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Institutions, ownership, and finance: the determinants of profit reinvestment among Chinese firms ☆

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Abstract

Johnson et al. (2002. American Economic Review 92 (5), 1335–1356) examine the relative importance of property rights and external finance in several Eastern European countries. They find property rights to be overwhelmingly important, while external finance explains little of firm reinvestment. McMillan and Woodruff (2002. Journal of Economic Perspectives 16 (3), 153–170) further conjecture that as transition moves along, market-supporting (financial) institutions should become more important. This paper reexamines those issues in the context of China in 2002, when the transition had moved far. We also find that secure property rights are a significant predictor of firm reinvestment. However, in line with McMillan and Woodruff, we find that access to external finance in the form of bank loans is also associated with more reinvestment. Following Acemoglu and Johnson (2003. Unbundling institutions. Unpublished working paper 9934, National Bureau of Economic Research,

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Cambridge, MA), we separate our proxies for the security of property rights into two groups: those measuring the risk of expropriation by the government and those measuring the ease and reliability of contract enforcement. Whereas those authors' cross-country results suggest that risk of expropriation is the more severe impediment to economic development, ours indicate that both expropriation risk and contract enforcement play a role in Chinese firms' reinvestment decisions. We also find that another aspect of property rights, the extent of private ownership, is associated with greater reinvestment. At China's current stage of development, expropriation risk, contract enforcement, access to finance, and ownership structure all appear to matter for reinvestment decisions. Some evidence also exists that access to finance and government expropriation affect small firms more than large ones.

JEL classification: D23; G31; P2; L2

Keywords: China; Property rights; Banking; Investment

1. Introduction

In recent years, two strands of research on growth and development have evolved more or less independent of one another. The first finds that secure property rights are an important precondition for growth, especially for countries in transition from a planned to a market economy. In particular, a series of cross-country studies find that less secure property rights are associated with lower investment and slower growth (Knack and Keefer, 1995; Mauro, 1995; Svensson, 1998; Acemoglu et al., 2001; Claessens and Laeven, 2003). The second finds that financial sector development is a robust determinant of growth (Levine, 1997; Rajan and Zingales, 1998; Levine et al., 2000). While these two sets of findings need not be contradictory, knowing which factor has greater influence on growth could be important for policy makers with limited time and resources. However, Johnson, McMillan, and Woodruff (JMW, 2002) point out that it is hard to separate the effects of property rights from external financing with country-level data because external financing is strongly influenced by the security of property rights (La Porta et al., 1997, 1998, 2000; Demirguc-Kunt and Maksimovic, 1998).

Following this line of thought, JMW (2002) use micro data to highlight that secure property rights could be central to the earliest stages of development of a market economy. (Few micro-studies link investment behavior with property rights, with notable exceptions in Besley, 1995; Jacoby et al., 2002.) For a sample of firms from Poland, Romania, Russia, Slovakia, and Ukraine, JMW find that entrepreneurs choose to reinvest a higher share of their profits when property rights are perceived to be more secure. Proxies for access to external finance are not significantly associated with reinvestment rates, from which they conclude that, at least until now, insecure property rights have been a more serious impediment to investment and firm growth than a lack of finance in a number of transition countries.

Though intriguing, the JMW results on the importance of property rights should be viewed in context. The transition countries of Europe and the former Soviet

Union underwent rapid transformations from planned to developed economies. Under this big bang approach to economic development, the security of newly established rights to property would be uncertain in a rapidly changing environment, and thus likely an important determinant of whether firms grew. Moreover, financial institutions in these countries were notoriously poor intermediaries and were undergoing their own chaotic transformations.[1] Finally, firms in the JMW sample tend to have high profit margins, which likely makes them less reliant on external finance for investment. These conditions made it likely that the security of property rights would be a more important determinant of firm growth than access to external finance.

By contrast, Demirguc-Kunt and Maksimovic (DKM, 1998) find that access to external finance contributed to the sales growth of firms in 20 industrialized and ten developing countries, none of which was in transition from a planned to a market economy. In addition, reliance on long-term finance was greater in countries with efficient legal systems, an active stock market, and a large banking sector, none of which was characteristic of the economies in transition. The DKM results, viewed in combination with those of JMW, suggest that economies in the early stages of transition might be the rare current example in which the security of property rights matters much more for growth than access to external finance.

Although it might be tempting to generalize the JMW results to all transitional countries, there are important unsettled issues to consider. By construction, the JMW sample is composed of firms with substantial retained earnings, many in industries largely protected from competition. Firms in competitive industries with less retained earnings likely are in greater need of external finance, which might make the JMW results less applicable to transitional countries facing a great deal of competition (such as China).

The JMW results are put in perspective in a recent survey on entrepreneurs and transition by McMillan and Woodruff (2002). They suggest that the overwhelming importance of property rights relative to external financing might not hold as transition progresses. In particular, the need for market-supporting institutions increases when competition forces down profit margins and when relational contracting gives way to formal contracting, often because products and transactions become more complex such that ex ante contracting is needed to coordinate buyers and sellers. While the conjecture sounds plausible, no formal econometric evidence is offered to indicate that as market transition moves along, the relative importance of market-supporting institutions increases. In this paper, we offer such evidence using the most populous transitional country, China, as the backdrop.

[1]On the difficulties of bank privatization in the Czech Republic, Hungary, and Poland, see Bonin and Wachtel (2000). In the Czech case, the state banks had long-standing creditor relationships with many of the large state-owned enterprises privatized through vouchers. Because those firms represented a large share of their portfolios, bank managers had strong incentives to prop up troubled firms through further lending and rollovers to avoid revealing their own insolvency (Hrncir, 1993; Capek, 1994; Brom and Orenstein, 1994; Desai, 1996). Cull et al. (2002) confirm that privatized firms with close links to the Czech banking system performed worse than all others.

We add to the JMW results in a number of ways. First, we offer evidence from China, a country whose transition to a market economy has been more gradual than those in Europe and the former Soviet Union. Lacking a big bang, uncertainties regarding the security of property rights could be less severe, and China thus offers a potentially interesting contrast to most other transitional economies. The time period we cover is 2000–2002, during which China had made progress in its transition and likely satisfied the conditions for the increasing importance of market-supporting institutions (such as competition and more arm's-length relationships between buyers and sellers). Second, we have detailed data on the ownership structure of our firms, in particular the extent to which they are privately owned. We thus are able to distinguish two different aspects of property rights: perceptions about how secure those rights are (which is the focus of JMW) and ownership structure. We test explicitly whether investment behavior is different for firms with a higher share of private ownership. Third, our sample is composed of less profitable firms, on average, than those studied by JMW, at least in part because the level of protection from competition enjoyed by Chinese firms is lower than that enjoyed by firms in some transition economies in the 1990s. This feature helps us assess whether the JMW results (i.e., that access to external finance does not affect reinvestment) are largely attributable to a sample of relatively profitable firms that had little need for external finance.

Following Acemoglu and Johnson (2003), we separate our proxies for the security of property rights into two groups: those measuring the risk of expropriation by the government and those measuring the ease and reliability of contract enforcement. In a cross-country analysis, those authors find that the risk of expropriation is the more severe impediment to economic development, and they speculate that individuals can alter the terms of formal and informal contracts to avoid the adverse effects of contracting institutions but are unable to do so against the risk of expropriation. By contrast, we find that both expropriation risk and contract enforcement play a role in Chinese firms' reinvestment decisions. At this stage of the transition, individuals could still be learning how to tailor their contracting to offset weak supporting institutions.

We confirm many of the JMW results regarding the importance of secure property rights for reinvestment decisions. Given where China is in terms of economic growth and financial development, the continued importance of secure property rights for investment might come as a surprise to some. Table 1 offers a comparison between China and the countries in the JMW sample in terms of standard indicators of the security of property rights and financial development. The general impression is that China is in the middle of the pack in terms of property rights, trailing both Poland and Slovakia. However, regarding financial development, China is well ahead of the JMW countries. It might come as less surprise, therefore, that in line with the McMillan and Woodruff conjecture, access to external finance is a significant predictor of firm reinvestment in China.

One should not take the figures for China's financial development at face value. Under corporatization, which had affected most Chinese firms by the turn of the 21st century and thus explains the relatively high ratio of private credit to gross domestic

Table 1
Financial development and property rights in China and JMW countries

Country	Financial development indicators (2001)			Property rights indicators (1997)	
	LL/GDP (%)	BANK/GDP (%)	PRIV/GDP (%)	Rule of law	Corruption
China	150.1	129.2	119.7	−0.27[a]	−0.38[a]
Poland	42.5	34.5	27.6	0.51	0.44
Romania	19.6	11.7	6.3	−0.26	−0.28
Russia	n.a.	n.a.	n.a.	−0.79	−0.69
Slovakia	65.8	63.7	27.3	0.12	0.16
Ukraine	14.4	9.7[b]	7.3[b]	−0.70	−0.79

n.a. is not available.
LL/GDP is the ratio of liquid liabilities to gross domestic product (GDP). BANK/GDP is the ratio of deposit money banks' assets to GDP. PRIV/GDP is the ratio of private credit extended by deposit money banks to GDP. The source of all the indicators of financial development is the electronic version of the International Monetary Fund's *International Financial Statistics*. Those indicators are available via the internet in the World Bank financial structure database, http://www.worldbank.org/research/projects/finstructure/database.htm. Indicators of the security of property rights are taken from Kaufman et al. (2003). Their indicators are normally distributed, with a mean of zero and a standard deviation of one. The larger the value, the better the country. Their index for rule of law is composed of several indicators that measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Corruption measures the extent to which corruption is controlled based on perceptions from survey respondents.
[a]Average data 2000–2002.
[b]1999 data.

product (GDP) in Table 1, the performance of many majority-state-owned firms was converging to that of private firms. (See Zhu (1999), Lin and Zhu (2001) and Xu et al. (2005) for analysis of the effects of the recent corporatization and associated reforms.) However, state-owned enterprises (SOEs) continue to receive a disproportionately large share of the credit extended by the main (and largely state-owned) banks in China, and recent empirical research shows that state banks have grown increasingly inefficient in allocating credit as they have been increasingly forced to bail out poorly performing state-owned enterprises (Lardy, 1998; Cull and Xu, 2000, 2003). These bailouts come in the form of stability loans to keep SOEs afloat, as many or most of them maintain excessive employment.[2] We therefore view loans extended by state-owned banks to state enterprises as having a strong bailout component instead of as true external finance awarded on the basis of creditworthiness. For private firms, which are the focus of this analysis, these agency problems should be much less severe. Both the banks and their ultimate owner, the government, have an incentive to lend any excess funds to the best private borrowers.

[2]Bai et al. (2000) suggest that SOEs typically face multiple tasks. Bai and Xu (2002) present evidence consistent with the notion that the chief executive officer of a SOE likely faces multiple tasks. Shleifer and Vishny (1994) also emphasize that employment maintenance tends to be an important objective of SOEs.

Section 2 discusses relevant theoretical issues and lays out the JMW framework for investment decisions. Section 3 describes our data set. Section 4 formalizes our testable hypotheses, while Sections 5 and 6 contain the empirical results. Section 7 concludes.

2. Framework for investment decisions

JMW offer a framework for evaluating the effects of insecure property rights on investment decisions, based on the financial pecking order described in Myers and Majluf (1984). With minor modifications for the Chinese case, we rely on the same framework to illustrate our central hypotheses and defend the assumptions implicit in the regressions that follow.

The firm's demand for investable funds is given by

$$I^{\mathrm{d}} = I(p, s, r^I, r^E), \tag{1}$$

where p is the firm's profits, s is the amount of those profits taken by corrupt officials or criminals, r^I is the interest rate that the firm owner could earn by investing profits outside the firm, and r^E is the interest rate the owner must pay for external loans.

Funds for investment are generated internally or borrowed externally, and therefore

$$I^{\mathrm{d}} = R + L^E, \tag{2}$$

where R is reinvested earnings and L^E is the firm's demand for external loans. Under the pecking-order hypothesis, the cost of internal funds r^I is assumed to be less than the cost of external funds r^E. This is because the borrower has better information about the quality of its investment opportunities than does the lender. The lender, therefore, requires compensation in the form of a higher interest rate. Because external funds are more costly, firm owners first exhaust internal funds to support investment before turning to credit markets, and thus a pecking order exists between the two sources of finance.

JMW assume that firm i is willing to reinvest a maximum amount E_i of its current profits ($E_i \leqslant p$). The wedge between the value of internal funds and the cost of external funds implies that

$$I^{\mathrm{d}} = R \quad \text{if } I^{\mathrm{d}} \leqslant E_i$$

and

$$I^{\mathrm{d}} = E_i + L^E \quad \text{if } I^{\mathrm{d}} > E_i. \tag{3}$$

The assumptions underlying (3) give rise to the equation estimated by JMW:

$$R = I(p, s, r^I) \quad \text{if } I^{\mathrm{d}} \leqslant E_i$$

and

$$R = E_i \quad \text{if } I^{\mathrm{d}} > E_i. \tag{4}$$

Their data provide explicit proxies for p and s. Country and industry control variables capture differences across firms in r^I. We follow the same strategy, except that we also include some firm-level proxies for r^I. The key insight is that the firm's decision to invest internally generated funds is made independently of its decision to borrow external funds. This allows JMW to estimate an equation for profit reinvestment independent of the demand for external finance.

As JMW note, there are at least three reasons that the investment of internal funds might depend on access to external funds. First, the pecking-order hypothesis might not hold if the government subsidizes loans so that $r^E < r^I$. Although JMW offer evidence that this is relevant only for loans to state enterprises in their sample, the same might not hold for China, where state banks continue to dominate the financial system and interest rates remain highly regulated.

Second, insecure property rights might compel owners to invest bank funds in their firms and divert internal profits to more secure investment opportunities. In this way, we would expect a negative relation between access to loans and reinvestment rates. While we find this somewhat unlikely given China's reasonably high scores on indicators of the security of property rights (see Table 1), our regressions will offer a test of whether it might be true.

Third, investment could be lumpy, in the sense that the scale of efficient investment is larger than retained earnings can support. Thus, firms need both internal and external funds to undertake investment, which implies a positive association between reinvestment rates and access to finance. For their sample, JMW point out that 35% of the firms without access to loans reinvested half or more of their profits, which suggests that lack of external finance did not impede internally financed investment. However, JMW deliberately sampled small firms, ranging in employees from seven to 270. The average firm in our sample has 133 employees, and more than 10 percent employ at least a thousand. Therefore, lumpy investment could lead to a positive relation between reinvestment and access to loans in our case.

3. Data

Our data come from a survey of firms for the period between 2000 and 2002, conducted in early 2003 by the World Bank (jointly with the Enterprise Survey Organization of China) on the investment climate in China. The survey enables us to study variation in firm-level financing decisions across a number of industries.

Firms were drawn from 18 cities that were selected to achieve balanced representation across five regions: (1) Northeast: Benxi, Changchun, Dalian, and Haerbin; (2) Coastal: Hangzhou, Jiangmen, Shenzhen, and Wenzhou; (3) Central: Changsha, Nanchang, Wuhan, and Zhenzhou; (4) Southwest: Chongqing, Guiyang, Kunming, and Nanning; (5) Northwest: Langzhou and Xi'an. The total sample is composed of 2,400 firms, 100 or 150 from each city (Fig. 1).

The questionnaire has two parts. Part one, based on interviews with the manager of a firm, contains questions on general information about the firm and the manager, innovation, market environment, relationships with clients and suppliers, location of

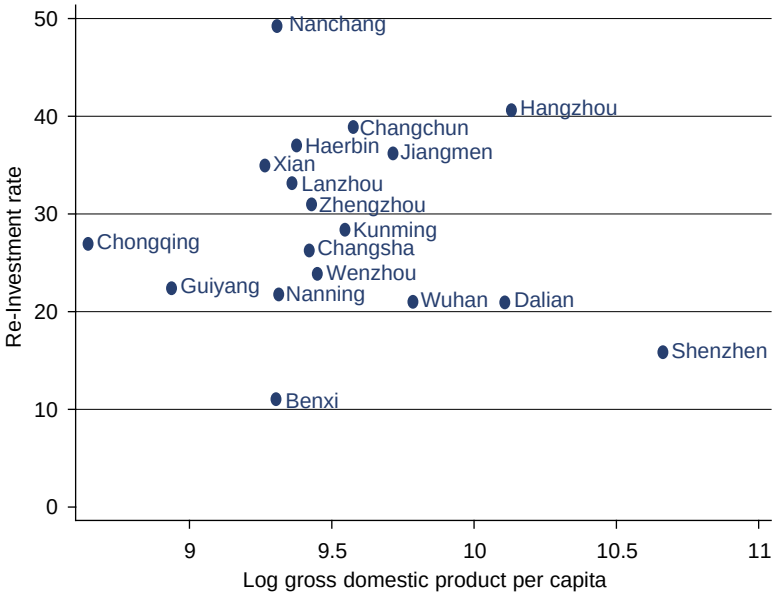

Fig. 1. Reinvestment rate and income level for the 18 cities.

manufacturing plant, relations with government, and international trade. Part two is based on interviews with the firm's accountant and personnel manager, who provided quantitative information on production, costs, employee training, schooling, and wages. While most of the qualitative questions pertained only to the year 2002, many quantitative questions also requested information for 2000–2002. Therefore, in the regressions the qualitative variables are time-invariant, while quantitative ones vary over 2000–2002.

Firms were sampled randomly subject to a few constraints. First, the survey sampled only the following industries: for manufacturing, apparel and leather goods, electronic equipment, electronic components, consumer products, and vehicles and vehicle parts; for services, accounting and related services, advertising and marketing, business logistics services, communication services, and information technology services.[3] Second, the size restriction of firms as measured by number of employees was prespecified.[4] Once these constraints were roughly satisfied, the surveyors randomly drew the required number of firms from an electronic list of firms in that city.

The data contain both private firms and state-owned enterprises. For comparability to JMW, we restrict our analysis to that of private firms, defined as those with private ownership of more than 50%. Besides the comparability reason, our

[3]In certain cities, a few additional industries were included because of the inability to sample a sufficient number of firms.

[4]For manufacturing (service) firms, the minimum number of employees is 20 (15). When there were not sufficient firms from a particular sector in a city, the size constraint was loosened.

narrower focus is also shaped by our concerns that the behavior of state and private firms differs greatly. For instance, access to bank loans by state enterprises could be much more reflective of a soft budget constraint than loans for private firms (Cull and Xu, 2000, 2003). Government officials could harass state enterprises in a different manner and amount relative to private firms, and the impact could differ.

For our purposes, the key survey questions deal with firm managers' perceptions about the security of property rights. Following Acemoglu and Johnson (2003), we separate the property rights variables into two groups: those that measure the risk of government expropriation and those that measure the ease and reliability of contract enforcement. We also designed our property rights questions to mimic those used by JMW. See the appendix for a comparison.

The first expropriation variable measures the extent to which the government acts as a helping instead of a grabbing hand. It is the manager's response to: "Among the government officials that your firm regularly interacts with, what is the share (0–100) of that interaction that is oriented toward helping rather than hindering firms?" The mean response is 35, with a standard deviation of 31. Therefore, substantial disagreement exists about the general tendency for government officials to help firms. The second expropriation variable is the manager's estimate of informal payments to government regulators divided by total sales. Most responses tended toward zero so that the mean is only 0.2%, but the standard deviation is 1.6 percentage points. To the extent that it measures the likelihood and severity of government expropriation and can thus be viewed as an additional tax (Bardhan, 1997), this variable should be negatively associated with profit reinvestment.

Three variables measure the ease and reliability of contract enforcement. The first is the manager's response to: "On a scale of 0–100%, what is the likelihood that the legal system will uphold your contract and property rights in business disputes?" Responses range from zero to 100, with a mean of 62, and a standard deviation of 39. A second variable is a dummy equal to one if a firm has signed a formal contract with a client. Because a firm would sign a contract only if it expected that it had some chance of being protected in case of dispute, we expect those that do so to have greater faith in the contract enforcement system. However, because 91% of firms report some formal contracting (see Table 2), this variable might not explain substantial variation in reinvestment rates. The third contract enforcement variable measures owners' perceptions of the ability of courts to resolve payment disputes. It is the actual percentage of disputes over payment that were resolved by court action (as reported by the manager). Its average value is 7%, with a standard deviation of 23%. As with the other two proxies for contract enforcement, we hypothesize that higher values are a reflection of greater faith in the enforcement of contracts and thus should be positively associated with reinvestment.

One might expect little variation in survey responses in a relatively authoritarian country such as China. However, the means and standard deviations reported in Table 2 indicate a large variation in the responses regarding property rights. Moreover, the sample statistics mask substantial variation across cities (see Table 3). In cities such as Changsha, Chongqing, Hangzhou, and Jiangmen, respondents indicate that roughly half of government officials' contact with firms was a help, not

Table 2
Summary statistics of main variables

Only firms with positive profits enter the reinvestment regressions and summary statistics. Firm-level observations are calculated by averaging each firm's responses from 2000 to 2002. Reinvestment is the firm manager's assessment of the percentage of profits that were reinvested in the firm in the last year. Percent private ownership is the percentage of total shares held by private interests. Dummy: access to bank loan equals one if the firm has at least one loan from a bank. Share of input purchased via trade credit is the percentage reported by the manager. Collateral as percent value of loan is the manager's assessment of the collateral required on a typical loan, expressed as a percentage of the loan's face value. Percent total sales spent on informal payments to government officials is also reported by the manager. Percent disputes resolved via court is the manager's assessment of the share of the firm's business disputes that are resolved in the courts. Dummy: sign formal contract equals one if the firm has signed at least one formal contract with a client. Likelihood of upholding contract is the manager's response to: "On a scale of 0–100, what is the likelihood that the legal system will uphold your contracts and property rights in business disputes?" Government officials help instead of hinder firms is the manager's response to: "Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?" Profit/sales is the ratio of current profits to current sales. Chief executive officer (CEO) schooling is the years of formal education for the current CEO. CEO tenure is the years that the current CEO has held that post in this firm. Dummy: deputy CEO equals one if the current CEO was the deputy CEO at that firm prior to becoming CEO. Dummy: government official equals one if the current CEO was a government official just prior to becoming CEO at that firm. Percent growth in employment is relative to employment one year prior. It is calculated from the yearly employment figures. Total factor productivity is calculated by estimating a fixed-effects output production function (that is regressing the constant value of output onto the constant value of capital stock, of material inputs, and labor), allowing for industry-specific coefficients for each variable including the constant. The residual including the fixed effect is the total factor productivity.

Variable	Number of firms	Mean	Standard deviation	Minimum	Maximum
Reinvestment	705	0.27	0.37	0.00	1.00
Percent private ownership	760	0.96	0.12	0.50	1.00
log(city population)	727	6.38	0.55	5.05	8.04
log(GDP per capita), in 2000 yuan	727	9.48	0.37	8.55	10.74
log(number of employees)	760	4.32	1.30	0.00	9.37
log(firm age)	760	1.82	0.76	0.00	3.96
Dummy: access to bank loan	760	0.28	0.35	0.00	1.00
Share of input purchased via trade credit	710	0.09	0.20	0.00	1.00
Collateral as percent value of loan	758	0.25	0.44	0.00	3.00
Percent total sales spent on informal payments to government officials	760	0.002	0.02	0.00	0.49
Percent disputes resolved via court	743	0.07	0.23	0.00	1.00
Dummy: sign formal contract	754	0.91	0.29	0.00	1.00
Likelihood of upholding contract	671	0.62	0.39	0.00	1.00
Government officials help instead of hinder firms	731	0.35	0.31	0.00	1.00
CEO schooling	758	14.35	2.75	0.00	18.00
CEO tenure	760	6.56	4.22	0.50	29.00
Dummy: deputy CEO before becoming CEO	755	0.36	0.48	0.00	1.00
Dummy: was a government official before becoming CEO	755	0.06	0.24	0.00	1.00
Total factor productivity	648	0.14	1.57	−3.18	4.73
Percent employment growth	725	0.16	0.30	−0.46	2.56
Profit/sales	759	0.07	0.11	0.00	1.53

Table 3
Property rights protection and contract enforcement across 18 cities

City	Risk of expropriation by government		Ease and reliability of contract enforcement		
	To what extent do government officials that you regularly have contact with help rather than hinder firms? (scaled 0–1)	Share of total sales spent on informal payments to government officials	What percentage of your business disputes have been resolved by court action?	Percent of firms that have signed at least one formal contract with a client	On a scale of 0–1, what is the likelihood that the legal system would uphold your contracts and property rights in business disputes?
Northeast					
Benxi	0.289	0.0002	0.069	0.706	0.679
Changchun	0.449	0.0001	0.036	0.967	0.691
Dalian	0.283	0.0001	0.001	0.939	0.554
Haerbin	0.398	0.0042	0.124	0.951	0.577
Coastal					
Hangzhou	0.574	0.0001	0.208	0.944	0.743
Jiangmen	0.449	0.0002	0.093	1.000	0.531
Shenzhen	0.346	0.0098	0.190	0.861	0.661
Wenzhou	0.202	0.0001	0.045	0.897	0.402
Central					
Changsha	0.455	0.0007	0.039	0.917	0.620
Nanchang	0.415	0.0004	0.097	0.985	0.815
Wuhan	0.343	0.0001	0.021	1.000	0.605
Zhengzhou	0.435	0.0001	0.049	0.731	0.825
Northwest					
Lanzhou	0.246	0.0002	0.051	0.884	0.511
Xian	0.212	0.0138	0.014	0.950	0.428
Southwest					
Chongqing	0.453	0.0043	0.123	0.917	0.883
Guiyang	0.222	0.0004	0.030	0.927	0.408
Kunming	0.325	0.0001	0.054	0.791	0.702
Nanning	0.279	0.0000	0.139	0.949	0.558

a hindrance, while for cities such as Guiyang, Wenzhou, and Xian, that figure was only about 20%. The percentage of sales used for informal payments to government officials shows similar variation, with respondents from cities such as Changsha, Dalian, Hangzhou, Jiangmen, Kunming, Nanning, Wenzhou, Wuhan, and Zhengzhou reporting almost no such payments, while those from Shenzhen and Xian reported that such payments composed roughly 1% of sales.

Substantial variation across cities also exists regarding the ease and reliability of contract enforcement. Managers of private firms from Hangzhou, for instance,

resolve 21% of their disputes via the court system, yet the percentage is only 0.1% for Dalian. The likelihood of upholding contract and property rights also varies across cities. Chongqing leads with an average response of 88%, which is more than twice the figure for the last-place city on this dimension, Wenzhou. Finally, the share of firms that have signed at least one formal contract with a client is 100% for Jiangmen and Wuhan, which is 40% higher than Benxi at 71%.

One might be concerned that the variation in survey responses is not an indication of true underlying variation in the security of property rights, but merely that survey respondents' perceptions differ. We argue that the responses reflect differences in the security of property rights for three reasons. First, the institutions associated with contract enforcement, in particular the legal system, vary in their effectiveness across regions in a country as vast as China. Second, a firm's relations with the state likely depend upon its size, the political importance of its sector, and, for firms with a high share of state ownership, the level of government responsible for its oversight. These differences are especially likely to affect the level of informal payments required by regulators. Third, respondents' knowledge about the security of property rights is dictated by the nature of their business, which varies across sectors. Those that engage in long-term contracts are likely keenly aware of the security of those agreements.

Firms also vary in their responses to financial questions (Table 2). With respect to external finance, 28% of our private firms have access to bank loans. In addition, the typical firm purchases 9% of its inputs with trade credit, although the standard deviation of that average is 20%, with some firms financing all input purchases in this manner. Firms also vary in the amount of collateral they are required to provide to secure loans. The average private firm posts 25 cents of collateral per dollar borrowed, but the standard deviation is 44 cents.

Table 4 indicates that access to finance also differs greatly across cities. For example, almost 58% of private firms in Wenzhou have access to loans, which is more than nine times higher than firms in Benxi. The difference in access to trade credit is also striking. Firms in Hangzhou buy 19% of their inputs via trade credit, seven times more than firms in Changsha. On average, firms in Chongqing provide 39 cents in collateral for every dollar that they borrow, while in Lanzhou they provide only five. In short, our sample contains rich variation in both perceptions about the security of property rights and access to finance, and that variation appears to have a strong city-specific component to it.

Our sample has at least two other notable features. First, the average ratio of profits to sales for our private firms is 7.5%, which is lower than the averages for the private firms in most of the JMW sample: 21% for firms in Russia, 18% in Ukraine, 13% in Romania, 10% in Poland, and 6% in Slovakia. This feature of our sample is relevant because, lacking internal funds, firms in more competitive industries might have greater need of external funds to finance investment.

Second, the correlations between our property rights variables and financial variables tend to be low (Table 5). As JMW note, high correlations could be a sign that measures of insecure property rights are proxying for a lack of access to finance. The correlations between access to bank loans (the key financial variable in our

Table 4
Access to finance across 18 cities

Share of firms with access to loans is the city-level average of a dummy variable that equals one if the firm has at least one loan from a bank. Share of input purchased via trade credit is the percentage reported by the manager. Collateral as percent value of loan amount is the manager's assessment of the collateral required on a typical loan, expressed as a percentage of the loan's face value.

City	Share of firms with access to loans	Share of input purchased via trade credit	Collateral as percent value of loan
Northeast			
Benxi	0.057	0.045	0.168
Changchun	0.172	0.146	0.275
Dalian	0.143	0.109	0.289
Haerbin	0.157	0.039	0.244
Coastal			
Hangzhou	0.486	0.188	0.376
Jiangmen	0.325	0.131	0.081
Shenzhen	0.139	0.088	0.158
Wenzhou	0.580	0.069	0.265
Central			
Changsha	0.364	0.026	0.240
Nanchang	0.323	0.042	0.369
Wuhan	0.152	0.030	0.250
Zhengzhou	0.203	0.108	0.194
Northwest			
Lanzhou	0.136	0.094	0.048
Xian	0.339	0.134	0.326
Southwest			
Chongqing	0.348	0.179	0.388
Guiyang	0.450	0.033	0.320
Kunming	0.338	0.032	0.391
Nanning	0.124	0.120	0.223

analysis) and the expropriation risk variables are insignificant. The correlation between the access to bank finance and the two contracting variables (the percentage of disputes resolved via courts and the dummy for the existence of a formal contract with a client) are either insignificant or significant but small in magnitude. The pattern of correlations is similar to that found in the JMW sample. This suggests that the property rights and financial variables capture different sources of variation, and thus including both in profit reinvestment regressions is reasonable.

4. Hypotheses

We test whether access to external finance or property rights better explains firms' investment decisions. We control also for firm characteristics, ownership structure,

Table 5
The correlation coefficients for key variables

Percent disputes resolved via court is the manager's assessment of the share of the firm's business disputes that are resolved in the courts. Dummy: sign formal contract equals one if the firm has signed at least one formal contract with a client. Likelihood of upholding contract is the manager's response to: "On a scale of 0–100, what is the likelihood that the legal system will uphold your contracts and property rights in business disputes?" Government officials help instead of hinder firms is the manager's response to: "Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?" Percent total sales spent on informal payments to government officials is reported by the manager. Dummy: access to bank loan equals one if the firm has at least one loan from a bank. Share of input purchased via trade credit is the percentage reported by the manager. Collateral as percent value of loan is the manager's assessment of the collateral required on a typical loan, expressed as a percentage of the loan's face value.

Variable	Percent disputes resolved via the court	Dummy: sign formal contract	Likelihood of upholding contract	Government officials help firms	Percent sales on informal payments to government officials	Dummy: access to bank loans	Percent inputs purchased via trade credit
Contract enforcement							
Dummy: sign formal contract							
Correlation coefficient	0.026						
p-value for the null that the correlation is zero	0.486						
Number of observations	737						
Likelihood of upholding contract							
Correlation coefficient	0.039	0.025					
p-value for the null that the correlation is zero	0.314	0.517					
Number of observations	659	665					
Risk of expropriation							
Government officials help rather than hinder firms							

Correlation coefficient	−0.049	0.041	0.320				
p-value for the null that the correlation is zero	0.190	0.266	0.000				
Number of observations	716	725	662				
Percent total sales spent on informal payments to government officials							
Correlation coefficient	0.012	0.022	0.032	0.049			
p-value for the null that the correlation is zero	0.737	0.532	0.408	0.182			
Number of observations	743	743	671	731			
Financial							
Dummy: access to bank loan							
Correlation coefficient	0.092	0.048	−0.051	0.025	0.044		
p-value for the null that the correlation is zero	0.011	0.186	0.184	0.499	0.230		
Number of observations	743	754	671	731	760		
Share of input purchased via trade credit							
Correlation coefficient	0.019	−0.009	0.015	0.034	−0.016	0.068	
p-value for the null that the correlation is zero	0.616	0.798	0.698	0.364	0.662	0.067	
Number of observations	695	706	637	686	710	710	
Collateral as percent value of loan							
Correlation coefficient	0.069	0.018	0.071	0.067	−0.008	0.388	0.022
p-value for the null that the correlation is zero	0.056	0.619	0.065	0.068	0.821	0.000	0.546
Number of observations	742	752	669	729	758	758	709

and industry affiliation using the following reduced form equation

$$\begin{aligned} REINVESTMENT_{it} = \alpha + \beta_1' FIRM_{it} + \beta_2' CITY_{it} + \beta_3 PRIVATE_i \\ + \beta_4' EXPROPRIATION_i + \beta_5' CONTRACT_i \\ + \beta_6 BANK_{it-1} + \beta_7' FINANCIAL_i + \varepsilon_{it}. \end{aligned} \quad (5)$$

For firm i in year t, *REINVESTMENT* is its profit reinvestment rate as reported by the firm manager. *FIRM* is a vector of control variables, composed of the log of the number of employees and the log of firm age. Large firms, those with more employees, are likely to have different investment needs than smaller ones, and size therefore should be controlled for. Older firms are likely to require less investment, because any investments to exploit scale economies were likely to have occurred in the past, and upgrading their dated technology is more difficult and thus less likely. Additional control variables are subsumed within *CITY*, a vector that includes the log of the level of city GDP per capita (measured in 2000 yuan) and the log of city population.

The variables of interest are those related to property rights and access to finance. Our variables capture two separate aspects of property rights. The first, expropriation risk (denoted by the vector *EXPROPRIATION*), is captured by the two variables described in Section 3, informal payments to government officials as a share of total sales and the manager's assessment of whether government officials tend to be a help or a hindrance in their regular interactions with firms. In the profit reinvestment regressions, we expect the share of informal payments to have a negative sign, while the manager's assessment of government officials' helpfulness should have a positive one.

Our proxies for contract enforcement are the three variables described in previous Section 3 (denoted *CONTRACT*): the firm manager's belief that the legal system will uphold his property rights in a dispute (scaled from 0 to 100), the percentage of commercial disputes the firm resolves via the courts, and a dummy variable indicating whether the firm has signed at least one formal contract with a client. For the reasons laid out in Section 2, we expect that reinvestment is positively associated with the contract enforcement variables.

We also argue that ownership structure is itself a measure of the security of property rights. Direct state ownership is often associated with the pursuit of political objectives at the expense of other stakeholders in the firm. The control rights of the manager and other owners are often weakened to achieve social objectives or to provide private benefits to politicians and bureaucrats. (See Shleifer (1998) and Megginson and Netter (2001) for excellent summaries of theories and evidence on the impact of ownership structure on performance.) A higher share of private ownership implies that the owner or manager of a firm can have greater confidence in being shielded from government interference, and therefore a higher expected return on investment. We thus expect a positive relationship between private ownership and reinvestment rates. In Eq. (5), the percentage of private ownership is denoted as *PRIVATE*.

We include separate variables for access to bank loans and additional aspects of access to external finance. The key variable is *BANK*, a dummy equal to one if the

firm has access to loans from domestic banks, which are almost all state-owned in China. (See Lardy (1998) and Cull and Xu (2000, 2003) for a breakdown of the assets of the Chinese banking sector by type of ownership.) If investment is lumpy as described in Section 2 or the pecking order hypothesis regarding the relative price of internal and external funds does not hold, access to bank loans could be positively associated with reinvestment. If neither of those hypotheses is true, we expect *BANK* to be insignificant. Because current access to bank loans and reinvestment could both be determined by investment demand, we follow JMW and control for past access to bank loans, in particular whether the firm had access to bank loans in the previous three years.

FINANCE is a vector containing two variables, one that measures access to alternative sources of external finance, another measuring the terms on which bank loans are secured by the firm. The first is the percentage of inputs bought with trade credit. Some observers of the Chinese economy suggest that trade credit is an indirect means of channeling bank loans to profitable firms. State-owned enterprises obtain loans from state banks, then relend them to their trading partners that lack access to funds. If the relending hypothesis is correct, the trade credit variable provides an indication of trading partners' willingness to supply funds to the firm. As with *BANK*, the sign on trade credit depends on whether that source of funds is a substitute or a complement for internal funds.

As an indication of banks' willingness to lend to a firm, we include the manager's estimate of the collateral required on a typical loan, expressed as a percentage of its face value. Higher collateral requirements indicate that banks are less willing to supply funds, thus making it more difficult to finance investment through bank loans. Because this could necessitate greater reliance on internal funds to finance investment, we expect that the collateral variable could be positively associated with the rate of profit reinvestment. Ideally we would like to include financial variables in our reinvestment regressions that are correlated with access to external funds but that are uncorrelated, or weakly correlated, with investment demand. Because the trade credit and the collateral variables capture the willingness to supply funds to the firm, these seem like good candidates. The bank loan dummy variable is more susceptible to criticism on these grounds, but we offer a series of robustness checks to address this potential problem.

We also experimented with variables such as the percentage of loans in foreign currency, a dummy variable indicating whether the firm has an overdraft facility (which can serve as a sort of line of credit), and the number of banks that have extended loans to the firm. None of these was significant in the reinvestment regressions, and thus we drop them from the results that follow.

5. Base results

Table 6 presents the basic results. Again, the sample for the reinvestment equations includes only those private firms with positive profits. Because we have multiple observations from each firm, our panel regressions on the left hand side of

Table 6 allow for clustering at the firm level to obtain correct standard errors. On the right-hand side of Table 6, we offer collapsed cross-sectional regressions in which a firm's average value for each variable enters the regression. Thus, there is one observation per firm in the cross-sectional regressions. The shortcoming of using the collapsed version is that we sacrifice some time-variant information.

Although the correlations in Table 5 indicate that mulitcollinearity between the property rights and financial variables is not a major problem, we present regressions in which each group of variables enters separately to demonstrate that our main results are robust to alternative specifications.[5] Because the share of private ownership is conventionally controlled for in these types of regressions and is less subject to multicollinearity problems, it is included in all specifications. However, our main results hold whether or not that variable is included.

Our results for property rights and profit reinvestment corroborate those in JMW. Given China's stage of development, this might come as a surprise to some. It also suggests that China's development pattern is not inherently different from other transition economies, at least not in every respect. As in JMW, the variables related to contract enforcement are typically of the hypothesized signs and often significantly associated with reinvestment. The proxy for reliance on courts is positive and significant. A one standard deviation increase on that measure (0.24) is associated with a 4 percentage point increase in the rate of profit reinvestment. This is large considering that the average reinvestment rate is 27%.

The effects of signing a formal contract with a client appear to be even larger. Those firms that did so had reinvestment rates 8–13 percentage points higher than those that did not. The significance of that result is slightly stronger in the clustered regressions than in the cross-sectional regressions. Finally, owners who express greater faith that their rights would be protected by the legal system also reinvest more than others, although the coefficient is small and insignificant.

The variables related to risk of government expropriation are also of the hypothesized signs, although the manager's assessment of the helpfulness of government officials is significant while the share of sales devoted to informal payments is not. A one standard deviation increase in government helpfulness (31 percentage points) is associated with a 3 percentage point increase in the rate of profit reinvestment. Although the payments variable is insignificant in the base results, it achieves significance in some of the robustness checks that follow. However, its magnitude is relatively small. A one standard deviation on that measure implies an increase in reinvestment of less than half a percentage point. In short, proxies for both the risk of expropriation and the ease and reliability of contract

[5]We also ran regressions that we do not report in which the property rights variables enter the regression one at a time. Qualitative results are similar to those in Table 6, except that the manager's perception of whether contracts and property rights would be upheld is significant.

enforcement are significant predictors of reinvestment rates, and some appear to be economically important.

Ownership structure also appears to have a strong effect on profit reinvestment. The share of private ownership, which we argue is a fundamental reflection of the security of property rights, is positive and significant, and its magnitude indicates that it is economically important. A one standard deviation increase in private ownership (0.12) for private firms is associated with an increase in the reinvestment rate by 2.4–3.6 percentage points, depending on the specification. Clearly the implied magnitude would be much larger if we use the standard deviation of the sample of both private and state firms.

Unlike JMW, we find that access to bank loans is positively and often significantly associated with the rate of profit reinvestment in both the clustered and cross-sectional regressions. Those firms with a loan had reinvestment rates 4–10 percentage points higher than those that did not. The result is consistent with the conjecture that as transition progresses and competition increases, the complexity of transactions also increases. Supporting institutions, including financial ones, become increasingly important for firm growth. Interpreting the bank loan coefficient and assessing its validity are one focus of our robustness checks. This result appears to undercut the pecking-order hypothesis described in Section 2, either because the price of internal funds is not lower than that of external funds or perhaps because investment is lumpy and requires both internal and external funds to be undertaken. The collateral variable is positive and generally significant, suggesting that firms that are required to post more collateral are more reliant on internal funds for investment. The trade credit variable is also positive, but generally statistically insignificant. The positive sign for trade credit indicates perhaps that type of finance is a complement to internal funds, but the large standard error warns against a strong conclusion. None of the city-level or firm-level controls is significant across multiple specifications. Most are never significant. However, some weak indications are that the reinvestment rate is higher in larger and younger firms.

6. Robustness checks

To test the robustness of our base results, we re-run our regressions on sub-samples of our firms based on size. We also perform median regressions to confront outliers, control for characteristics of CEOs in our base regressions, and offer additional tests of whether bank loans are being directed to better performing firms.

6.1. JMW equivalent sample

Although our results are substantially similar to those for the transition economies studied by JMW, some differences exist, and these might be attributable to the nature of our respective samples. Our sample contains firms that are notably larger

Table 6
Determinants of reinvestment

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% percent level respectively. All models estimated via ordinary least squares. Standard errors in full sample models (1–5) allow for clustering at the firm level. Collapsed sample models (6–10) allow one observation per firm. For a firm with multiple observations, its average value for each variable enters the regressions. Percent private ownership is the percentage of total shares held by private interests. Dummy: access to bank loan equals one if the firm has at least one loan from a bank. Share of input purchased via trade credit is the percentage reported by the manager. Collateral as percent value of loan is the manager's assessment of the collateral required on a typical loan, expressed as a percentage of the loan's face value. Percent total sales spent on informal payments to government officials is also reported by the manager. Government officials help instead of hinder firms is the manager's response to: "Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?" Percent disputes resolved via court is the manager's assessment of the share of the firm's business disputes that are resolved in the courts. Dummy: sign formal contract equals one if the firm has signed at least one formal contract with a client. Likelihood of upholding contract is the manager's response to: "On a scale of 0–100, what is the likelihood that the legal system will uphold your contracts and property rights in business disputes?" GDP is gross domestic product.

Variables	Full sample: standard errors clustered at firm level					Collapsed sample: one observation per firm				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Percent private ownership	0.238	0.185	0.291	0.272	0.300	0.283	0.214	0.311	0.294	0.319
	(0.112)**	(0.114)	(0.122)**	(0.123)**	(0.122)**	(0.120)**	(0.123)*	(0.133)**	(0.138)**	(0.139)**
Financial										
Dummy: access to bank loan	0.039		0.046		0.047	0.046		0.083		0.099
	(0.024)		(0.026)*		(0.027)*	(0.043)		(0.049)*		(0.051)*
Share inputs purchased via trade credit	0.111		0.051		0.077	0.122		0.036		0.083
	(0.077)		(0.086)		(0.089)	(0.073)*		(0.081)		(0.084)
Collateral as percent value of loan	0.092		0.074		0.081	0.100		0.054		0.065
	(0.034)***		(0.036)**		(0.038)**	(0.034)***		(0.037)		(0.039)*
Property rights government expropriation										
Percent sales spent on informal payments		−0.142		−0.095	−0.086		−0.242		−0.087	−0.093
		(0.503)		(0.402)	(0.431)		(0.657)		(0.660)	(0.673)

Government officials help instead of hinder firms		0.106		0.095	0.110		0.116		0.113	0.126
		(0.052)**		(0.056)*	(0.058)*		(0.050)**		(0.054)**	(0.055)**
Contract enforcement										
Percent disputes resolved via courts		0.171		0.156	0.159		0.152		0.142	0.144
		(0.073)**		(0.078)**	(0.082)*		(0.065)**		(0.078)*	(0.079)*
Dummy: sign formal contract		0.102		0.121	0.126		0.079		0.097	0.099
		(0.044)**		(0.050)**	(0.050)**		(0.052)		(0.057)*	(0.058)*
Likelihood of upholding contract		0.014		0.022	0.022		0.017		0.019	0.024
		(0.040)		(0.044)	(0.045)		(0.039)		(0.043)	(0.044)
Other controls			0.004	0.018	−0.002			0.015	0.026	0.004
log(city population)			0.004	0.018	−0.002			0.015	0.026	0.004
			(0.034)	(0.034)	(0.036)			(0.035)	(0.035)	(0.036)
log(gdp per capita), in 2000 yuan			0.009	0.014	0.015			0.014	0.021	0.021
			(0.047)	(0.048)	(0.050)			(0.047)	(0.051)	(0.052)
log(number of employees)			0.026	0.020	0.008			0.022	0.020	0.004
			(0.014)*	(0.014)	(0.015)			(0.015)	(0.015)	(0.016)
log(firm age)			−0.041	−0.031	−0.029			−0.036	−0.029	−0.024
			(0.023)*	(0.024)	(0.024)			(0.023)	(0.023)	(0.024)
Number of observations	2,072	1,913	1,493	1,359	1,312	660	608	590	537	514
R^2	0.03	0.03	0.05	0.08	0.09	0.03	0.03	0.06	0.08	0.10

than those sampled by JMW, and somewhat less profitable. In columns 1 and 2 of Table 7, we present results for Chinese firms with 270 or fewer employees, which was the maximum value in the JMW sample. This reduces the number of active observations by about one-fifth, but the results are similar to the base results. There are two exceptions.

First, the informal payments variable is now significant in the clustered regressions, although it continues to be insignificant in the cross-sectional regression. The magnitudes across the two specifications are similar, implying a decrease in the reinvestment rate by roughly 1 percentage point with a one standard deviation increase in informal payment. Second, access to bank loans is now no longer statistically significant. This is especially interesting because the result is the same as in the JMW paper. Thus part of the reason for our earlier discovery of a significant effect of the banking variable could be attributable to the differences in samples with JMW.

6.2. Outliers

The summary statistics in Table 2 make clear that extreme observations are possible for a number of our variables. To test whether those observations are driving our results, we run median regressions, which tends to decrease the influence of extreme observations relative to ordinary least squares. Our results (columns 3 and 4) become somewhat stronger, with the same qualitative conclusions. The finance variables, for instance, are all significant now. These results suggest that outliers have a dampening effect on our base results.

6.3. Firm size: split-sample tests

To test whether the relations between property rights, access to finance, and investment are different for firms of different sizes, we split the sample in half based on the number of employees (columns 5–8, Table 7). Small firms, those below the sample median in employees, appear to be more fearful of expropriation than large firms. Unlike in the base results, the informal payments variable is significant at the 1% level in the clustered regression (column 7). For small firms, the government helpfulness measure increases in significance to the 5% level in the cross-sectional regression. By contrast, neither of the expropriation proxies is significant for large firms in either the clustered or the cross-sectional regression.

Regarding contract enforcement, the percentage of disputes resolved via courts is positive and significant for large firms in the pooled regressions, but not small ones. This suggests, perhaps, that firms need to be of a certain size to make use of the formal judicial system. The dummy for a formal contract is significant only for small firms. This could be because nearly all large firms have signed at least one contract, and thus that variable cannot explain variation in their reinvestment rates. Moreover, access to bank loans is significant only for small firms. This could be because large firms have access to alternative sources of finance and are therefore less

reliant on bank loans. Both types of firms might face lumpy investment opportunities, but only the small ones are absolutely dependent on some bank finance to undertake projects. Finally, the collateral variable is significant only for small firms. This is another indication that small firms are more subject to financial constraints. Taken together, these results suggest that the profit reinvestment decisions of small firms are more sensitive to potential expropriation and access to external funds than those of larger firms.

6.4. CEO characteristics

JMW offer robustness checks that control for entrepreneur characteristics, to confront the possibility that higher reinvestment rates and more secure property rights both reflect the optimism of the responding manager. We do the same using four variables that summarize the experience of each firm's chief executive officer (CEO): his years of schooling, tenure with the firm as CEO, and dummies to indicate whether he was the firm's deputy CEO prior to becoming CEO and whether he was a government official prior to becoming CEO. None of those variables is significant when added to our base specification. The qualitative results for the property rights variables and access to bank loans are the same as in the base results (see columns 9 and 10, Table 7).

6.5. Determinants of access to loans

We find that access to bank loans by private firms was positively and significantly related to reinvestment rates and suggest that this finding is consistent with the notion that improvement in market-supporting (financial) institutions might be important as transition drags along. Yet the conclusion rests on an important premise: The Chinese banking sector has to perform reasonably well for private firms before the importance of the financial sector can be highlighted as a market-supporting institution.

We now provide evidence that the Chinese banking sector is working reasonably well for the private firms. Table 8 offers models of the determinants of access to bank loans. In column 1, we include three measures of firm performance (total factor productivity; employment growth; and profitability, i.e., the ratio of profit to sales) and the control variables from the reinvestment specifications. All three measures of firm performance are positively associated with access to bank loans and the productivity and employment variables are significant at the 10% and 1% level, respectively. Thus the Chinese banks tend to allocate funds to firms with better performance.

This is not to say that all lending by China's state banks to private firms is based solely on economic criteria. When we regress access to bank loans on the property rights variables (column 2), both informal payments and government helpfulness are positive and significant, suggesting perhaps that firms with close relationships with the government also are more likely to receive loans from state

Table 7
Determinants of reinvestment, robustness checks

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level, respectively. All models estimated via ordinary least squares, except for models 3 and 4, which are estimated via median regressions. Standard errors in clustered models (1, 3, 5, 7, 9) allow for clustering at the firm level. Collapsed sample models (2, 4, 6, 8, 10) allow one observation per firm. For a firm with multiple observations, its average value for each variable enters the regressions. Control variables include log(city population), log(gdp per capita), log(number of employees), and log(firm age). GDP is gross domestic product. Percent private ownership is the percentage of total shares held by private interests. Dummy: access to bank loan equals one if the firm has at least one loan from a bank. Share of input purchased via trade credit is the percentage reported by the manager. Collateral as percent value of loan is the manager's assessment of the collateral required on a typical loan, expressed as a percentage of the loan's face value. Percent total sales spent on informal payments to government officials is also reported by the manager. Government officials help instead of hinder firms is the manager's response to: "Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?" Percent disputes resolved via court is the manager's assessment of the share of the firm's business disputes that are resolved in the courts. Dummy: sign formal contract equals one if the firm has signed at least one formal contract with a client. Likelihood of upholding contract is the manager's response to: "On a scale of 0–100, what is the likelihood that the legal system will uphold your contracts and property rights in business disputes?" In models 9 and 10, four variables are included to describe chief executive officer (CEO) characteristics: CEO schooling, CEO tenure, a deputy CEO dummy variable, and a former government official dummy variable. CEO schooling is the years of formal education for the current CEO. CEO tenure is the years that the current CEO has held that post in this firm. Dummy: deputy CEO equals one if the current CEO was the deputy CEO at that firm prior to becoming CEO. Dummy: government official equals one if the current CEO was a government official just prior to becoming CEO at that firm. JMW is Johnson et al. (2002).

Variable	JMW sample		Median regressions		Large firms		Small firms		Include CEO characteristics	
	Clustered (1)	Collapsed (2)	Clustered (3)	Collapsed (4)	Clustered (5)	Collapsed (6)	Clustered (7)	Collapsed (8)	Clustered (9)	Collapsed (10)
Percent private ownership	0.432 (0.145)***	0.467 (0.190)**	0.184 (0.031)***	0.207 (0.100)**	0.280 (0.146)*	0.364 (0.167)**	0.415 (0.195)**	0.303 (0.304)	0.243 (0.126)*	0.278 (0.143)*
Financial										
Dummy: access to bank loan	0.028 (0.033)	0.094 (0.057)	0.036 (0.008)***	0.075 (0.036)**	0.034 (0.034)	0.024 (0.071)	0.050 (0.043)	0.148 (0.078)*	0.048 (0.027)*	0.104 (0.051)**
Share inputs purchased via trade credit	0.051 (0.113)	0.051 (0.104)	0.114 (0.019)***	0.106 (0.058)*	0.006 (0.099)	0.093 (0.105)	0.226 (0.164)	0.111 (0.151)	0.080 (0.089)	0.086 (0.084)

Collateral as percent value of loan	0.121	0.091	0.146	0.105	0.040	0.034	0.121	0.133	0.080	0.064
	(0.042)***	(0.045)**	(0.009)***	(0.028)***	(0.047)	(0.049)	(0.063)*	(0.073)*	(0.038)**	(0.039)
Property rights										
Government expropriation										
Percent sales spent on informal	−0.424	−0.450	−0.155	−0.202	3.018	2.958	−0.541	−0.585	−0.096	−0.137
payments to govt. officials	(0.135)***	(0.722)	(0.119)	(0.229)	(1.830)	(1.921)	(0.155)***	(0.732)	(0.409)	(0.674)
Government officials help instead	0.101	0.126	0.165	0.142	0.087	0.089	0.146	0.179	0.131	0.148
of hinder firms	(0.066)	(0.062)**	(0.012)***	(0.040)***	(0.075)	(0.079)	(0.087)*	(0.082)**	(0.058)**	(0.056)***
Ease of contract enforcement										
Percent disputes resolved via courts	0.227	0.194	0.255	0.218	0.166	0.130	0.093	0.170	0.158	0.144
	(0.121)*	(0.101)*	(0.018)***	(0.056)***	(0.098)*	(0.093)	(0.152)	(0.173)	(0.081)*	(0.079)*
Dummy: sign formal contract	0.165	0.136	0.055	0.032	0.115	0.121	0.161	0.116	0.112	0.090
	(0.057)***	(0.064)**	(0.013)***	(0.041)	(0.086)	(0.099)	(0.059)***	(0.076)	(0.051)**	(0.058)
Likelihood of upholding contract	0.038	0.042	0.014	0.025	0.030	0.050	0.010	0.005	0.014	0.019
	(0.050)	(0.049)	(0.010)	(0.031)	(0.063)	(0.066)	(0.063)	(0.062)	(0.045)	(0.044)
Control variables included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO characteristics included?	No	No	No	No	No	No	No	No	Yes	Yes
Number of observations	1020	414	1312	514	656	262	656	252	1297	509
R^2	0.11	0.12			0.12	0.12	0.14	0.15	0.11	0.11

Table 8
Determinants of access to bank loans

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level, respectively. All models estimated via ordinary least squares. The dependent variable is the three-year average of the dummy variable that is equal to one if the firm has at least one loan from a bank in the previous three years. Percent growth in employment is relative to the employment one year prior. It is calculated from the yearly employment figures. Total factor productivity is calculated by estimating a fixed-effect output production function (that is, regressing the constant value of output onto the constant value of capital stock, of material inputs, and labor), allowing for industry-specific coefficients for each variable including the constant. The residual including the fixed effect is the total factor productivity. Profit/sales is the ratio of profits over sales. Percent total sales spent on informal payments to government officials are reported by the manager. Government officials help instead of hinder firms is the manager's response to: "Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?" Percent disputes resolved via court is the manager's assessment of the share of the firm's business disputes that are resolved in the courts. Dummy: sign formal contract equals one if the firm has signed at least one formal contract with a client. Likelihood of upholding contract is the manager's response to: "On a scale of 0–100, what is the likelihood that the legal system will uphold your contracts and property rights in business disputes?" GDP is gross domestic product.

Variable	(1)	(2)	(3)
Performance			
Total factor productivity	0.028		0.037
	(0.014)*		(0.015)**
Percent growth in employment	0.161		0.159
	(0.062)***		(0.065)**
Profits/sales	0.043		0.067
	(0.185)		(0.196)
Control			
log(city population)	−0.099	−0.046	−0.056
	(0.042)**	(0.044)	(0.045)
log(gdp per capita), in 2000 yuan	−0.154	−0.079	−0.084
	(0.057)***	(0.063)	(0.064)
log(number of employees)	0.108	0.119	0.108
	(0.017)***	(0.018)***	(0.019)***
log(firm age)	−0.022	−0.044	−0.030
	(0.027)	(0.028)	(0.029)
Property rights			
Government expropriation			
Percent sales spent on informal payments		1.124	1.170
to government officials		(0.294)***	(0.237)***
Government officials help instead of		0.109	0.116
hinder firms		(0.065)*	(0.066)*
Ease of contract enforcement			
Percent disputes resolved via courts		−0.054	−0.066
		(0.092)	(0.093)
Dummy: sign formal contract		0.104	0.073
		(0.068)	(0.069)
Likelihood of upholding contract		−0.196	−0.193
		(0.052)***	(0.054)***
Number of observations	646	566	547
R^2	0.16	0.17	0.19

banks.[6] However, the firm performance variables remain significant when property rights variables are included in the specification (column 3). Because the property rights variables are already included in the reinvestment specifications, the bank loans variable could be capturing lending based on legitimate economic criteria.

7. Conclusions

Our evidence from Chinese firms confirms that secure property rights are a key determinant of profit reinvestment, thus complementing results from European transition countries. Our results further indicate that both the risk of government expropriation and the ease and reliability of contract enforcement affect firms' profit reinvestment decisions. This stands in contrast to cross-country results indicating that risk of expropriation is the more important of these two aspects of property rights in explaining growth. Our speculation is that our regressions are highlighting Chinese firms' adaptation to an imperfect and evolving system of contract enforcement. The cross-country evidence likely summarizes periods long enough to have permitted economic actors to create contracts that compensate for weaknesses in institutions.

In contrast to evidence from other transition countries, profit reinvestment by the firms in our sample is positively associated with access to bank loans. This could be because investment is lumpy in the sense that both internal and external funds are required to undertake investment projects, and because the price of external funds does not always exceed that of internal funds given China's extensive regulation of interest rates. More generally, the result is consistent with the conjecture that, as transition progresses and competition increases, the complexity of transactions also increases. Supporting institutions, including financial ones, become increasingly important for firm growth. Although Chinese banks are rife with incentive problems, especially in their lending to state-owned enterprises, robustness checks indicate that the better performing private firms are more likely to receive loans. This suggests that the loans are supporting valid investment. In addition, access to bank loans appears to affect the reinvestment patterns of small firms more than it does large ones, as do fears of government expropriation. This could be because larger, better established firms have access to more sources of external funds and are better able to protect themselves from expropriation.

Finally, we also find that the share of private ownership has a positive effect on profit reinvestment rates. At this stage of China's transition, expropriation risk, contract enforcement, access to finance, and ownership structure all appear to matter for the investment decisions of firms.

[6]Another hypothesis offered by JMW is that less secure property rights encourage entrepreneurs to invest more from bank funds instead of their own profits. They reject that hypothesis because they find no significant link between their index of the insecurity of property rights and the use of bank loans. In our case, the positive sign on the government helpfulness variable would seem to invalidate the hypothesis.

Appendix

	Comparison between Johnson, McMillan, Woodruff (JMW, 2002) and Chinese survey questions	
	JMW transition countries	China
Expropriation by government	1. Do firms in your industry make extralegal payments for government services? 2. Do firms in your industry make extralegal payments for licenses? 3. Do firms in your industry make payments for protection? 4. Do firms in your industry make unofficial payments for ongoing registration? 5. Do firms in your industry make unofficial payments for fire/sanitary inspection? 6. Do firms in your industry make unofficial payments for tax inspection?	1. What percentage of total sales is spent on informal payments to government officials in any of the following agencies: tax, labor and social security, fire and construction safety, health and infectious disease control, police station, environmental agency, and the standards bureau? 2. Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?
Contract enforcement	1. Can firms in your industry use courts to enforce an agreement with a customer or supplier?	1. On a scale of 0–100, what is the likelihood that the legal system will uphold your contracts and property rights in business disputes? 2. Has your firm signed at least one formal contract with a client? 3. What is the actual percentage of business disputes that were resolved by court action?

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