Other studies have made use of past credit records as an important component of the loans supply introducing lagged loans in the model (e.g.: Johnson et al, 1999); however, this is not possible in the context of cross sectional data. On the other hand, it may be important to relax the time frame as loan applications for a particular investment project may be needed to be done one year in advance. Instead, credit worthiness is proxied by firm's $profit$ and $growth$, two variables that are are related to the good performance and profitability of the firm. There may be other firm characteristics which are desirable to know but banks may not have access to that type of internal information to the extend that the firm may hide some activities. Two extra variable considered are firm's age and $size$, while vector X^s may include other firm characteristics. Assuming the market for loans clears, the reduced form loan equation may take the form

$$L = L(I, coll, profit, growth, size, age, X) \quad (4)$$

where X is a vector that combines the firm characteristics from X^d and X^s. A similar reduced from equation for the loans market has been used by Johnson et al (1999) and Bigsten et al. (2003). The analysis of investment and access to credit presents some challenges, according to equations (3) and (4). This system of equations suggests both investment and loans may be endogenous.

4. Econometric framework

As mentioned in the previous section, most studies of the investment function have been mostly concerned with the estimation of a single equation with emphasis in its time series elements. Firm-level studies are dominated by the estimation of dynamic panel data models, employing Arellano and Bond (1991) and Blundell and Bond (1998). If loans (or some other proxy of access to finance) is introduced as explanatory variable, the IV GMM estimator would deal with the endogeneity with lagged first differences as instruments, augmented with lags of levels in Blundel and

Bond (1998). Weak instruments is a real treat, as usual with this type of GMM estimators, but this would be a sensible framework. However, these studies still ignore the most important characteristic of the data: both variables most likely are heavily left-censored at zero. Further, even if instruments were not weak, censoring would imply the instruments would also be censored since they are lagged values.

We have modified our framework to avoid lags of I_i and L_i. Assuming equations (3) and (4) can be linearized and adding an error term to each, they may be expressed as

$$I_i = \beta_0^I + \beta_1^I L_i + Z_i'\theta^I + \varepsilon_i^I \quad (5)$$

$$L_i = \beta_0^L + \beta_1^L I_i + X_i'\theta^L + \varepsilon_i^L \quad (6)$$

Linearized investment functions are common in the related literature and a linear loans function could be obtained from log-linear supply and demand of the loans market. Alternatively, the reduced from equations to be estimated are

$$I_i = \alpha_0^I + W_i\gamma^I + u_i^I \quad (7)$$

$$L_i = \alpha_0^L + W_i\gamma^L + u_i^L \quad (8)$$

where W_i is a vector that combines the variables from both $Z_i$and X_i.

Since the two dependent variables are not observed if they decide not to make any investment or apply for loans, these two corner restrictions may introduce a bias in the estimation. The linear regression model becomes inappropriate for estimation of both the structural and reduce forms. Instead, the Probit and Tobit approaches will be proposed to deal with the limitations of the dependent variables.

4.1 The Probit equation

Let $credit_i$ be a dummy variable (1 if the firm has credit, zero otherwise). In similar fashion, $invest_i$ maybe defined as a binary choice between investing ($invest$=1) or not ($invest$=0). Variables I_i and L_i may not be observed when $I_i < 0$ and $L_i < 0$ but $invest_i$ and $credit_i$ would be correctly observed. The probabilities that the firm

decides to invest and has access to credit can be modelled using a latent variable approach based on both the structural and reduced form equations for of I_i and L_i. For example, firm's propensities to invest, given equation (5) and the firm's characteristics in Z_i, may be defined as:

$$P(invest_i = 1|L_i, Z_i) = F(\beta_0^I + \beta_1^I L_i + Z_i'\theta^I) \quad (9)$$

where $F(.)$ is the cumulative distribution function and, assuming this is the standard normal distribution function, would lead to the estimation of the Probit model.

Most investment studies which make use of the Probit model estimate the single structural equation (9). Making use of equation (6), a Probit specification for $credit_i$ could be obtained which, together with the previous Probit equation for investment, would become the binomial Probit or Biprobit version of the same simultaneous equation structural model of (5) and (6). However, the endogeneity of $credit$ and $invest$ is still a relevant issue for the estimation of either a single equation or the two-equation system.

Further, there is a well-known limitation of logical consistency (see Maddala, 1983, chapter 5), which is necessary for the bivariate distribution of $invest_i$ and $credit_i$ to be well specified. Lewbel (2007) shows the consistency condition of the structural model is equivalent to requiring a valid reduced form system. The condition for logical consistency in the Probit structural equations is $\beta_1^L \beta_1^I = 0$. That is, either loans need to be excluded from the investment equation ($\beta_1^L = 0$) or investments must be excluded from the credit equation ($\beta_1^I = 0$). Imposing one of these two conditions would transform the system into a recursive (triangular) model; therefore, this would also imply the two equations conditions for identification are met and instrumental variables are not required.

One possible strategy is to make use of the credit equation in its reduced form together with equation (9) for investment. The Probit credit equation takes the form

$$P(credit_i = 1|W_i) = F(\alpha_0^L + W_i\gamma^L) \quad (10)$$

Then, the parameter of investment in the credit equation can be set to zero, meeting the consistency condition. The estimation of the recursive system (9) and (10) is reasonable if access to credit can be considered as an exogenous regressor of investment in equation (9), an hypothesis that will be tested. Therefore, estimation of the biprobit model of Heckman (1978) becomes adequate.

Very few studies have followed a system of equations approach. From previous studies, only Bigsten et al. (2003) make use of this biprobit model but they estimate two credit equation based on the reduced form (10). Investment is not included and the credit market is modelled as having a sequential two-stage mechanism: a credit application equation (demand side) and accredit assignation equation (supply side). The use of a recursive system to reach the consistency condition can be found in other models. Rivers and Vuong (1988) rely on a system of two equations with a structural Probit for the limited dependent variable, which is the main variable of interest, and a reduced form equation for the second variable of interest, which is continuous[5]. The Heckman model with sample selection (Heckman, 1979) combines a continuous dependent variable (the main variable of interest) and a limited dependent variable (the treatment equation, which does not include the main variable of interest and can be interpreted to be in reduced form). The latter is the approach favoured by Ayyagari et al (2010) to relate investment spending and access to credit, combining equations (5) and (10). However, the last two models are not appropriate because the two variable of interest are censored.

4.2. The tobit equation

Using $credit$ and $invest$ to define the indicator functions of the two censoring processes, the two variables actually observed are:

$$I_i^{cen} = I_i \times invest_i \tag{12}$$

$$L_i^{cen} = L_i \times credit_i \tag{13}$$

[5] Although we are not aware of any study that have adopted it so far, this type of estimator could be used for a system with equations (9) and (8) for investment and loans, respectively.

Equations (5) and (12) define a standard Tobit model for $I_i$while equations (8) and (13) define another Tobit model for L_i. Since logical consistency is still an issue; therefore, credit is still represented by its reduced form equation. This is a recursive system with two censored variables which can be estimated by the bivariate Tobit model.

The model is nonlinear and may also be referred as the censored regression model. It makes a better use of the information of the non-censored data; however, there is loss of observations. Some firms are reluctant to provide figures than responding YES/NO questions, reducing the coverage of the sample. Further, the lost information are uncensored observations. This is particularly worrisome for loans: around 34% of the firms that express they have a loan or line of credit either refuse to provide the amount or express amount is not known. Likewise, around 18% of the firms that express they have performed some investment in the year 2011 do not provide the amount. With increasing missing information of uncensored data, the reliability of the results may be affected.

5. Results

The data is from the 2012 World Bank Enterprise Survey for China, which includes 2,700 firms from 25 urban cities across 12 provinces. There are two types of questionnaires, depending on whether the firm belongs to either the manufacturing (1,692 firms) or services (1,008 firms) sector; however, most questions overlap. There are 20 and 7 industries represented in the manufacturing and services sectors, respectively. The sample is intended to be representative of the country's private sector. The main objective of the survey is to ascertain characteristics of the business environment, including access to finance. It covers many characteristics of the firm related to infrastructure, bribery, crime, financing and credit, competition and informality, land and permits, business government-relations, etc.

Table 3 presents in some detail all variables that have been used, together with some summary statistics. Most of them have been mentioned when presenting the theoretical framework. Additional firm characteristics considered are: sex

discrimination (whether one of the owner is female or whether the general manager is female), state and foreign capital ownership, export intensity, manager experience (in years, proxy of the quality of management), a business group dummy (whether the firm belongs to a business group of firms) and listed firm dummy (whether the firm is a listed company). City and industry dummies are included in all specifications to control for other factors than firm characteristics.

Table 3. Summary statistics table

Variable	Obs	Mean	Std. Dev.	Minimum	Maximum
Investment and access to credit:					
Access to credit dummy: 1 if firm has a loan	2,588	0.31	0.46	0	1
Loans: amount of loans (RMB 1,000)	536	20,850	83,190	0.001	1,000,000
Investment decision dummy: 1 If firm invests in 2011	2,678	0.51	0.50	0	1
Investment: amount of investment in 2011 (RMB1,000)	1,131	6,221	51,876	7,035,569	1,500,000
Investment financed by the financial sector (RMB 1,000)	195	543,098	2,201,329	1,560	20,000,000
Joint determinants of investment and credit"					
Employment: full-time (permanent & temp.) employees	2,699	248.0	1,127.3	5	30,100
SME1 dummy: 20 or less full-time employees	2,699	0.22	0.42	0	1
SME2 dummy: between 20 & 100 full-time employee	2,699	0.37	0.48	0	1
Exports: as % of sales, (direct and indirect exports)	2,698	10.87	24.63	0	100
Foreign: % of foreign ownership	2,692	3.81	16.91	0	100
State: % of government or state ownership	2,692	3.04	15.45	0	95
Exporter dummy: 1 if exports>50%	2,698	0.24	0.43	0	1
Foreigner dummy: 1 if foreign ownership > 50%	2,692	0.06	0.24	0	1
State dummy:1 if government or state ownership > 50%	2,692	0.04	0.20	0	1
Manager experience (in years)	2,640	16.34	7.52	1	55
Female owner (dummy): 1 if there is a female owner	2,700	0.39	0.49	0	1
Female manager (dummy): 1 if the manager is female	2,696	0.89	0.31	0	1
Age (in years)	2,627	12.72	7.91	0	125
Growth: growth of sales	2,408	8.89	11.20	-15.45	53.86
Profit: margin of sales over cost	2,660	877.9	6,136.3	-100.0	247,834
Determinants of credit:					
BIZ dummy: 1 if the firm belongs to a business group	2,700	0.13	0.34	0	1
Listed dummy: 1 if the firm is a listed company	2,700	0.02	0.14	0	1
Land dummy 1 if the firm owns >50% of the land	2,624	0.51	0.50	0	1

Source: all variables come from the 2012 World Bank Enterprise Survey for China. Monetary values are in Remimbi (RMB).

5.1. Access to credit

The initial analysis in Table 4 is based on the reduced form (10) for alternative specifications of firm characteristics. Since the credit equation is in its reduced form, determinants of both I_i and L_i are included. At the bottom of Table 4, the number of observations where $credit = 1$ is around 31-32% of the sample.

Table 4. Credit in SME firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Employment (log)	0.878***	0.735***	0.649***	0.651***	0.643***	0.609***	0.538***
	(0.115)	(0.196)	(0.167)	(0.167)	(0.167)	(0.170)	(0.184)
Empl. (log), Squared	-0.058***	-0.045***	-0.040***	-0.040***	-0.039**	-0.037**	-0.030*
	(0.012)	(0.017)	(0.015)	(0.015)	(0.015)	(0.016)	(0.017)
SME1 dummy		-0.165	-0.271*	-0.274*	-0.271*	-0.287*	-0.471***
		(0.222)	(0.146)	(0.146)	(0.146)	(0.150)	(0.165)
SME2 dummy		0.061					
		(0.106)					
Exports	0.003**	0.003**	-0.004**	-0.004**	-0.004**	-0.004**	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Foreign ownership	0.000	0.000	0.001				
	(0.002)	(0.002)	(0.004)				
State ownership	-0.005**	-0.006***	-0.005	-0.005**	-0.005**	-0.005**	-0.005**
	(0.002)	(0.002)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)
Exporter dummy			0.565***	0.564***	0.554***	0.570***	0.581***
			(0.117)	(0.116)	(0.117)	(0.119)	(0.126)
Foreigner dummy			-0.051				
			(0.254)				
State dummy			-0.013				
			(0.433)				
Manager Exper.	0.008*	0.008*	0.007*	0.007*	0.007	0.007*	0.010**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
BIZ dummy	0.021	0.020	0.016	0.017			
	(0.097)	(0.097)	(0.098)	(0.097)			
Listed dummy	0.176	0.149	0.102	0.102			
	(0.210)	(0.210)	(0.212)	(0.212)			
Female owner				0.066			
				(0.074)			
Female manager				-0.044			
				(0.104)			
Age					0.000		
					(0.004)		
Land dummy						0.141**	0.123
						(0.070)	(0.077)
Growth (sales)							0.009***
							(0.003)
Profit							0.000**
							(0.000)
Constant	-4.036***	-3.691***	-3.424***	-3.430***	-3.395***	-3.367***	-3.533***
	(0.371)	(0.638)	(0.500)	(0.529)	(0.501)	(0.505)	(0.562)
Observations	2,529	2,529	2,529	2,528	2,464	2,463	2,197
Log likelihood	-1157	-1155	-1143	-1143	-1130	-1108	-952.5
Credit = Yes	786	786	786	785	784	765	678

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.All regressions include city and industry fixed effects.

Firm size is measured by the number of full-time employees (either permanent or fixed term contract). First, employment (in logs) will be considered as a continuous variable. A quadratic function of employment seems to provide a better fit, since the coefficient of the squared term is statistically significant. The positive and negative sign of the coefficients of the linear and quadratic terms would suggest firm size is

associated with a larger probability of gaining access to credit although gains of a larger size seems to be less important as the firm grows. Second, we will also define two dummy variables, *SME1* and *SME2*, to consider small (20 or less employees) and medium (between 21 and 99 employees) size firms, respectively. From these two dummy variables, only *SME1* is statistically significant. The coefficient is large and negative so firms with 20 or less employees are considerably less likely to obtain credit.

Three explanatory variables are censored at zero: exports (77.5% of the firms do not export), foreign ownership (94% of the firms have no foreign participation) and state ownership (94% of the firms have no participation of the government).[6] This is a concern given the large mass of zeros since censored observations usually introduce nonlinearities. For these three variables, both the continuous variable and a dummy variable for whether the observations are censored or not are included. The full set of six variables is introduced in regression (3) where only exports and the dummy variable for exporters are significant while state ownership is significant when its dummy is not included. Contrary to our expectations, firms with larger government ownership have lower chances to have credit. On the contrary, being an exporter has a large and positive effect in having better chances to get a credit; however, firms that export larger shares of their sales actually have lower chances to get a loan than exporting firms for which the domestic market rather than foreign markets is a more important destiny of their sales. From the two, exporting has a quite larger effect than government ownership.

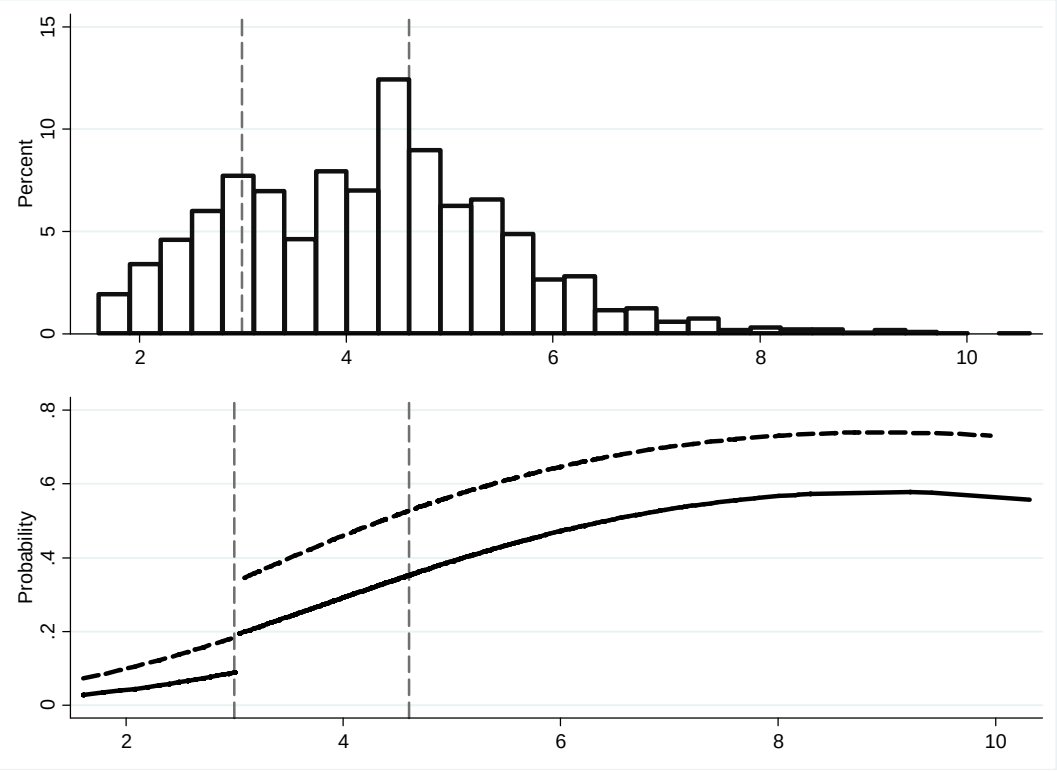
Figure 1 summarizes these findings. The top chart is the histogram of employment, where the distribution has been divided in small (20 or less employees), medium (between 20 and 100) and large firms (100 or more employees). The bottom chart is the predicted probability of having access to credit given the size of the firm. The estimated lines are representative of 100% privately and domestically owned firms from Beijing in the Electronics industry[7]. Other firm characteristics, except firm size

[6] Notice these variables may also be right-censored (at 100); however, this happens far less often: fully foreign owned firms and fully export oriented firms are only 2% and 3% of the sample respectively while no firm is completely owned by the government. Right-censored observations have been dropped.

[7] That is, other city and industry fixed effects were set to zero.

and exporting, are fixed at the sample mean (manager experience, sales growth and profits). The solid line represents firms that produce for the domestic market only while the dashed line characterises firms which also export their products. Exporters have a large advantage to gain access to the credit market at all firm sizes. Most of the firms are in the positive slope side of the functional form. Very few firms in the sample are so large that can be found in the flat area of the curve: less than 1.3% of the firms may have the logarithm of the number of employees larger than 8. This translates into a positive effect of firm size in the likelihood to get access to credit. There are positive but diminishing gains of an increase in firm size as well as the large and negative effect of being a small firm. Around 22% of our sample is affected by this small size effect. From the two, it is actually the latter negative effect of being a small firm which has the largest impact in the credit possibilities of the firm.

Figure 1. Access to credit and firm size of exporters and non-exporters



Notes: The plot at the top is the histogram of firm size measured by full-time employees (in logs). The plot at the bottom shows the effect of firm size on the probability of access to credit based on regression (7). The dotted and solid black lines correspond to exporting firms and firms that exclusively serve the domestic market, respectively. The graph is representative of firms from Beijing in the Electronics industry with no foreign or state participation (i.e. 100% domestic and private firms) while manager experience, growth and profits are fixed at their sample mean value.

Some other control variables which were considered but are not statistically significant include a business group dummy and listed firm dummy. Likewise, regression (4) suggests sex discrimination is not an important issue to access to credit. The age of the firm is another variable that seems not to have any influence in whether the firm gets access to credit or not, as it is the case in regression (5). Other alternative specifications of age were considered [8] but none were statistically significant.

The last two columns consider the availability of land as collateral and the performance of the firm. These two factors are important for the financial institution that may provide the loan. Since firms in the services sector do not provide information on machinery and equipment, land is the most important asset to be used as collateral for which information is available for the whole sample. The highly significant and positive coefficient of the land dummy in regression (6) is consistent with this interpretation; however, this variable becomes non-significant in regression (7). Regression (7) considers two important variables for financial institutions to decide whether to grant a loan to the firm: growth and profitability performance. Growth is measured as the growth rate of sales while profit is the mark-up over cost of sales. The two variables seem to be relevant since they are statistically significant.

[8] They include the quadratic function, age in logarithms, the quadratic function in logarithms and dummy variables (i.e. fixed effects) for years of age. However, due to space limitations, results are nor presented here.

Table 5. Investment

	(8)	(9)	(10)	(11)	(12)	(13)
Credit	0.482***	0.483***	0.462***	0.473***	0.467***	0.433***
	(0.069)	(0.069)	(0.070)	(0.070)	(0.070)	(0.076)
Employment (log)	0.544***	0.415**	0.538***	0.528***	0.531***	0.516***
	(0.103)	(0.171)	(0.104)	(0.103)	(0.105)	(0.113)
Empl. (log), Squared	-0.033***	-0.025*	-0.033***	-0.032***	-0.032***	-0.033***
	(0.011)	(0.015)	(0.011)	(0.011)	(0.011)	(0.012)
SME1 dummy		-0.219				
		(0.194)				
SME2 dummy		-0.135				
		(0.098)				
Exports	0.002*	0.002*	-0.002			
	(0.001)	(0.001)	(0.002)			
Foreign ownership	0.001	0.001	0.002			
	(0.002)	(0.002)	(0.004)			
State ownership	-0.014***	-0.014***	-0.024***	-0.014***	-0.014***	-0.014***
	(0.002)	(0.002)	(0.006)	(0.002)	(0.002)	(0.002)
Exporter dummy			0.369***	0.261***	0.270***	0.250***
			(0.117)	(0.072)	(0.074)	(0.078)
Foreigner dummy			-0.059			
			(0.244)			
State dummy			0.763*			
			(0.432)			
Manager Experience	0.009**	0.009**	0.009**	0.009**	0.012***	0.010**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Female owner				-0.232***	-0.237***	-0.247***
				(0.066)	(0.066)	(0.069)
Female manager				0.026		
				(0.098)		
Age					-0.007*	
					(0.004)	
Growth (sales)						0.014***
						(0.003)
Profit						-0.000
						(0.000)
Constant	-2.602***	-2.107***	-2.597***	-2.298***	-2.230***	-2.461***
	(0.311)	(0.548)	(0.312)	(0.366)	(0.333)	(0.364)
Observations	2509	2509	2509	2508	2448	2230
Log likelihood	-1434	-1433	-1427	-1423	-1382	-1251
Invest = Yes	1300	1300	1300	1300	1276	1154
Credit = Yes	782	782	782	781	780	691
Endogeneity test	0.347	0.306	0.285	0.288	0.551	0.137
p-value	0.556	0.580	0.593	0.592	0.458	0.711
Weak Instrument test	5.766	6.610	5.689	5.790	5.777	5.616

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All regressions include city and industry fixed effects. The endogeneity test of access to credit makes use of SME1, the land ownership dummy and profitability as instrumental variables, except regressions (9), where SME1 is not an instrument, and (13), where profitability is not considered as an instrument. The critical value of the endogeneity test at 5% is 10, with "+" standing

5.2. Investment decision

Among the positive effects access to credit may have, promoting investment is of special interest to policy makers. Given that only around one third of the firms have had access to credit while 21% have found access to finance is the major obstacle to growth, access to credit may have a strong effect on investment. The decision to invest may be constrained if the firm has no access to the financial sector, even if the funding is not directly spent in investment but remains available to other purposes. Table 5 is the probit estimation of equation (4). About 51-52% of the sample shows some positive investment decision compared to 31-32% that has a loan. This is explained by the fact that the most important source of investment is internal funding.

The endogeneity test of access to credit and its p-value at the bottom of Table 5 makes use of three instrumental variables which were used estimating the credit equation in Table 4 but are not determinants of investment in Table 5: SME1 (dummy for small firms), the land ownership dummy and our proxy for profitability. Land ownership may be considered as an instrument since this variable may be the most important collateral of the firm to obtain a loan, especially in the services sector. Most loans in China are backed by land and buildings as collaterals. Collaterals has been used as instrument for loans in the investment equation before, such as Johnson et a (1999) and Ayyagari et al (2010). Profitability may be a variable that banks observe when looking at loan applications. In the case of the dummy for small firms, I may reflect the discrimination small firms suffer in the financial sector when making a loan application. In all regressions, the test finds no evidence of endogeneity of our proxy for access to credit, suggesting the probit model is adequate. However, it may be this is the result of having weak instruments (i.e. instruments that may not be much related to the) which affects negatively the performance of instrumental variables estimates. Table 5 provides the weak instrument test based on the explanatory power of the instrumental variables on the potentially endogenous regressor. The test is based on an auxiliary regression of the endogenous regressor on the proposed instruments and the other explanatory variables of the investment equation[9]. The weak instrument statistic is the F statistic of testing whether all the predictive power of the instrumental

[9] The auxiliary regression is commonly referred as the first stage regression since it mimics the first stage of the Two Stage Least Squares.

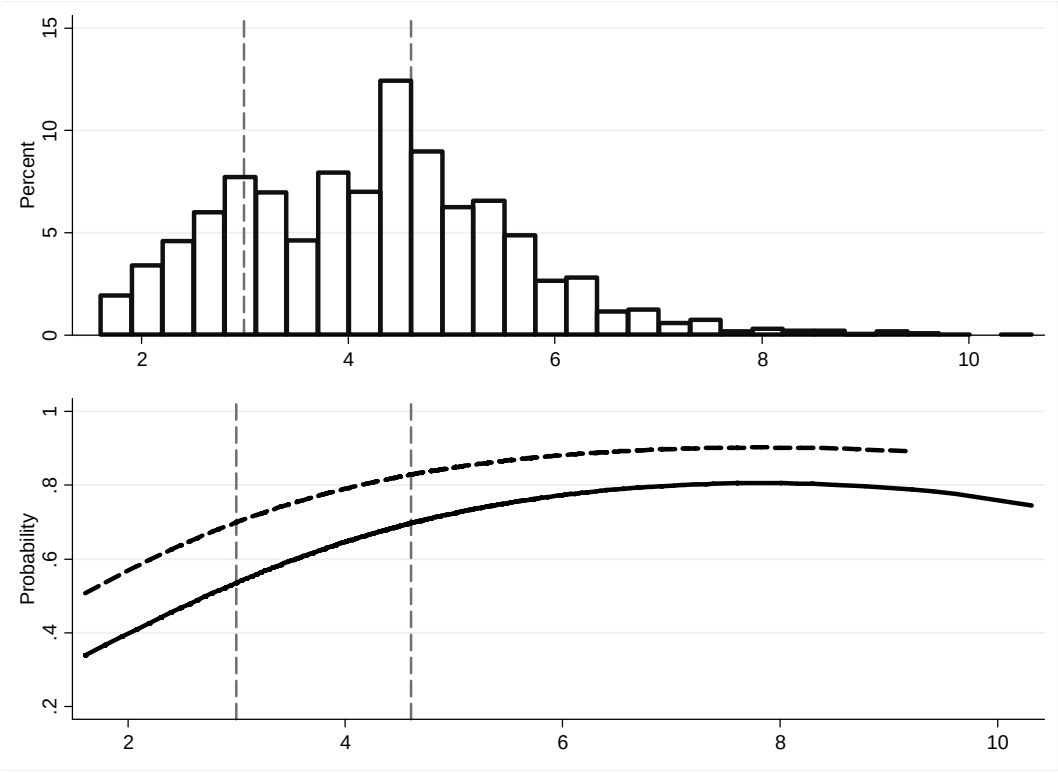
variables; however, the critical values are not the standard ones. Staiger and Stock (1997) have shown weak instruments arise even when this F statistic is significant at conventional levels (5% or 1%) and in large samples. The rule of thumb for a single endogenous regressor is a critical value (at the 5% level) of 10 (Staiger and Stock 1997). The null of weak instruments is rejected in all regressions, supporting the result of no endogeneity of $credit$ in the investment equation.

Therefore, the standard probit used in Table 5 is consistent and efficient estimator of equation (4). The variable $credit$ is strongly significant and positive, suggesting access to the financial sector is an important factor when the firm is making decision of whether to investment or not. More access to finance would be associated with more firms investing and therefore it seems constrains in the Chinese financial market may be affecting efficient allocation choices. Combined with results from Table 4, small firms which tend to suffer from large financial constrains may be particularly affected by access to credit. When looking at the firm size directly, we again find a positive but decreasing effect; however, neither the small nor medium firm size dummies (even if considered each individually) have a significant effect. Figure 2 shows the positive effects of both firm size and access to credit in the likelihood of investing. The bottom graph is, again, the typical private domestic firm that does not export located in Beijing in the Electronics sector. The effect of firm size is quite large: even if the firm does not have access to credit, a large typical firm may have a likelihood to invest of 70-80%, compared to 35-55% of a small typical firm. The distance between the dashed and solid lines shows gain in the probability to invest of having access to credit for different firm sizes. Typically, firms with access to credit of all sizes have a likelihood of investing of more than 50%.

From the variables censored at zero and their dummies, only state ownership and the dummy for exporters are statistically significant. State ownership seems to be negative for investment which would not be surprising if publicly owned companies were to be less influenced by business opportunities. The result of a positive effect of exporting on investment decisions is to be expected. On the other hand, the positive sing of the female ownership dummy variable was not expected given that was not

significant in Table 4. Female manager is still not significant. Age is significant in regression (12) and (13). In regression (13), growth is also significant but not profit.

Figure 2: Investment, firm size and access to credit



Notes: The plot at the top is the histogram of firm size (in logs). The plot at the bottom shows the effect of firm size and access to credit on the probability of investing based on regression (13). The dotted and solid black lines correspond to firms with and without access to credit, respectively. This is representative of firms from Beijing in the Electronics industry with no foreign or state participation (i.e. 100% domestic and private firms) while manager experience, growth and profits are fixed at their sample mean value.

5.3. Loans and investment

With two probit equations, we now move to a bivariate framework in which the correlation of the disturbances of equations (2) and (3) can be estimated. The first two columns of Table 6 reproduce the Probit estimation of equations (2) and (3) separately with the most significant variables of Tables 4 and 5, respectively. Not surprisingly, results have not changed much. In the next two columns, equations (2) and (3) are jointly estimated by a seemingly unrelated bivariate probit model. The estimates are very similar, except that the coefficient of $credit$ in the investment equation (regression 17), which is still significant at 1%, has more than doubled. The

estimation of the biprobit model suggests access to credit is now the most important factor to decide to invest.

Table 6. Loans and investment

	(14) credit	(15) invest	(16) credit	(17) invest	(18) loans	(19) investment	(20) loans	(21) investment
Credit		0.448***		1.031***		3.224***		6.347***
		(0.075)		(0.278)		(0.852)		(1.616)
Loans (log)						0.141***		0.382***
						(0.050)		(0.094)
Employment (log)	0.538***	0.534***	0.533***	0.385***	7.403**	5.838***	4.617**	4.308***
	(0.184)	(0.111)	(0.181)	(0.134)	(2.923)	(1.102)	(2.125)	(1.126)
Empl. (log), Sq.	-0.030*	-0.035***	-0.029*	-0.025**	-0.397	-0.436***	-0.227	-0.331***
	(0.017)	(0.011)	(0.017)	(0.013)	(0.272)	(0.111)	(0.194)	(0.110)
SME1 dummy	-0.471***		-0.495***		-6.868***		-7.089***	
	(0.165)		(0.166)		(2.555)		(1.933)	
Exports	-0.003		-0.004*		-0.043		-0.046**	
	(0.002)		(0.002)		(0.031)		(0.023)	
Exporter dummy	0.581***	0.248***	0.627***	0.158*	7.599***	1.310*	6.974***	0.396
	(0.126)	(0.078)	(0.127)	(0.090)	(1.774)	(0.730)	(1.377)	(0.767)
State dummy	-0.005**	-0.014***	-0.005*	-0.014***	-0.035	-0.155***	-0.036	-0.147***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.037)	(0.023)	(0.034)	(0.024)
Manager Exper.	0.010**	0.009**	0.009*	0.007	0.195***	0.098**	0.130**	0.053
	(0.005)	(0.004)	(0.005)	(0.005)	(0.071)	(0.041)	(0.055)	(0.041)
Land dummy	0.123		0.128*		1.925*		1.689**	
	(0.077)		(0.075)		(1.146)		(0.843)	
Growth (sales)	0.009***	0.013***	0.007**	0.013***	0.082*	0.157***	0.034	0.155***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.046)	(0.025)	(0.036)	(0.025)
Profit	0.000**		0.000***		0.000***		0.000*	
	(0.000)		(0.000)		(0.000)		(0.000)	
Female Owner		-0.244***		-0.229***		-2.675***		-2.407***
		(0.069)		(0.068)		(0.680)		(0.635)
Constant	-3.533***	-2.471***	-3.463***	-2.048***	-62.92***	11.58***	-39.41***	3.110
	(0.562)	(0.361)	(0.554)	(0.428)	(9.287)	(0.230)	(9.838)	(6.306)
Observations	2,197	2,253	2,187		2,077	2,272	2,183	
logL	-952.5	-1265	-2171		-2422	-4578	-8164	
Invest = Yes		1169		1149		1175		1145
Credit = Yes	678	706	675	675	472	472	674	674
Endogeneity test		1.051		0.678		0.188		7.627
p-value		0.305		0.410		0.828		0.022
Weak Instrument		5.616		5.609		5.2		5.178
rho			-0.387**				-0.513**	
			(0.198)				(0.213)	
sigma					15.31***	11.58***	13.04***	11.19***
					(0.417)	(0.230)	(0.385)	(0.335)

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All regressions include city and industry fixed effects. At the bottom of the table, two additional estimates are included (and their standard errors in parentheses): the contemporary correlation coefficient between the error term of the two equations (rho) and the standard deviation of the error term.

Although the size of the sample gets reduced, we move to a tobit framework where the two dependent variables have been replaced by $loans$ and $investment$, both variables transformed in logarithms. In regressions (18) and (19), the loans and investment equations are estimated separately while the same estimation is made in

the context of seemingly unrelated bivariate tobit model in regressions (20) and (21). Notice that *loans* is also included in the investment equation. This is consistent with our previous practice with censored regressors: $loans$ represents the level of access to credit of the firm while $credit$ captures the effect of not having access to finance at all. The results of the two investment equations show having access to credit (i.e. the coefficient on $credit$) has significant positive large impact on investment. Likewise, the significant coefficient of $loans$ also shows this positive effect increases as the level of access to credit increases.

When looking at the firm characteristics that may explain access to loans in the loans equations (regressions 18 and 20), the firm size remains a key factor; however, the quadratic term is not significant anymore which suggests this effect does not diminish once the firm reaches the largest firm size of the distribution. The negative sign of the coefficient of the SME dummy for firms with 20 or less employees is still large and statistically significant. Other variables also become non-significant but this may also be the result of the aforementioned loss of observations where the variable *loans* is positive.

6. Conclusions

The importance of access to finance for small and medium enterprises has been highlighted many times in the international literature. The development of an appropriate financial system has become an important goal in many developing countries. Although the economy has been booming for many years, China in particular has an underdeveloped financial system. The development of the financial sector as potential engine of economic growth of the private sector is at the top of the priority list of public policy.

This study makes use of one of the most recent surveys of Chinese firms, with 2,700 observations. The financial sector is failing to support firms as much as it is needed. Although half of the firms incur in investment, this is an economy where only 30% or less of the firms report to have access to credit. Instead, the most important sources of finance are internal to the firm. However, our results suggest access to credit is an

important factor to decide to invest, maybe this is the most important firm characteristic related to investment decisions. Likewise, the size of the firm shows to be among the most important firm characteristics to gain access to credit. In particular, small firms with 20 or less employees have considerably lower chances to gain access to credit. Other firm characteristics positive to access to credit are being an exporter and manager experience.

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