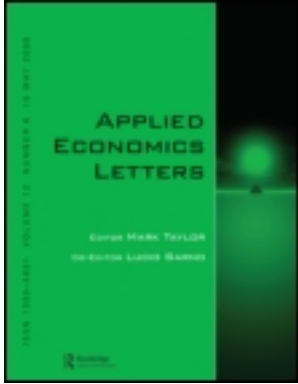


This article was downloaded by: [University Town Library of Shenzhen]

On: 07 October 2013, At: 21:09

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Applied Economics Letters

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/rael20>

Bank finance heterogeneity in China: micro-level evidence

Chunyang Wang^a & Tianran Niu^a

^a HSBC Business School, Peking University, Shenzhen, China

To cite this article: Chunyang Wang & Tianran Niu (2014) Bank finance heterogeneity in China: micro-level evidence, Applied Economics Letters, 21:2, 103-106

To link to this article: <http://dx.doi.org/10.1080/13504851.2013.842634>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

Bank finance heterogeneity in China: micro-level evidence

Chunyang Wang* and Tianran Niu

HSBC Business School, Peking University, Shenzhen, China

This article finds that there is a nonlinear relationship between a city's development level and a bank's impact on firm performance in China, by using firm level data. In particular, bank's impact on firm performance is largest in cities with intermediate level of development. This article reconciles the work done by Allen *et al.* (2005) and that done by Ayyagari *et al.* (2010).

Keywords: bank finance; firm growth; regional difference; China

JEL Classification: R10; G21; O16

I. Introduction

There are two divergent viewpoints about the role of formal finance (bank finance) in China. One strand of literature, such as Allen *et al.* (2005), states that informal finance based on relationship and reputation plays a key role in firm's growth in China, since formal finance from banks is poorly developed. The other strand, such as Ayyagari *et al.* (2010), argues that even after controlling for selection, firms with bank financing grow faster than those without bank financing. This article lies in the middle of these two strands of literature. Using data for 12 400 firms from the Investment Climate Survey conducted by the World Bank in 2005, we find that the bank financing effect on firm performance is weak for cities with either a high or a low development level, and is strong for cities with a moderate level of development. Possible explanations are that for cities with a low development level, the poor institutional cause as emphasized by Allen *et al.* (2005), leads to a weak effect, and for cities with a high development level, the growth of other financing channels, such as VC and PE, has contributed to the decline of the role played by banks.

II. Data and Method

We mainly use the data from the 2005 World Bank Investment Climate Survey conducted in collaboration with the Enterprise Survey Organization of the Chinese National Bureau of Statistics (NBS), covering 12 400 firms (almost 6 times more than that in the 2003 survey), which is used by Ayyagari *et al.* (2010). The data from 2003 covers only 18 cities, which is geographically very limited as compared to the 2005 survey that covers 120 cities. According to the Chinese NBS, the distribution of firms in the sample matches the real distribution very well. The survey questionnaire consists of two parts. The first part includes questions to managers regarding the business environment. The second part comprises questions regarding the firm's balance sheet.

For city development levels, as is usually done, we divide Chinese cities into four tiers according to their GDP and GDP per capita, which are positively correlated in China. Cities in the first tier include Beijing, Shanghai, Guangzhou and Shenzhen, which are on top in terms of GDP, GDP per capita and competitiveness. The second tier is mainly composed of provincial capitals and regional economic centres. The third and

*Corresponding author. E-mail: cywangecon@gmail.com

Table 1. Financing patterns across development levels

Development level	No. of cities	No. of firms	No. of firms using bank finance	Percentage of firms using bank finance
First tier cities	4	600	312	52.0
Second tier cities	16	1800	1241	68.9
Third tier cities	28	2800	1638	58.5
Fourth tier cities	72	7200	4244	58.9

fourth tier cities are mostly located in the middle or in the western regions that are less developed than the coastal region, and are especially concentrated in the Gansu, Shanxi, Shaanxi, Sichuan, Qinghai and Hubei Provinces. We categorize a firm as using bank finance if the manager answers in the questionnaire that the firm has borrowed money from banks.

Table 1 shows the financing patterns for cities with different development levels. The percentage of firms using bank finance is the highest in the second tier cities and the lowest in the first tier cities.

This article studies the heterogeneous effect of bank finance on firm performance. The dependent variable is the performance of enterprises, which has three measures – sales growth, labour productivity growth and profit growth – which will be utilized separately. Sales growth is computed as the annual growth rate from the period 2002 to 2004; the labour productivity is computed as (sales – material cost)/total employment; and the profit growth indicates net profit growth from the period 2002 to 2004.

As for explanatory variables, we use both firm- and city-level data. Bank dummy is our key variable. Bank dummy is equal to 1, if the firm has a loan or line of credit (L/C) with a bank, and 0 otherwise. City-tier dummies group firms' locations. Size dummies are the quintiles of firm's sales: micro, small, medium and large. Age dummies include start (less than 5 years), growing (between 5 and 20 years) and mature (more than 20 years). Competition is based on the severity of anti-competition behaviours the managers claim, and is equal to 1 if the number of competitors is large and 0, otherwise. As for corporate governance, manager dummy is 1 if the bonus of the general manager is related to firm performance, and 0, otherwise; Labour dummy is equal to 1 if the annual income of the employees is related to performance, and 0, otherwise; and board dummy is equal to 1 if the firm has establishes the board of directors system, and 0, otherwise. Export denotes the proportion of overseas sales (including Hong Kong, Macau and Taiwan). Ownership dummy is equal to 1 if the controlling shareholder of the firms is the state and 0, otherwise. There are also 31 industry dummies and 9 region dummies that control unobserved heterogeneity at the industry and region level.

$$\begin{aligned}
 \text{Firm performance} = & \alpha + \beta_1 \text{ bank dummy} \times \text{citytier dummies} \\
 & + \beta_2 \text{ age dummies} + \beta_3 \text{ size dummies} \\
 & + \beta_4 \text{ competition} + \beta_5 \text{ ownership dummy} \\
 & + \beta_6 \text{ manager dummy} + \beta_7 \text{ labour dummy} \\
 & + \beta_8 \text{ export dummy} + \beta_9 \text{ board dummy} \\
 & + \beta_{10} \text{ industrial dummies} \\
 & + \beta_{11} \text{ region dummies} + \varepsilon
 \end{aligned} \tag{1}$$

All variables are described in the paragraph above.

However, as addressed by Ayyagari *et al.* (2010), there exists endogeneity in the bank financing decision problem. Banks lend to a firm because the firm has high growth potential. Our results are biased due to this reverse causality problem. For this selection problem, Heckman (1979) develops a two-stage model by adding the inverse Mills ratio, which represents the nonzero expectation of the error term. Following Ayyagari *et al.* (2010), we use collateral as an instrument for bank financing, which takes the value 1 if the firm needs collateral for financing, and 0, otherwise. Then, bank dummy is 1 if

$$\begin{aligned}
 = & \alpha_0 + \beta_1 \text{ collateral} + \beta_2 \text{ age dummies} \\
 & + \beta_3 \text{ size dummies} + \beta_4 \text{ competition} \\
 & + \beta_5 \text{ ownership dummy} + \beta_6 \text{ manager dummy} \\
 & + \beta_7 \text{ labour dummy} + \beta_8 \text{ export dummy} \\
 & + \beta_9 \text{ board dummy} + \beta_{10} \text{ industrial dummies} \\
 & + \beta_{11} \text{ region dummies} + \eta > 0
 \end{aligned} \tag{2}$$

where $\eta \sim (0, \sigma^2)$ is proprietary information observed by the bank. Equation 2 is the selection equation and forms the first stage for the two-stage model. The second-stage equation is as follows:

$$\begin{aligned}
 \text{Firm performance} = & \alpha_1 + \gamma_1 \text{ bank dummy} \times \text{citytier dummies} \\
 & + \gamma_2 \text{ age dummies} + \gamma_3 \text{ size dummies} \\
 & + \gamma_4 \text{ competition} + \gamma_5 \text{ ownership dummy} \\
 & + \gamma_6 \text{ manager dummy} + \gamma_7 \text{ labour dummy} \\
 & + \gamma_8 \text{ export dummy} + \gamma_9 \text{ board dummy} \\
 & + \gamma_{10} \text{ industrial dummies} \\
 & + \gamma_{11} \text{ region dummies} + \lambda + \varepsilon
 \end{aligned} \tag{3}$$

The nonselection hazard λ (inverse of the Mills ratio) is computed from the estimates of the selection equation.

III. Results

Table 2 shows Equation 1 estimation results.

We can see that the effect of bank finance on firm performance is significant at the 1% level, and is the strongest in the second tier cities. The effect for second tier cities, 0.102, is almost twice as large as the effect for first tier cities. The coefficients for the other variables have the expected signs.

We can see from the selection model estimation that although the effect of bank finance on firm performance in various cities is smaller than that displayed in Table 3, we

still obtain the results that the coefficients for bank dummy for cities with various development levels are significant at the 1% level and that the effect for the second tier cities is the strongest.

IV. Conclusion

This article contributes to the two strands of literature – led by Allen *et al.* (2005) and Ayyagari *et al.* (2010) – on bank finance and firm growth in China by showing that bank finance is important for firm growth but the effect is nonlinear, using the World Bank Investment Climate Survey data, where the effect is the strongest for cities with a moderate level of economic development.

Table 2. Bank finance and firm performance

	Sales growth		Labour productivity growth			
	Overall	Development level	Overall	Development level		
Bank dummy	0.0649*** [0.0020]	1st Tier 0.0595*** [0.0045]	0.0443*** [0.0025]	1st Tier 0.0535*** [0.0085]	2nd Tier 0.102*** [0.0032]	0.0726*** [0.0043]
		3rd Tier 0.0743*** [0.0032]		3rd Tier 0.0452*** [0.004]	4th Tier 0.0546*** [0.0021]	0.0385*** [0.0029]
Start	0.1614*** [0.0031]	0.1647*** [0.0024]	0.0437*** [0.0039]	0.0442*** [0.0039]		0.0442*** [0.0039]
Growing	-0.0009 [0.0026]	-0.0005 [0.0026]	-0.0546*** [0.0032]	-0.0548*** [0.0033]		-0.0548*** [0.0033]
Small	-0.1373*** [0.0033]	-0.1462*** [0.0032]	-0.1022*** [0.0038]	-0.0974*** [0.0041]		-0.0974*** [0.0041]
Medium	-0.1928*** [0.0033]	-0.2013*** [0.003]	-0.1286*** [0.0036]	-0.1246*** [0.004]		-0.1246*** [0.004]
Large	-0.2243*** [0.0035]	-0.2358*** [0.0032]	-0.164*** [0.0037]	-0.1606*** [0.0042]		-0.1606*** [0.0042]
Competition	-0.011*** [0.0008]	-0.0115*** [0.0008]	-0.0089*** [0.001]	-0.0089*** [0.0011]		-0.0089*** [0.0011]
State	-0.0301*** [0.0035]	-0.0259*** [0.0034]	0.0215*** [0.0045]	0.0194*** [0.0045]		0.0194*** [0.0045]
Manager	0.022*** [0.002]	0.0227*** [0.0019]	0.02*** [0.0024]	0.0197*** [0.0026]		0.0197*** [0.0026]
Labour	0.0082*** [0.0009]	0.0078*** [0.0009]	0.0029*** [0.0011]	0.0032*** [0.0012]		0.0032*** [0.0012]
Export	0.0008*** [0.000]	0.0008*** [0.0008]	0.0003*** [0.0000]	0.0003*** [0.0000]		0.0003*** [0.0000]
Board	0.0574*** [0.0025]	0.0619*** [0.0024]	0.0356*** [0.0026]	0.0351*** [0.0031]		0.0351*** [0.0031]
Cons	0.1983*** [0.0057]	0.1998*** [0.0059]	0.1485*** [0.0073]	0.1464*** [0.0076]		0.1464*** [0.0076]
Adjusted R ²	0.7037	0.8093	0.4412	0.3088		

Notes: SDs are in parentheses. Coefficients for industry and region dummies are available upon request. ***denotes significant at 1% level.

Table 3. Bank finance and firm performance – selection model

	Sales growth		Labour productivity growth		
	Selection	Development level	Selection	Development level	
Bank dummy		1st Tier	0.0483*** [0.0066]	1st Tier	0.0491*** [0.0081]
		2nd Tier	0.093*** [0.0038]	2nd Tier	0.0677*** [0.0047]
		3rd Tier	0.0659*** [0.0036]	3rd Tier	0.0389*** [0.0045]
		4th Tier	0.0439*** [0.0032]	4th Tier	0.0308*** [0.0035]
Collateral	0.8784*** [0.0032]			0.8728*** [0.0034]	
Start	-0.0152*** [0.0026]		0.161*** [0.0031]	-0.0171*** [0.0027]	0.045*** [0.0038]
Growing	-0.0076*** [0.0022]		-0.0027 [0.0024]	-0.0086*** [0.0025]	-0.054*** [0.0033]
Small	0.0341*** [0.0042]		-0.1476*** [0.0035]	0.0367*** [0.0046]	-0.0987*** [0.0042]
Medium	0.0498*** [0.0037]		-0.1994*** [0.003]	0.0539*** [0.004]	-0.1259*** [0.0038]
Large	0.0738*** [0.0036]		-0.2364*** [0.0032]	0.0777*** [0.0039]	-0.1623*** [0.0041]
Competition	-0.003*** [0.0006]		-0.0111*** [0.0008]	0.0029*** [0.0007]	-0.0094*** [0.0011]
State	0.0301*** [0.0035]		-0.0282*** [0.0033]	-0.0025 [0.0031]	0.0194*** [0.0042]
Manager	0.0021* [0.0013]		0.0225*** [0.002]	0.0028*** [0.0016]	0.0205*** [0.0026]
Labour	0.002*** [0.0006]		0.0092*** [0.0009]	0.002*** [0.0008]	0.0037*** [0.0011]
Export	0.0000*** [0.0000]		0.0008*** [0.0000]	0.000*** [0.0000]	0.0003*** [0.0000]
Board	0.0195*** [0.0022]		0.0609*** [0.0025]	0.0193*** [0.0024]	0.036*** [0.003]
Cons	0.0467*** [0.0049]		0.2172*** [0.0075]	0.0504*** [0.0057]	0.1371*** [0.009]
Lambda			-0.0289*** [0.0064]		-0.0132*** [0.0048]
Adjusted R^2	0.9245		0.8408	0.9139	0.3165

Notes: SDs are in parentheses. Coefficients for industry and region dummies are available upon request.

*, ***denotes significant at 10%, 1% level, respectively.

References

- Allen, F., Qian, J. and Qian, M. (2005) Law, finance, and economic growth in China, *Journal of Financial Economics*, **77**, 57–116.
- Ayyagari, M., Demirguc-Kunt, A. and Maksimovic, V. (2010) Formal versus informal finance: evidence from China, *Review of Financial Studies*, **23**, 3048–97.
- Heckman, J. J. (1979) Sample selection bias as a specification error, *Econometrica: Journal of the Econometric Society*, **47**, 153–61.