



Formal versus Informal Finance: Evidence from China

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Financial System and Growth

❑ Finance and growth literature:

- Developed financial system → growth
- King and Levine (1993), Rajan and Zingales (1998), Demirguc-Kunt and Maksimovic (1998)

❑ Consistent findings:

- Beck, Levine and Loayza (2000), Wurgler (2000), Beck, Demirguc-Kunt and Maksimovic (2005), Klapper, Laeven and Rajan (2006)



Is China a counterexample?

□ Allen, Qian and Qian (2005):

- *“China is an important counter example to the findings in the law, institutions, finance and growth literature”*
- In the absence of an efficient formal financial sector: “there exist effective alternative financing channels and corporate governance mechanisms, such as those based on reputation and relationships, to support the growth of the Private Sector”
- “Although our results are based on China, similar “substitutes” based on reputation and relationships may be behind the success of other economies as well including developed economies”.
- “Our [private sector] evidence is mainly based on a survey of 17 entrepreneurs and executives in Zhejiang and Jiangsu provinces, two of the most developed regions in China



Role played by the informal financial sector

- ❑ **Peer monitoring view** (Stiglitz, 1990; Arnott and Stiglitz, 1991)
Non-market institutions have a comparative advantage in monitoring and enforcement capacity
 - Context: households, individuals, rural areas, agricultural contracts, small entrepreneurial ventures, or SMEs
- ❑ **General role of reputation:**
 - Gomes (2000)
- ❑ **The literature recognizes that the financial system is diverse:**
 - Informal components: Angel financing and informal loans
 - ❑ Service the lower end of the market. Ill-equipped to scale up and meet the needs of the higher end of the market
- ❑ **Can the informal system substitute for the formal system?**



In this paper

- ❑ **Is the informal sector associated with high growth and profit reinvestment? Does it serve as a substitute to the formal financial system or does the informal sector primarily serve the lower end of the market?**

- ❑ To answer this question, we proceed in steps:
 - Are Chinese firms' financing patterns different compared to other countries?
 - How do formal and informal financing patterns vary across different types of firms in different cities and regions?
 - How are bank finance and financing from informal sources associated with
 - ❑ firm sales growth
 - ❑ productivity growth
 - ❑ profit reinvestment.

Data



- ❑ **Investment Climate Survey**, a major firm level survey conducted in China in 2003 and led by the World Bank (in collaboration with the Chinese National Bureau of Statistics). **2400 firms** across **18** different cities

- ❑ In addition to general information on the firm (age, registration status, ownership structure), the survey has detailed information on
 - Firms' financing choices of working capital and new investments
 - Access to bank loan (year of approval, collateral requirements, etc)

- ❑ While most of the qualitative questions pertain only to the year 2002, a short panel from 1999 to 2002 is available for the quantitative questions.
 - Strength of the survey is in broad coverage of **small and medium sized firms**
 - The firms are randomly surveyed from both manufacturing and services industries with a restriction on minimum firm size where firm size is defined by number of employees.

Cities in China covered by ICA Survey

Ranking of Cities by their Investment Climate
 (Source: Dollar et al. (2004))



Data on Financing Patterns

- ❑ Firms were asked to “identify the contribution of each of the following sources of financing for your establishment’s new investments”:

Individual Financing Sources	Aggregate Patterns	Classification in Allen et al. (2005)
Local Commercial Banks	} Bank Finance	} Bank Finance
Foreign Commercial Banks		

Investment Funds/Special Development Financing/Or Other State Services	Investment Funds	} Self Fund-Raising
Trade credit (supplier or customer credit)	Operations Finance	
Other informal sources (e.g. money lender, informal bank)	Informal	
Equity	Equity	

Loans from family, friends	} Internal	
Internal funds or Retained earnings		
Other		



Data Caveats

- ❑ Financing patterns are given in terms of proportions of financing, not as debt to asset ratios
- ❑ No information on size of loan
- ❑ However proportions of financing more informative than subjective measures of importance of financing sources.
- ❑ No information on state budget and foreign investment.
 - Unlikely to influence our results on bank finance and informal finance since we have only 116 firms in our sample that have more than 50% foreign ownership and the state budget contributes to only 10% of state owned companies' total funding.



Additional Data

- ❑ As of 2006, there were 67 country surveys covering over 40,000 firms. Since the core survey instrument is the same across all countries, we have comparable information on financing sources across the different countries.

How different is China?

China vs. Other Developing Countries

Aggregate Financing Patterns								Allen et al. (2005)'s Categorization	
	# Firms	Internal	Bank	Informal	Operations Finance	Equity	Investment Funds	Bank	Self Fund Raising
Bangladesh	892	64.84	29.64	0.35	4.55	0.38	0.26	29.64	70.36
Brazil	1351	59.80	14.30	1.04	12.12	4.29	8.45	14.30	85.70
China	1342	63.82	20.37	1.84	1.03	12.39	0.55	20.37	79.63
India	92	51.49	33.48	0.75	0.43	4.33	9.52	33.48	66.52
Indonesia	291	68.42	16.34	6.74	5.49	1.34	1.67	16.34	83.66
Nigeria	145	64.69	29.76	0.34	1.07	2.59	1.55	29.76	70.24
Russian	701	86.08	5.93	1.02	5.87	0.36	0.73	5.93	94.07

How different is China?

China vs. RoW

Aggregate Financing Patterns							Allen et al. (2005)'s Categorization	
	Internal	Bank	Informal	Operations Finance	Equity	Investment Funds	Bank	Self Fund Raising
China	63.82	20.37	1.84	1.03	12.39	0.55	20.37	79.63
<i>Across Regions</i>								
Africa	71.84	19.19	0.48	6.15	1.36	0.98	19.19	80.81
EAP	40.84	31.87	1.23	3.30	21.38	1.37	31.87	68.13
ECA	73.34	12.86	0.71	7.87	4.20	1.01	12.86	87.14
LAC	60.47	21.22	0.76	10.79	3.13	3.63	21.22	78.78
MENA	79.55	13.07	0.15	5.25	1.70	0.28	13.07	86.93
South Asia	67.51	22.82	0.68	4.76	3.23	1.00	22.82	77.18
<i>Across Income Groups</i>								
Low Income	66.67	17.42	0.94	3.23	10.43	1.30	17.42	82.58
Middle Income	68.05	17.52	0.82	7.29	4.89	1.43	17.52	82.48
High Income OECD	60.40	20.78	0.10	12.81	5.29	0.62	20.78	79.22

Chinese firms do not appear to be an anomaly in their use of Self Fund Raising compared to other developing countries



Methodology

1. Formal Bank Finance

- Correlations: what is the role of bank financing on growth, reinvestment, productivity?
 - *Note that to the extent that we are interested in seeing if there is an association between the use of bank finance and high growth rates, the direction of causality is immaterial.*
- Selection model: incorporates private information driving the self selection decision
- Matching model: controls for matches based on observables using propensity scores.
- Instrumental variables
- Robustness

2. Compare bank finance to self finance

The Statistics



- ❑ Association between firm performance and bank financing:
 - Bank financing → firm performance
 - Good firms → bank financing
 - ❑ Consistent with “revealed preference” argument
 - Need to check: “Favored firms” → bank financing & “Favored firms” → growth
- ❑ Selection argument to uncover causality
 - Heckman model
 - Estimate dropping firms that report govt. help in obtaining financing
 - Instrumental variable estimation

Bank Financing and Firm Performance

$$\begin{aligned} \square \text{ Firm Performance} &= \alpha + \beta_1 \text{Bank Dummy} + \beta_2 \text{ Firm Size dummies} \\ &+ \beta_3 \text{ Age dummies} + \beta_4 \text{ Corporations} \\ &+ \beta_5 \text{ Collectives} + \beta_6 \text{ State Ownership} \\ &+ \beta_7 \text{ Competition Dummies} + \beta_8 \text{ City Dummies} \\ &+ \varepsilon \end{aligned}$$

where

■ *Firm Performance:*

- Sales Growth [2001-2002, 1999-2002]
- Productivity Growth [2001-2002, 1999-2002]
- Profit Reinvestment Rate [2001-2002]

■ *Bank Dummy:*

- 1 if the firm states that it has a loan from a bank or financial institution
- 0 if the firm states that it has no bank loan and no overdraft facility or line of credit

- OLS Regressions with clustered standard errors.

Bank Financing and Firm Performance

Partial Correlations

	Full Sample				
	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Productivity Growth [2001-2002]	Sales Growth [1999-2002]	Productivity Growth [1999-2002]
Bank Dummy	0.075** [0.034]	0.078*** [0.020]	-0.002 [0.051]	0.115*** [0.019]	0.058*** [0.022]
Observations	2145	1905	1456	2135	1423
R-squared	0.036	0.072	0.017	0.175	0.071

	Drop Public Corporations and State Owned Companies				
	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Productivity Growth [2001-2002]	Sales Growth [1999-2002]	Productivity Growth [1999-2002]
Bank Dummy	0.068* [0.040]	0.086*** [0.024]	-0.004 [0.056]	0.120*** [0.024]	0.066** [0.026]
Observations	1535	1363	1099	1528	1072
R-squared	0.038	0.087	0.023	0.195	0.083



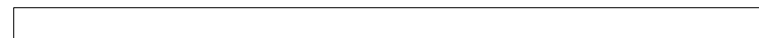
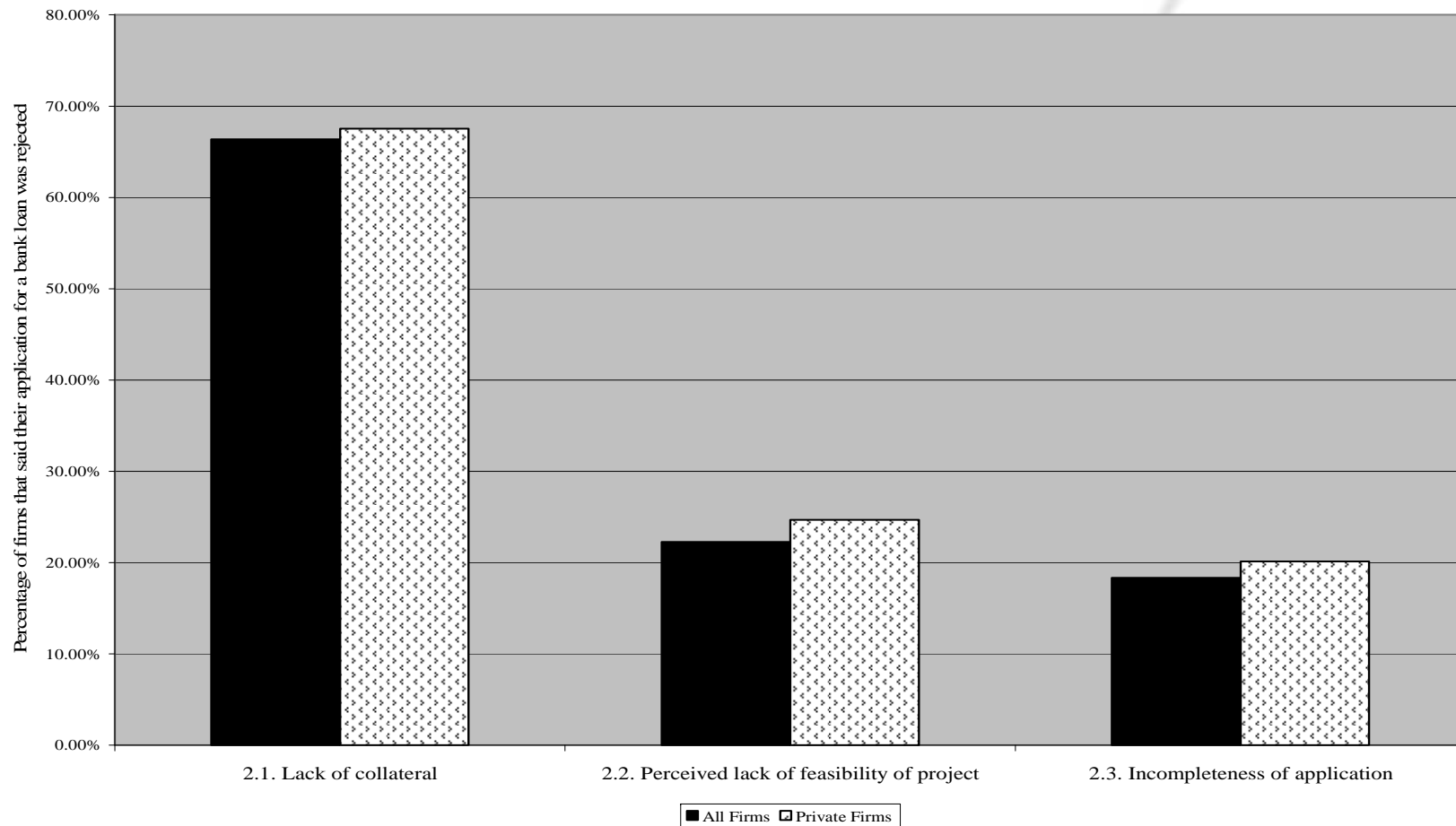
Selection Effects

Two step selection model

- *Selection Equation: Bank Dummy = 1 if*
 - $\alpha_0 + \beta_1 \text{ Collateral} + \beta_2 \text{ Size dummies} + \beta_3 \text{ Age dummies} + \beta_4 \text{ Corporations} + \beta_5 \text{ Collectives} + \beta_6 \text{ State Ownership} + \beta_7 \text{ Competition Dummies} + \beta_8 \text{ City Dummies} + z > 0,$ (1)
 - where $z \sim (0, \sigma^2)$ is proprietary information observed by the bank.
 - Collateral is identifying variable

- *Second Stage Equation:*
 - $\text{Firm Performance} = \alpha_1 + \gamma_1 \text{ Bank Dummy} + \gamma_2 \text{ Size dummies} + \gamma_3 \text{ Age dummies} + \gamma_4 \text{ Corporations} + \gamma_5 \text{ Collectives} + \gamma_6 \text{ State Ownership} + \gamma_7 \text{ Competition Dummies} + \gamma_8 \text{ City Dummies} + \lambda + \varepsilon$ (2)
 - where λ is Inverse Mills Ratio (estimate of selection bias)

Reasons why loan application was rejected



Selection Model and Identifying Restriction

- ❑ **We use Collateral as our identifying variable.**
 - 1 if firm reported 'yes' to the question "Did the financing require collateral"
 - 0 if firm reported 'no' to the question "Did the financing require collateral"
OR
 - 0 If firm reported it did not apply for a loan because collateral requirements were too stringent OR
 - 0 if firm reported its application for a loan was rejected

- ❑ **How contingent are our results on the way Collateral is defined?**
 - Also use fixed assets in place of collateral variable.

Bank Financing and Firm Performance – Selection Model

Full Sample						
	Sales Growth [2001-2002]	Selection Equation	Profit Reinvestment rate in 2002	Selection Equation	Productivity Growth [2001-2002]	Selection Equation
Bank Dummy	0.310*** [0.116]		0.183*** [0.058]		0.116 [0.147]	
Collateral		0.968*** [0.076]		0.964*** [0.080]		0.941*** [0.089]
Hazard Lambda	-0.146** [0.072]		-0.068* [0.036]		-0.095 [0.092]	
Observations	1549	1549	1397	1397	1089	1089

The Selection Model

Predictors of bank loan

❑ Selection model variables

- Size
- Collateral
- 4-6 Competitors
- Corporations

❑ Expanded Selection Model

- Variables to proxy for Government Help, Bank Corruption, Property Rights Protection, Loan from Group or Holding Company, Loan Guarantee Program, Located in Export Processing Zone, CEO Education Level, Politically Connected CEO, Past Growth



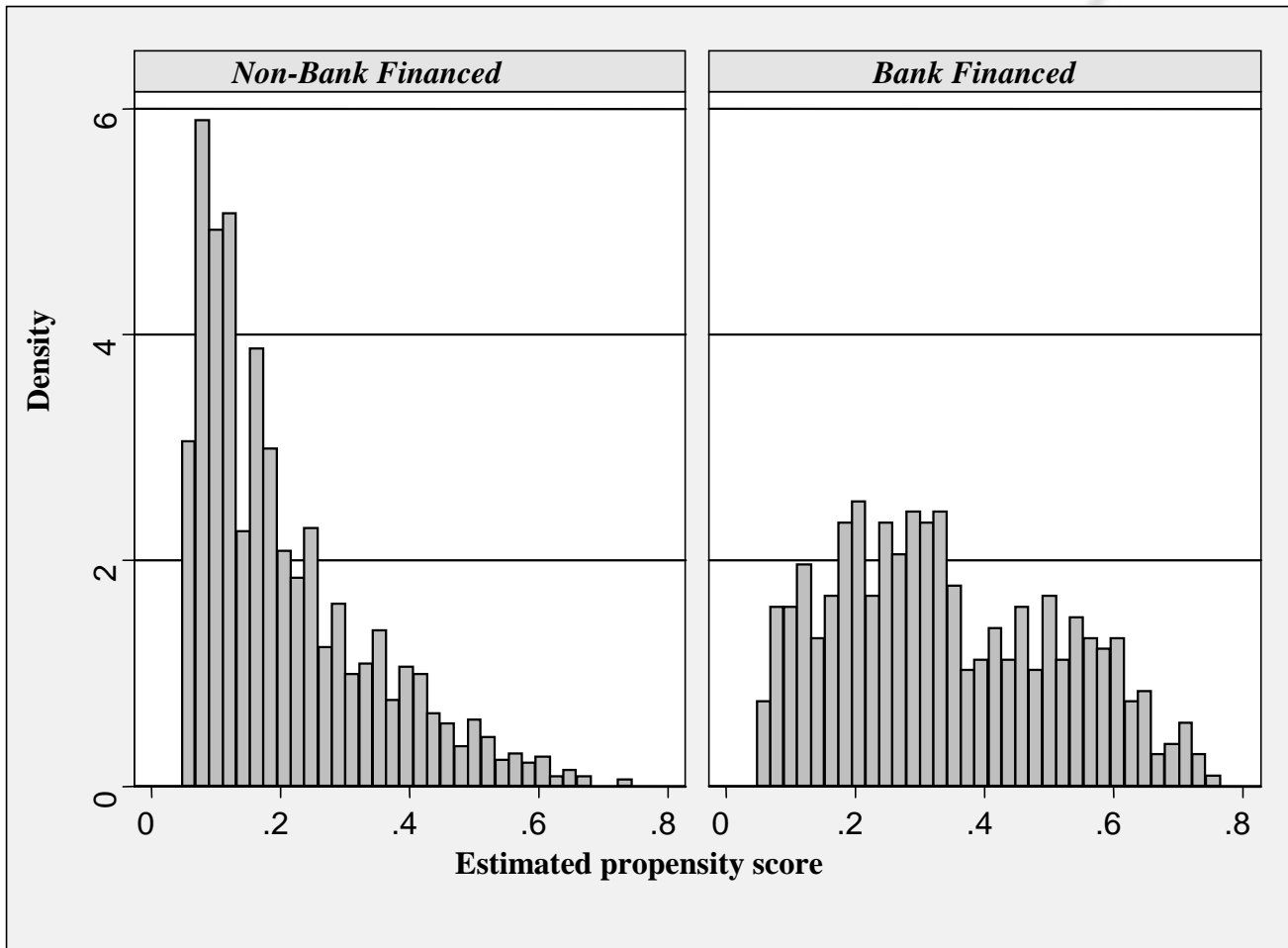
Treatment Effects

Matching Estimators

- ❑ Matching models focus on estimating treatment effects. A treatment effect is the value added or the difference in outcome when a firm has bank finance relative to not having bank finance
 - $E(Y_{i1} | \text{Bank}_i=1) - E(Y_{i0} | \text{Bank}_i=1)$ (3)
 - ❑ *Cannot be estimated directly*
 - $E(Y_{i1} | \text{Bank}_i=1) - E(Y_{i0} | \text{Bank}_i=0)$ (4)

- ❑ Propensity Score Matching
 - Firms with bank finance are matched to a control group of firms without bank finance by matching on the propensity score and then average treatment effects are estimated to test whether firms with bank loans grow faster.
 - Propensity Score is estimated using following set of covariates: Size Dummies, Age Dummies, City Dummies, Corporations Dummy, Cooperatives Dummy and State Ownership Dummy.

Figure 4: Distribution of Propensity Scores



Selection Effects

Matching Estimators

	1	2	3	4	5	6
	Radius Matching			Kernel Matching		
	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Labor Productivity Growth [2001- 2002]	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Labor Productivity Growth [2001- 2002]
Average Treatment Effect on the Treated (ATT)	0.060* [0.036]	0.098*** [0.021]	0.001 [0.049]	0.065* [0.035]	0.075*** [0.020]	0.005 [0.052]

- Balancing Property Satisfied*
- Common Support Condition Imposed*
- Bootstrapped standard errors*

Robustness



- ❑ All results robust to dropping firms with government help in obtaining finance.

- ❑ Instrumental Variables Regression
 - Collateral and government help as instruments for bank finance

- ❑ Median Regressions

- ❑ Firms that never applied for a bank loan grew more slowly

- ❑ Broader measure of access to bank finance
 - **Access Dummy**, takes the value 1 if the firm had access to a bank loan in any year prior, from 1990-2001, and 0 otherwise.

Robustness --- Government Help

	OLS Drop firms that report government help	Instrumental Variables Full Sample		
	1	2	3	4
	Sales Growth [2001-2002]	Sales Growth [2001-2002]	Sales Growth [2001-2002]	Sales Growth [2001-2002]
<i>Instruments</i>	-	<i>Collateral</i>	<i>Government Help</i>	<i>Collateral and Government Help</i>
Bank Dummy	0.100 ^b [0.0398]	0.324 ^a [2.675]	0.080 [0.398]	0.296 ^b [2.527]
Observations	1799	1549	2117	1531
R-squared	0.033			
Durbin-Wu- Hausman Chi-Sq Test		4.2825 (0.0385)	0.0003 (0.9851)	3.5129 (0.0609)
First Stage F Stat		157.63 (0.000)	50.67 (0.0000)	87.55 (0.0000)
<i>Overidentification Test:</i>		-	-	0.662 (0.4157)
Conditional LR (CI, p-value)		[.0871, .5726] (0.0074)	[-.3283, .4895] (0.6930)	[.0656, .5358] (0.0119)

^c significant at 10%; ^b significant at 5%; ^a significant at 1%

Financing Proportions of New Investments & Working Capital

Bank Financing versus Informal Financing

Bank Financing

- 1 if the firm states that it has a loan and reports that bank finances at least 50% of new investments or working capital.
- 0 if the firm states that it has no loan or said it had no overdraft facility or line of credit and the bank financing of new investments and working capital was equal to 0%

Self Financing1

- 1 if the sum of Informal financing and Other financing of either new investments or working capital is greater than 50%.
- 0 if the sum of informal and other financing of new investments and working capital is equal to 0 %.

Self Financing2

- Broadens the definition of self financing (to be more consistent with Allen et al. (2005)) and takes the value 1 if the sum of Internal, Informal, Family, and Other financing of new investments or working capital is greater than 50%

Financing Proportions of New Investments & Working Capital

Bank Financing versus Informal Financing

	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Productivity Growth [2001-2002]
Bank Financing	0.092* [0.056]	0.078** [0.031]	0.045 [0.076]
Observations	895	809	621
R-squared	0.063	0.099	0.039

	Sales Growth [2001-2002]	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Profit Reinvestment rate in 2002	Productivity Growth [1999-2002]	Productivity Growth 2002]
Self Financing1	-0.04 [0.039]		-0.126*** [0.020]		0.092 [0.059]	
Self Financing2		-0.015 [0.048]		0.045* [0.024]		0.154** [0.072]
Observations	1363	1372	1203	1207	952	956
R-squared	0.056	0.055	0.11	0.103	0.041	0.042



Overview

- ❑ Chinese firms in our sample do not look different in their use of bank loans.
- ❑ Firms with bank loans grow faster and reinvest more. Firms with bank loans do not report lower productivity.
- ❑ Who gets loans:
 - Large firms
 - Relatively few competitors.
 - Have govt help
 - Part of group
 - Located in export processing zones
 - Firms that can post Collateral
- ❑ Corruption reported, but implications for efficiency and allocation not evident
- ❑ Fund raising from informal channels is not associated with faster firm growth.
 - To the extent that there are measurable benefits of informal financing, they arise only when retained earnings is classified as informal financing



Conclusion

- ❑ Little evidence that the formal system misallocates loans for firms that do not get government help in obtaining loans
- ❑ Formal system is not associated with superior performance for firms that get government help in obtaining finance.
- ❑ Little evidence that informal system works well.
- ❑ Caveat: The unit of analysis is firm, not loan value.



EXTRA STUFF

Bank Financing across firm sizes

	Quintiles of Total Employees in 1999				
	Quintile1	Quintile2	Quintile3	Quintile4	Quintile5
Number	481	469	480	459	471
Mean # of Employees in 1999	17.67	44.23	104.46	265.52	2475
Mean Sales Growth	0.1	0.0002	0.01	0.085	0.069
Proportion with bank loans	0.06	0.16	0.23	0.29	0.41
Mean % of bank financing (bankdummy1)	0.082	0.186	0.21	0.359	0.521

Individual Financing Patterns

	Retained Earnings	Local Commercial Banks	Foreign Owned Commercial Bank	Operations Finance	Investment Funds	Loans from Family and Friends	Equity	Informal Sources	Other
Bangladesh	59.92	28.41	1.22	4.55	0.26	4.27	0.38	0.35	0.64
Brazil	56.32	13.09	1.21	12.12	8.45	1.21	4.29	1.04	2.27
China	15.24	20.24	0.12	1.03	0.55	5.89	12.39	1.84	42.7
India ^c	43.84	30.73	2.75	0.43	9.52	3.56	4.33	0.75	4.09
Indonesia	41.89	13.21	3.13	5.49	1.67	17.73	1.34	6.74	8.8
Nigeria	63.94	29.76	0	1.07	1.55	0.74	2.59	0.34	0
Russian Federat	82.47	5.57	0.36	5.87	0.73	1.74	0.36	1.02	1.87

Robustness - IV

	1	2	3
	Sales Growth	Sales Growth	Sales Growth
<i>Instruments</i>	<i>Collateral</i>	<i>Govt Help</i>	<i>Collateral and govt help</i>
Bank Finance	0.324***	0.080	0.296**
	[2.675]	[0.398]	[2.527]
N	1549	2117	1531
<i>First Stage Statistics:</i>			
Shea Partial R2	0.1098	0.0355	0.1199
First Stage F Stat	157.63 (0.000)	50.67 (0.0000)	87.55 (0.0000)
<i>Weak identification statistics:</i>			
Cragg-Donald (N-L)*minEval/L2 F-stat	187.18	76.7	102.01
<i>Anderson-Rubin test of joint significance of endogenous regressors:</i>			
F Stat			3.66 (0.0259)
Chi-sq			7.49 (0.0237)
<i>Overidentification Test</i>	-		0.662 (0.4157)
<i>Moreira and Poi Tests:</i>			
Anderson Rubin (CI, p-value)	[.0870635, .5726149] (0.0074)	[-.3283473, .4894775] (0.6930)	[.0247635, .5801579] (0.0301)

Two-stage Least Squares

$$Y_{1i} = \beta_0 + \beta_1 Y_{2i} + X_i \beta_2 + \varepsilon_i,$$

$$Y_{2i} = \alpha_0 + Z_i \alpha_1 + X_i \alpha_2 + \mu_i.$$

$$E(\beta_1^{2SLS}) - \beta_1 \approx \frac{l\rho(1 - \tilde{R}^2)}{n\tilde{R}^2}$$

Murray (2005)

Instrumental Variable Regression

LIML K-class Estimator

	1	2	3
	Sales Growth [2001-2002]	Profit Reinvestment rate in 2002	Labor Productivity Growth [2001-2002]
Bank Finance	0.324*** [2.675]	0.221*** [0.062]	0.2 [0.162]
N	1549	1397	1089
<i>First Stage Statistics</i>			
Shea Partial R2	0.1098	0.1091	0.107
First Stage F Stat	157.63 (0.000)	141.14 (0.0000)	114.90 (0.0000)
<i>Weak identification statistics:</i>			
Cragg-Donald (N-L)*minEval/L2 F-stat	187.18	167.15	126.63
<i>Anderson-Rubin test of joint significance of endogenous regressors:</i>			
F Stat	7.41 (0.0066)	12.77 (0.0004)	1.53 (0.2163)
Chi-sq	7.56 (0.006)	13.07 (0.0003)	1.58 (0.2093)
<i>Moreira and Poi Tests:</i>			
Anderson Rubin (CI, p-value)	[.0870635, .5726149] (0.0074)	[.1026222, .3465188] (0.0003)	[-.0997022, .5165059] (0.1906)



The Financial system and growth:

□ Finance and growth literature:

- Developed financial system → growth
- King and Levine (1993), Demirguc-Kunt and Maksimovic (1998), Rajan and Zingales (1998)

□ The literature recognizes that the financial system is diverse:

- Informal components: Angel financing and informal loans

□ Can the informal system substitute for the formal system?

Is China a counterexample?

□ Allen, Qian and Qian (2005):

- *“China is an important counter example to the findings in the law, institutions, finance and growth literature”*
- In the absence of an efficient formal financial sector: “there exist effective alternative financing channels and corporate governance mechanisms such as those based on reputation and relationships to support the growth of the Private Sector”
- “Although our results are based on China, similar “substitutes” based on reputation and relationships may be behind the success of other economies as well including developed economies”.
- “Our [private sector] evidence is mainly based on a survey of 17 entrepreneurs and executives in Zhejiang and Jiangsu provinces, two of the most developed regions in China