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Informal or formal financing? Or both? First evidence on the co-funding of Chinese firms

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Abstract

The recent financial crisis has reopened the debate on the impact of informal and formal finance on firm growth in developing countries. Using unique survey data, we find that informal finance is associated with higher sales growth for small firms and lower sales growth for large firms. We identify a complementary effect between informal and formal finance for the sales growth of small firms, but not for large firms. Informal finance offers informational and monitoring advantages, while formal finance offers relatively inexpensive funds. Co-funding, i.e. the simultaneous use of formal and informal finance, is the optimal choice for small firms.

Key words: informal finance, formal finance, co-funding, growth
JEL Codes: G21, G32, P2

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1 Introduction

The financial crisis has tightened credit constraints for small and medium-sized enterprises (SMEs) around the world, particularly in emerging economies. This has turned the attention of policy makers and academics to the role played by informal finance.[1] Government policies in emerging economies often aim at replacing modes of informal finance with easier-to-regulate formal finance, even if informal financing continues to be an essential source of credit for the private sector (Besley and Levenson, 1996; Kan, 2000).

Both informal and formal finance have their strengths and weaknesses, implying that a borrower may benefit by *simultaneously* engaging informal and formal financiers. Informal finance relies on relationships and reputation implying that information asymmetries between informal lenders and their borrowers are less acute, the loan application procedure lighter, and the collateral requirement easier to fulfill. Furthermore, informal financiers are often better positioned to efficiently monitor and enforce repayment when legal enforcement is difficult and time-consuming as in the case of China's fast-moving economy (Allen and Qian, 2010).

Formal finance, in contrast, may provide a cheap source of financing in emerging economies. Unlike informal financiers, large commercial banks, for example, have a widespread geographic footprint, face fewer restrictions in attracting deposits, and benefit from the protections of deposit insurance. Large banks, however, may have little incentive to lend to small firms. Unlike informal lenders, they lack mechanisms for collecting the required soft information about small firms.[2]

The informational advantage of informal finance is not necessarily good news for small firms. The informal lender can mine this advantage for rent extraction. Poor busi-

[1] Informal finance is borrowing that occurs outside the formal financial sector. It includes loans from family members, friends, Rotating Savings and Credit Associations (ROSCAs), suppliers, moneylenders ("loan sharks"), and informal banks. Formal finance is borrowing from financial institutions such as banks and credit unions, and other non-financial institutions subject to state supervision and regulation. Our main analysis does not include trade credit granted by suppliers to buyers as a type of informal finance, but our results are robust to their inclusion. Cull and Xu (2005) treat trade credit as a complement to internal finance. This is somewhat different from the discussion at hand, which considers informal finance as a complement to formal finance.

[2] Different types of banks have heterogeneous expertise in dealing with small firms. Generally speaking, community banks (small, single market and local institutions) are seen as dealing better with small opaque firms than megabanks (large, multimarket, and nonlocal institutions). Yet, small opaque firms may still prefer megabanks over community banks if financing costs are cheaper, and if it makes it easier to evade scrutiny or contract enforcement. Since deregulation in the mid-1990s, megabanks have been active in upgrading their lending technology and leveraging their geographical advantage (Berger and Black, 2011; Berger and Rice, 2010).

nesses and households, in particular, are easy targets for usury. Melzer (2011), for example, shows that payday loans (typically small, informal loans that carry a high interest rate), increase the difficulties for low-income households to meet payments for their mortgage, rent, and utility bills, while doing little to alleviate any immediate economic hardship. The source of informal finance may also be important. Allen, Qian and Xie (2013) show that while informal finance from moneylenders endangers firm growth, informal finance from family members, friends and suppliers enhances firm growth in China. Thus, little consensus exists on whether the access to informal finance is a blessing or curse for cash-strapped SMEs and low-income households.

The debate on the costs and benefits of informal versus formal finance has traditionally considered each type of financing in isolation, based on the assumption that both modes of financing are suited to particular firm types. The co-existence and potential complementarity between the two financing modes has received little attention, even if a familiar requirement for small entrepreneurs is that they demonstrate an ability to raise funds from informal financiers that can screen and monitor their activities before formal financiers give a green light on external finance.[3]

Indeed, formal lenders are likely to have superior capabilities when it comes to collecting deposits or monitoring transparent clients (Diamond, 1984; Jain, 1999), but informal lenders may have better *ex ante* proprietary information that is useful in screening new applicants and monitoring small opaque firms. Consequently, by forcing borrowers to seek financing first from informal lenders, formal lenders only have to partially fund a given project (Jain, 1999). Andersen and Malchow-Møller (2006) model *co-funding*, i.e., the co-existence of informal and formal finance, and argue that it can be beneficial to both lenders as it yields higher profits. In addition, Dybvig, Shan and Tang (2012) show that formal lenders outsource the screening for SME lending to informal lenders (in their case, third-party loan guarantee companies), suggesting a similar mechanism in utilizing information advantages of third-party credit guarantees. Furthermore, Cole (2011), using a US survey dataset, shows that trade credit can complement the use of bank finance. Garmaise and Moskowitz (2003) show that informal networks between banks and real estate brokers can enhance the availability of finance to the brokers' clients, which is consistent with the

[3] In the terminology of Tirole (2005), informal financiers monitor firms and increase pledgeable income. Informal financiers are (partially) rewarded through financing the project. Formal financiers then provide the additional external funds required to finance the investment project in full.

suppliers having an informational advantage. Besides, funds from the banking sector may also be intermediated by informal financiers to reach groups of borrowers that have difficulties accessing formal finance (Bose, 1998; Hoff and Stiglitz, 1997).[4]

We examine the relationship between different modes of external financing (informal, formal and co-funding) and firm growth using a survey dataset of privately owned Chinese firms that are comparable in size to those of the *US Survey of Small Business Finance*.[5] By differentiating between small and large firms, we gain several valuable insights.

First, as in Ayyagari, Demirgüç-Kunt and Maksimovic (2010), we find that for the average firm formal finance is associated with higher firm growth, while informal finance is not. The average firm, however, hides an important heterogeneity. In particular, we find that informal finance is associated with a higher sales growth rate for small firms, but not large firms. In particular, obtaining informal finance is associated with a ten percentage points higher sales growth rate for small firms, while the continued reliance of large firms on informal finance is associated with an eleven percentage points lower sales growth rate (annual sales growth rates are around 27% in our sample).

Second, we also find that *co-funding* is associated with a fifteen percentage points higher sales growth rate for small firms, but a six percentage points lower growth rate for large firms. Furthermore, *co-funding with a minority proportion of informal finance* is associated with a twenty percentage points higher sales growth rate for small firms, but a five percentage points lower sales growth rate for large firms. All our results are robust to employing different proxies for firm growth and various measurements and timing of the finance variables.

Our findings add a new dimension to the results reported in Allen, Qian and Qian (2005). They show that informal finance bolsters the growth of private small firms, which provides most of the economic growth in China. We provide evidence on the beneficial effects of co-funding for firm growth, showing that informal and formal financiers are not merely providing loans to different market segments, but in the case of small borrowers actually complement each other. Our findings also challenge the logic of governmental ef-

[4] At a Bank of Finland workshop in September 2012 on "China's Financial Markets and Internationalization of the Renminbi", Dr. Xuechun Zhang of the People's Bank of China noted that more than 10% of bank lending in recent years in the city of Wenzhou (i.e. famous for its active informal credit market) has flowed to informal lenders even if financial regulations forbid banks from engaging in such lending.
[5] See *Report to the Congress on the Availability of Credit to Small Businesses* by the Board of Governors of the Federal Reserve System: http://www.federalreserve.gov/boarddocs/rptcongress/sbc_rep.pdf.

forts in developing countries such as India to "repress" informal credit and "promote" formal bank lending to the private sector (Bell, 1990). Our findings show that co-funding may be an optimal choice for both lenders and small borrowers. While there seems to be no pecking order between formal and informal finance, co-funding with a minority proportion of informal finance may be an optimal choice to spur the growth of small firms.

Our findings on co-funding also correspond to those on the corporate debt structure and the mix of private and public debt resulting from information asymmetry. Houston and James (1996), for example, show that the relationship between growth opportunities and bank finance depends on whether the firm has public debt already outstanding, while in Faulkender and Petersen (2006) firms with access to public debt markets are shown to maintain a higher leverage. Krishnaswami, Spindt and Subramaniam (1999) document that firms that face more severe information asymmetries have a higher proportion of private debt when they have inside information on profitability. In contrast, Carey and Rosen (2000) show that it is incomplete contracting instead of information asymmetry that allows public lenders to complement the monitoring of private lenders. As in this literature our results similarly highlight the existence of an optimal debt structure for firms that is based on both formal finance (the more "public" source) and informal finance (the more "private" source).

The remainder of the paper proceeds as follows. Section 2 reviews the literature and hypotheses, and section 3 discusses the Chinese credit market. Section 4 introduces the data and summary statistics. Section 5 provides empirical evidence linking our various modes of financing to firm growth. Section 6 presents the findings of several robustness checks. Section 7 provides some discussions. Section 8 concludes, noting several policy implications from our work.

2 Literature review and hypotheses

The finance-growth nexus has been investigated since Schumpeter (1934) first suggested it. Empirical evidence that comes from cross-country data (e.g., King and Levine, 1993), within-country data (e.g., Guiso, Sapienza and Zingales, 2004), and cross-industry and cross-country data (e.g., Beck, Demirgüç-Kunt, Laeven and Levine, 2008; Rajan and Zingales, 1998) consistently shows that more financial development leads to more economic

growth. However, these studies often exclude informal finance from their analyses due to a lack of appropriate data.

The findings of recent papers in the finance-growth literature that deal with informal versus formal financing modes are mixed (see also Appendix 1). On the one hand, some papers show that informal finance based on reputation and relationships may support the growth of the private sector in countries with less well developed legal and financial systems (e.g., Allen, Qian and Qian, 2005; Ge and Qiu, 2007; or De and Singh, 2011). On the other hand, there are studies suggesting that only the development of the formal banking sector has a pronounced positive impact on firm and provincial economic growth (Ayyagari, Demirgüç-Kunt and Maksimovic, 2010; Cheng and Degryse, 2010). The conflicting evidence on informal finance may be caused by differences across the samples in firm characteristics, such as firm size.

The current literature does not study whether the informal and formal credit markets are segmented and whether there are beneficial effects to subgroups of firms that differ in terms of size. Allen, Qian, Zhang and Zhao (2010) postulate that an informal sector consisting of alternative financing channels, governance mechanisms, and institutions can not only co-exist with formal banks and markets but even support economic growth. Giné (2011) shows that it is the limited ability of banks to enforce contracts, more than the presence of transaction costs, that leads to the side-by-side existence of informal and formal lending regimes. Our first hypothesis looks at the heterogeneous impact of informal finance according to firm size. The negative impact of finance obstacles is stronger for small firms (Beck, Demirgüç-Kunt and Maksimovic, 2005).[6] Thus, financial development exerts a disproportionate positive effect on small firms (Beck, Demirgüç-Kunt, Laeven and Levine, 2008). In addition, informal lenders rely less often on collateral than formal lenders (Kislat, Menkhoff and Neuberger, 2013). As small firms often lack proper collateral, informal lenders may alleviate the credit constraints for small firms more effectively, and in

[6] Under the US definition, an SME is a firm with fewer than 500 employees. In the *US Survey of Small Business Finances* in 1998, all firms had fewer than 500 employees. In our sample, 92.96% have fewer than 500 employees. The Chinese definition for SMEs by the number of employees varies across industries, ranging between 100 and 500 employees. In our sample, 67.03%, 78.18%, 86.77% and 91.77% of the firms have fewer than 100, 200, 300 and 400 employees, respectively. In addition, the *National Bureau of Statistics of China*, also defines SMEs according to the total sales revenues, i.e. lower than 300 million RMB in industrial, construction, transportation and postal sectors, and lower than 150 million RMB in the wholesale, retail, accommodation, and catering sectors. Thus, most of the firms in our sample are SMEs by both the US and Chinese definitions.

this way contribute to the growth of small firms.[7] While the screening and monitoring effect of informal finance through proprietary information may not scale up with firm size, it may reduce the profitability and retard growth of large firms as it carries a higher interest rate than bank finance. Consequently, our first hypothesis is:

Hypothesis 1: Informal finance is associated with higher sales growth for small firms, but not for large firms.

The empirical literature on formal and informal finance does not study whether there is a beneficial co-existence between them for the same firm (i.e. *co-funding*, where both lenders and firms benefit from bimodal funding).[8] Non-exclusive lending may impact on borrower financing and firm growth. Non-exclusivity may lead to negative contractual externalities as each creditor's lending increases the default risk for the others by exacerbating borrower moral hazard and incentives for strategic default (e.g., Bizer and DeMarzo, 1992; and Parlour and Rajan, 2001).[9] Multiple creditor relationships, however, can increase a firm's debt capacity (von Thadden, Berglof and Roland, 2010), and more valuable firms may prefer to limit the number of creditors to discipline them (Bris and Welch, 2005; Guiso and Minetti, 2010). Moreover, it may be better for the borrowing firm to deal with a relationship lender that has lower monitoring costs or operates in a concentrated regional lending market (Ongena, Tümer-Alkan and von Westernhagen, 2012). However, the benefits from limiting the number of creditors, i.e. enhancing the ability of lenders to monitor borrowers and reduce coordination failure among creditors, may be offset by the cost from a higher probability of debt renegotiation and the exposure to greater liquidity risk for the lender (e.g., Carmignami and Omiccioli, 2007).

[7] Ayyagari, Demirgüç-Kunt and Maksimovic (2010) show that informal finance combined with investment of retained earnings has a positive effect on growth in the quintile of the smallest firms. In addition, they find that firms with a minority proportion of informal finance enjoy higher growth than those without bank finance, and that firms with a majority proportion of informal finance perform worse than firms without informal finance. Firms with a majority proportion of informal finance and retained earnings perform better than firms without informal finance or retained earnings. Finally, firms that rely solely on bank finance have lower growth rates, possibly indicating another aspect of the role of the screening and monitoring by informal financiers.

[8] Informal and formal finance are often claimed to serve distinct market segments (e.g., Bennardo, Pagano and Piccolo, 2009). Informal finance then fills the financing gap by serving those firms without access to formal finance.

[9] Degryse, Ioannidou and von Schedvin (2013) show that an initial lender reduces its willingness to lend to a borrower when that borrower initiates loans from another lender.

Staying exclusively in the informal credit market may not be an optimal choice for small firms and their lenders. *Co-funding* is found to be an optimal choice for both informal and formal lenders (Jain, 1999), as well as a Nash Equilibrium under the strategic interaction between them (Andersen and Malchow-Møller, 2006). In particular, informal financiers employing their proprietary information can screen borrowers before the lending decision and monitor the borrowers after the loan has been granted. Formal finance, in contrast, induces lending at a lower interest rate on the condition that a monitor is on board. On the one hand, the co-funding is an optimal choice for both informal and formal lenders whether the interaction between both types of lenders is modeled in a static or sequential way. On the other hand, the co-funding equilibrium still holds even if neither type of lenders knows the lending behavior of the other. The banks can provide partial financing contracts to firms if the loan officers can elicit firms' credit demand from the soft information and firm fundamental analysis, which can force the firms to borrow the rest from informal lenders. As a result, "good" firms are able to borrow the rest from the informal lenders while "bad" firms are turned away by them. In sum, the co-funding equilibrium as an optimal choice for both type of lenders will be sustained under various circumstances.
Though there is no similar analysis on the welfare of the borrowers, we propose that the same mechanism also applies to them. Our second hypothesis therefore is:

Hypothesis 2: Co-funding (funding from both informal and formal sources) is associated with higher sales growth for small firms, but not for large firms.

The screening and monitoring role of informal finance can still be effective for small firms with a minority proportion of informal finance, while the effect may not scale up with firm size. Informal finance often carries a higher interest rate than formal finance. As a result, a minority proportion of informal finance can lead to a lower interest rate for co-funding firms. We categorize the firms with co-funding into two sub-categories, $Co-funding_{\,Informal<Formal}$ with a minority proportion of informal finance and $Co-funding_{\,Informal>Formal}$ with a majority proportion of informal finance.[10] Our third hypothesis is:

[10] We also split at 66% and 33%, respectively, and define the group with more than 66% of informal finance as *Co-funding* with majority of informal finance, while the group with less than 33% of informal finance is designed as *Co-funding* with minority of informal finance. The results are qualitatively similar as for a split at 50%.

Hypothesis 3: Co-funding with a minority proportion of informal finance is associated with higher sales growth for small firms, but not large firms.

3 Introduction to the Chinese credit market

China has a state-dominated banking sector with the four largest state-owned banks accounting for about 55% of total banking assets at the end of 2005.[11] This sector has witnessed gradual reform over the past three decades, but it is still displaying low efficiency. China's state-owned banks are inefficient in extending credit to the private sector due to substantial policy burdens, soft-budget problems, and substandard organizational structures. Moreover, all types of banks prefer lending to state-owned enterprises and large private firms (Boyreau-Debray and Wei, 2005) as these are usually first in line for government bail-outs when faced with the threat of bankruptcy. Bailey, Huang and Yang (2011) show that poorly performing firms are more likely to obtain loans from state-owned banks in China, pointing out an inefficient allocation and use of loans from state-owned banks. Moreover, the preferential treatment given by banks to state-owned and large private firms limits the access to bank finance by smaller private firms.

The distortion in the formal banking sector contributes to the vigor of the informal credit market, where firms borrow from family members, friends, enterprises, Rotating Savings and Credit Associations (ROSCAs),[12] moneylenders (loan sharks), and informal banks. Chinese private firms rely less on bank loans to finance investments, and more on retained earnings and informal finance, especially obtained from family members and friends (Dollar and Wei, 2007; Riedel, Jin and Gao, 2007; Song, Storesletten and Zilibotti, 2011). Chinese entrepreneurs may also have access to informal lenders as such lenders possess proprietary information about the entrepreneur's firm and his/her business histories. Furthermore, the low deposit rates in the banking sector has created an informal credit market where informal lenders often offer much higher deposit rates than banks. Both the demand and supply of funds contribute to the development of the informal credit market,

[11] The data is gleaned from the 2005 annual reports of four state-owned banks (Industrial and Commercial Bank of China, Agriculture Bank of China, Bank of China, and China Construction Bank), and from the China Banking Regulatory Commission.

[12] In principle, ROSCAs are not sanctioned by the People's Bank of China (China's central bank). Access to funds is provided in various formats such as *Biaohui* (tender for fund use), *Lunhui* (predetermined order for fund use) or *Yaohui* (random draw for fund use) (Ayyagari, Demirgüç-Kunt and Maksimovic, 2010).

which funded about a quarter of total firm borrowing over the last decade.[13] Appendix 2 shows that the proportion of self-financing and other sources (which includes informal finance) in fixed asset investment increased steadily over the past two decades, approaching the 80% level in recent years. As informal finance goes mainly to SMEs, informal finance plays a significant role in sustaining China's high economic growth.

Because the informal credit market is illegal and unregulated, a bankruptcy of informal banks can have serious consequences and even lead to social unrest. While the Chinese government has exerted substantial effort toward repressing the informal credit market, it has often found itself covering the losses of depositors after the default of an informal bank.[14] The government has adopted a series of policies to enhance access to bank finance for SMEs, but the financing gap is still substantial.[15] Thus, a two-pronged policy of repressing the informal financial sector and enhancing the formal sector is likely to be counterproductive in achieving the government's intended goals.

Court enforcement of breaches to loan contracts not only depends on whether the contract was made in the informal or formal financial sector, but in the case of the informal financial sector, the identities of the contracting parties. On the one hand, loan contracts between informal banks and private parties will not be enforceable through court, so informal lenders need to collect sufficient proprietary information before the lending decisions to screen out unreliable borrowers. On the other hand, loan contracts between family members and friends can be enforced through the court at interest rates up to a specified ceiling.[16] Furthermore, informal lenders can use a range of social sanctions ranging from

[13] According to a survey conducted by the Central University of Finance and Economics (China), 28.9% of firm borrowing was financed by the informal credit market in 2005. Source: Shanghai Securities News.

[14] Although the deposits in informal banks are not covered by explicit deposit insurance, the government often intervenes during the bankruptcy process. This is accomplished through the liquidation of assets of these institutions and the personal assets of persons running these institutions. To prevent social unrest, the government usually repays part of the deposits at informal banks when the liquidation value of the assets falls short of deposits.

[15] The Chinese government sought to bridge the financing gap by opening up the financial markets to foreign microfinance institutions since 2006. Following up on its commitments made when joining the *World Trade Organization* (WTO), the Chinese government started opening up its financial markets to the world in 2006. Specifically, "*Document No. 1 of the Chinese Communist Party*" issued on February 21, 2006, certified the legality of private and foreign capital in rural and community financial institutions. However, Turvey and Kong (2010) show that borrowing from family members and friends outcompetes microfinance, and that informal finance remains the main source of credit even for firms with access to the "semi-formal" microfinance sector.

[16] Generally speaking, an informal finance contract can be enforced under Chinese contract law and the general principals of civil law. However, there is a notional usury limit in China. In its 1991 ruling *Comments on the Loan Contract Case,* the Supreme Court of China declared that only explicitly agreed unofficial interest rates up to four times the official interest rate (set by the Chinese central bank) with similar maturity are enforceable.

mild disparaging of reputation and exclusion from business and personal relationships up to illegal threats of coercion and actual injury.[17]

Informal finance typically carries a higher interest rate than bank finance. Although loans of the family members and friends are often interest free, reciprocity among the family members and friends will lead to interest rates comparable to other sources of informal finance. In addition, a high interest rate on informal finance is required to compensate for the monitoring cost. Thus, the interest rate paid on informal finance may be higher than on bank finance, even after including the transaction costs associated with bank finance (such as collateral registration fees and bribing loan officers).[18] In this case, bank finance can enhance firm growth better than informal finance due to its cost advantage, which makes co-funding with a minority proportion of informal finance an optimal choice for firms (i.e. the interest rate is lower than in the case of co-funding with a majority proportion of informal finance).

However, the risks of bank finance may also be higher than in the case of informal finance. The default of bank finance leads to the foreclosure of collateral (as indicated earlier, depending on the effectiveness of the court enforcement), while the default of informal finance is typically dealt with through debt renegotiation if the borrower suffers an exogenous negative shock. As banks cannot distinguish whether borrowers are just having a bad time or are engaged in strategic default, they can only foreclose the collateral in case of default, which may be too high a risk for SMEs faced with volatile performance. In contrast, informal lenders often have an information advantage that enables them to help borrowers that have hit a bad patch or apply social sanctions and coercion if the borrower seems to contemplate a strategic default.[19] This informational advantage and corresponding

[17] In contrast, banks have limited contract enforcement remedies through court due to poor protection for the creditors. Even though state-owned banks are more likely to win default or deficiency judgments in court, the court can often do nothing to enforce the verdicts. Politically connected borrowers can often evade court enforcement, despite a default or deficiency judgment against them. In other words, poor contract remedies to enforce default on bank loans may indicate that the probability of default for formal loans is actually higher than for informal loans.

[18] When transaction costs are high, the interest rate on a bank loan exceeds that of an informal loan. Thus, certain conditions will shut bank financing out of the market, limiting the borrower to informal financing options (Andersen and Malchow-Møller, 2006).

[19] Informal lenders typically have more information on borrowers, particularly small opaque firms. This information advantage could be gained through a prior relationship or additional efforts in collecting information. Family members and friends surely have more proprietary information than other lenders, while moneylenders are often closer to the borrower and more aggressive in information collection. In any case, the information advantage of informal lenders is well-known and practically a stylized fact.

loan contracting flexibility of informal finance may enhance SME growth better than bank finance.

4 Data and summary statistics

Our data on the financing of Chinese firms is based on the *China Private Enterprises Survey* (CPES) of 2006.[20] The survey was designed to provide data on privately-owned enterprises in China and was initiated by the *China Administration for Industry and Commerce* (a government agency), the *All-China Federation of Industry and Commerce* (a quasi-governmental agency), the *China Private Economy Research Association* (a private research institute), and the *United Front Work Department of Communist Party of China Central Committee*.

The initial sample included 3,837 firm observations, with only 47 involving publicly listed firms. To be representative across regions and industries, the survey used a multi-stage stratified random sampling method among private firms. Six cities or counties were selected from each of the 31 regions (22 provinces, four provincial-level municipalities, and five minority autonomous regions), which included the capital city of the region, one prefecture-level city, one county-level city, and three counties. The total number of firms to be surveyed was 4,300, or about one-tenth of one percent of private firms in China at the time. Finally, trained surveyors conduct face-to-face interviews with entrepreneurs or main investors according to the questionnaire.

Previous work has examined the effect of financing modes using the *World Bank Investment Climate Survey in China (WBICS China)* (e.g., Ayyagari, Demirgüç-Kunt and Maksimovic, 2010). Table 1 compares the two datasets and highlights some benefits of employing the *CPES* for the issues we address here.

[20] The survey was conducted eight times in the period 1991 to 2006. However, the sample firms change from round to round, which makes it impossible to construct a balanced panel. Only a few of the surveyed firms in 2004 were retained in 2006. As their identities are not revealed, we cannot even exploit this retention. The recent rounds contain more detailed data on firm financing. Li, Meng and Zhang (2006) and Li, Meng, Wang and Zhou (2008) study the 2002 survey, while we employ the most recent survey of 2006.

Table 1 China private enterprise survey versus World Bank Investment Climate Survey in China

Database name	**China Private Enterprise Survey (CPES)**	**World Bank Investment Climate Survey in China (WBICS China)**
Research	This Paper	Ayyagari, Demirgüç-Kunt and Maksimovic (2010)
Year of Finance Data	2005	2002
Year of Accounting Data	2000, 2004, 2005	1999-2002
Number of Cities	108 *	18
Number of Observations	3,837	2,400
Mean (Median) of Firm Age (Number of Years)	7.74 (7)	15.98 (10)
Mean (Median) of Number of Employees	177 (45)	541 (110)
Mean (Median) of Sales (million RMB)	48 (7)	202 (9)
Format of Finance Variables	Stock Value	Flow Value
Use of Finance	Aggregate	New investment and working capital

Note: * 10 of the 108 cities in the CPES are in common with the WBICS China.

First, the *CPES* has a much wider coverage of cities than the *WBICS China*. Second, firms in the *CPES* are younger and smaller than those in the *WBICS China*. Appendix 3 shows that *CPES* firms are smaller than *WBICS China* firms, which may be an advantage when examining the role of informal finance.[21] Finally, *CPES* records the stock value of all financing at the end of 2005, while the *WBICS China* records the flow value for 2002. The stock value of financing may be a superior measure as it accounts for the accumulated volume of the flow of finance, allowing for an improved identification of the impact of co-funding.

We measure firm growth by *sales growth* which is the log change in sales over the period 2004 to 2005. Informal finance includes loans from family members, friends, ROSCAs, moneylenders, and informal banks. Formal finance includes loans from local commercial banks (state-owned banks, joint stock banks, city commercial banks and credit cooperatives) and foreign banks. All variable categories, names and definitions are listed in Table 2.

[21] The *CPES* reports basic accounting data (sales, profit, etc.) for 2000, 2004 and 2005, while the *WBICS China* reports this information from 1999 to 2002.

Table 2 Variable definitions

Variable category	Variable name	Variable definition
Firm Growth Variables	Sales Growth	Log(sales in 2005) - Log(sales in 2004)
	Employment Growth	The annual growth rate in the total number of employees since the year of establishment of the firm until 2005. The total employment in 2005 is calculated as the sum of the number of full-time employees, 0.75 times the number of employees who work less than one year but longer than six months, and 0.25 times the number of employees who work less than six months.
Finance Variables	Informal Finance	The total amount of loans (in RMB) from family members, friends, ROSCAs, moneylenders, and informal banks at year-end 2005
	Formal Finance	The total amount of loans (in RMB) from local commercial banks and foreign banks at year-end 2005
	Trade Credit	Accounts payable (in RMB) at 2005 year end
	Total Finance	The sum of Formal Finance, Informal Finance, Trade Credit and Equity at year-end 2005, in RMB
	Informal	= 1 if Informal Finance is positive, = 0 otherwise
	Formal	= 1 if Formal Finance is positive, = 0 otherwise
	Informal_Family Members and Friends	= 1 if loans from family members and friends are obtained, = 0 otherwise
	Informal_ROSCAs, Moneylenders and Informal Banks	= 1 if loans from ROSCAs, moneylenders and informal banks are obtained, = 0 otherwise
	Formal_State Banks	= 1 if loans from state-owned banks are obtained, = 0 otherwise
	Formal_Private Banks	= 1 if loans from private banks are obtained, = 0 otherwise
	Informal Only	= 1 if Informal Finance is positive and Formal Finance is zero, = 0 otherwise
	Co-funding	= 1 if both Informal Finance and Formal Finance are positive, = 0 otherwise
	Formal Only	= 1 if Informal Finance is zero and Formal Finance is positive , = 0 otherwise
	$\text{Co}-\text{funding}_{\text{Informal}>Formal}$	= 1 if Informal Finance is larger than Formal Finance and both are positive, = 0 otherwise
	$\text{Co}-\text{funding}_{\text{Informal}<Formal}$	= 1 if Informal Finance is smaller than Formal Finance and both are positive, = 0 otherwise
	Informal Loan Size	Log(1+Informal Finance)
	Formal Loan Size	Log(1+Formal Finance)
	Informal Finance Ratio	The ratio of Informal Finance over Total Finance
	Formal Finance Ratio	The ratio of Formal Finance over Total Finance
Firm-Specific Variables	Size	Log(1+Sales in 2004)
	Large Firm	= 1 if Size is above the sample median, = 0 otherwise
	Age	The number of years from when the firm registered as a private enterprise until 2005
	Partnership	= 1 if a firm is registered as a partnership, = 0 otherwise
	Limited Liability	= 1 if a firm is registered as a limited liability firm, = 0 otherwise
	Corporation	= 1 if a firm is registered as a public stock-holding corporation (not necessarily publicly listed), = 0 otherwise

The concept and precise definition of informal finance differs across studies. Allen, Qian and Qian (2005) define informal finance as all finance besides bank finance. Ayyagari, Demirgüç-Kunt and Maksimovic (2010) characterize informal finance as loans from in-

formal sources such as moneylenders and informal banks, while they also include internal financing (i.e. retained earnings, loans from family members and friends, and other sources) entailing a broader definition of informal finance. As we focus on the effect of *external* finance on firm growth, we define informal finance as the sum of loans from family members, friends, ROSCAs, moneylenders, and informal banks.[22]

We categorize the external finance status into four types which are represented by four dummy variables, *Informal Only*, *Formal Only*, *Co-funding*, and *No Finance*. *Informal Only* is a dummy variable equal to one when a firm employs only informal finance and thus no formal finance, and zero otherwise. *Formal Only* is a dummy variable equal to one when a firm employs only formal finance and thus no informal finance, and zero otherwise. *Co-funding* is a dummy variable equal to one when a firm borrows from both informal and formal finance sources, and zero otherwise. *No Finance* indicates that a firm has no borrowing from either informal or formal finance. All variable definitions are listed in Table 2.

Table 3 shows the summary statistics for the variables employed in our analysis. 11% of the firms rely solely on informal finance, while half of the firms access formal finance (36% employ only formal finance and 14% engage in co-funding (use both informal and formal finance), of which 10% rely predominantly on formal finance ($Co-funding_{\,Informal<Formal}$)).[23] 39% use neither informal nor formal finance (apparently financing everything out of pocket). The informal finance ratio (i.e. the fraction of total finance stemming from informal finance) is 5%, whereas the formal finance ratio equals 16%.[24] Besides, the mean (median) of firm sales is 38.52 (6.08) million RMB, while the 25th (75th) percentile is 1.77 (25.00) million RMB, which shows that most firms are small

[22] Guariglia, Liu and Song (2011) show that internal finance fosters growth for private but not for state-owned firms in China. We also include internal finance in unreported results, but the results are qualitatively similar. We restrict the analysis to the external finance in order to examine the interaction between informal and formal lenders. Note that we include loans from family members and friends in our definition of external finance.

[23] About half of these firms have bank finance, which is much higher than the 23% as reported in the *WBICS China*. While our finance variables are measured by the stock value of finance at the end of 2005, the *WBICS China* records the flow value of finance in 2002. It is possible that the stock value is higher than the flow value. For example, a long-term loan granted in 2004 that was still outstanding at the end of 2005 was included in the calculation, while a short-term loan granted in 2005 and repaid before the end of 2005 was ignored. The proportion of firms with "a loan outstanding at the end of 2005" is different with the proportion of firms with "a loan transaction in 2005".

[24] These shares are consistent with government statistics. According to the National Bureau of Statistics of China, 17% of total fixed asset investments were financed with domestic loans in 2005. See Appendix 2 for the composition of fixed asset investments during the 1990-2010 period.

and medium-sized enterprises according to the Chinese government's definition.[25] Furthermore, the mean (median) of firm age is 7.74 (7) years, and the 25th (75th) percentile is 4 (10) years, which shows that most firms are very young.

Table 3 Summary statistics

Variable category	Variable name	N	Mean	Median	Std.Dev	Min	P25	P75	Max
Firm Growth Variables	Sales Growth	1,970	0.27	0.21	0.57	-4.01	0.06	0.41	5.88
	Employment Growth	2,008	0.16	0.11	0.24	-0.63	0.02	0.24	3.06
Finance Variables	Informal	1,970	0.25	0	0.43	0	0	1	1
	Formal	1,970	0.50	0.5	0.50	0	0	1	1
	Informal Only	1,970	0.11	0	0.31	0	0	0	1
	Co-funding	1,970	0.14	0	0.35	0	0	0	1
	Formal Only	1,970	0.36	0	0.48	0	0	1	1
	$\text{Co}-\text{funding}_{\text{Informal}>Formal}$	1,970	0.04	0	0.19	0	0	0	1
	$\text{Co}-\text{funding}_{\text{Informal}<Formal}$	1,970	0.10	0	0.30	0	0	0	1
	Informal Loan Size	1,970	3.27	0	5.71	0	0	9.21	16.65
	Formal Loan Size	1,970	7.33	4.61	7.46	0	0	14.85	20.74
	Informal Finance Ratio	1,582	0.05	0	0.11	0	0	0.02	0.83
	Formal Finance Ratio	1,582	0.16	0.02	0.23	0	0	0.28	0.99
Firm-Specific Variables	Size	1,970	15.65	15.62	1.96	9.90	14.39	17.03	21.77
	Large Firm	1,970	0.50	1	0.50	0	0	1	1
	Age	1,970	7.74	7	4.27	2	4	10	21
	Partnership	1,970	0.06	0	0.24	0	0	0	1
	Limited Liability	1,970	0.67	1	0.47	0	0	1	1
	Corporation	1,970	0.06	0	0.24	0	0	0	1

Sales Growth is the difference between log sales in 2005 and 2004; *Employment Growth* is calculated from the year of establishment through 2005 for the total number of employees. *Informal Only* equals 1 if Informal Finance is positive and Formal Finance equals 0, 0 otherwise; *Co-funding* equals 1 if both Informal Finance and Formal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance equals 0 and Formal Finance is positive, 0 otherwise; $Co-funding_{Informal>Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise; $Co-funding_{Informal<Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise; *Informal Loan Size* is log(1+Informal Finance); *Formal Loan Size* is log(1+Formal Finance); *Informal Finance Ratio* is the ratio of Informal Finance over Total Finance; *Formal Finance Ratio* is the ratio of Formal Finance over Total Finance; *Size* is log(1+sales in 2004); *Large Firm* is 1 if *Size* is above the sample median, 0 otherwise; *Age* is the age of the firm; *Partnership, Limited Liability, Corporation* equals 1 if a firm is registered as partnership, limited liability company and public stock-holding corporation respectively, 0 otherwise. N is the number of observations; Mean, Median, and Std.Dev are the mean, median and standard deviation of the sample; Min, P25, P75, and Max are the minimum, 25th percentile, 75th percentile, and maximum of the sample.

[25] According to the definition set by the *National Bureau of Statistics of China*, SMEs have total sales that are lower than 300 million RMB in industrial, construction, transportation and postal sectors, and lower than 150 million RMB in the wholesale, retail, accommodation, and catering sectors. The exchange rate was about 8 RMB / USD at the end of 2005.

Appendix 4 shows the dynamics of the finance status from the establishment of the firm onwards to the end of 2005, tabulated for all firms, and for small and large firms, respectively. Our findings can be compared to Allen, Chakrabarti, De, Qian and Qian (2012) who find persistency in the usage of informal finance by Indian SMEs. If co-funding is the optimal financing profile, firms may start with informal finance before obtaining co-funding as formal finance (i.e., bank lending) becomes available.

Do firms graduate from informal finance via co-funding to formal finance as they expand, or simply stay put with co-funding? Among all firms with co-funding at their formation, 44% graduate to relying on formal finance exclusively, while 29% remain in the co-funding state. The ratio of firms staying in co-funding is 33% for small firms and 26% for large firms. In addition, 23% of firms that initially relied on informal finance at their inception graduate to formal finance only, while 13% graduate to co-funding. The respective values for small firms are 10% and 10%, while the values for large firms are 40% and 17%. To conclude, it seems indeed that there is graduation from informal to co-funding and formal finance, especially for large firms.

Appendix 5 shows the correlation coefficients between all the variables. All finance variables are positively related with *Sales Growth* (though statistically insignificant) except $Co-funding_{Informal>Formal}$. In addition, *Size* and *Age* are negatively correlated with *Sales Growth,* which is consistent with stylized facts. In the following section, we conduct a regression analysis to examine the effect of different modes of finance on the sales growth rates of firms.

5 Overview of results

We start by replicating the specification of Ayyagari, Demirgüç-Kunt and Maksimovic (2010) to study whether their results hold for our sample of firms. We next turn to the heterogeneous effect of different forms of external finance according to firm size, which is our first hypothesis. We then investigate our second and third hypothesis, i.e. the composition of co-funding and its impact on growth according to firm size.

5.1 Informal versus formal finance: Initial regressions

To examine the effect of informal versus formal finance, we replicate the econometric model of Ayyagari, Demirgüç-Kunt and Maksimovic (2010):[26]

$$Sales\ Growth = b_0 + b_1 Finance + b_2 Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability$$
$$+ b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e \quad (1)$$

Sales Growth is our indicator of firm growth, i.e. the growth of sales calculated over the 2004-2005 period. *Finance* is a set of dummy variables such as *Informal* and *Formal* which indicate the source of external finance. Following Ayyagari, Demirgüç-Kunt and Maksimovic (2010), we also include control variables for firm size (*Size*) and type, i.e. *Partnership*, *Limited Liability*, and *Corporation* (*Sole Proprietorship* is omitted). We further add province and industry fixed effects to account for observed and unobserved regional and industry heterogeneity, respectively.

Table 4 presents the estimation results for equation (1).[27] Model (1) includes a dummy variable *Informal* to measure the impact of informal finance relative to the omitted category (All other sources of finance), whereas Model (2) includes *Formal* to capture the impact of formal finance relative to all other sources of finance. Model (3) includes dummies for both sources of external finance (*Informal* and *Formal*).

The estimated coefficient on the variable *Informal* is insignificant in Models (1) and (3) of Table 4, while *Formal* is positive and statistically significantly in Models (2) and (3). This is consistent with the results in Ayyagari, Demirgüç-Kunt and Maksimovic (2010). Model (3) shows that firms employing formal finance exhibit a 7.1 percentage points higher sales growth than firms without any financing (*No Finance* indicates that a firm has no borrowing from either informal or formal finance and serves in Model (3) as the reference group). The effect is economically significant as the average sales growth rate is 27%. Finally, sales growth is negatively associated with the size and age of the firm,[28] which is consistent with the literature on US firm dynamics (e.g., Clementi and Hopenhayn, 2006; Dunne, Roberts and Samuelson, 1989). Firm registration types are in-

[26] This econometric model follows the literature on the dynamics of firm size, e.g., Angelini and Generale (2008) who study the effect of financing constraints on the firm's annual employment growth rate.
[27] We replicate the results using dummy variables for firm size and age following Ayyagari, Demirgüç-Kunt and Maksimovic (2010). Our findings are almost identical and omitted for the sake of brevity.
[28] Firm size is calculated using sales in 2004. We also use sales in 2000 and get similar results.

significant in Models (1)-(3) of Table 4. We keep controlling for firm age and registration types across all model specifications in the paper but omit reporting their coefficients from Table 5 onwards for brevity.

Table 4 Finance and sales growth: Baseline. The table provides OLS estimations for the model

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal	-0.002		-0.008			
	[0.033]		[0.033]			
Formal		0.071**	0.071**			
		[0.030]	[0.030]			
Informal_Family Members and Friends				-0.028		-0.036
				[0.035]		[0.035]
Informal_ROSCAs, Moneylenders and Informal Banks				0.133		0.121
				[0.113]		[0.112]
Formal_State Banks					0.057**	0.057**
					[0.028]	[0.029]
Formal_Private Banks					0.062**	0.063**
					[0.030]	[0.030]
Control Variables						
Size	-0.035***	-0.040***	-0.041***	-0.036***	-0.041***	-0.042***
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
Age	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Partnership	-0.076	-0.080	-0.080	-0.073	-0.080	-0.077
	[0.061]	[0.061]	[0.062]	[0.062]	[0.061]	[0.062]
Limited Liability	0.028	0.027	0.027	0.028	0.025	0.026
	[0.033]	[0.033]	[0.033]	[0.033]	[0.033]	[0.033]
Corporation	-0.016	-0.017	-0.016	-0.015	-0.016	-0.014
	[0.046]	[0.046]	[0.046]	[0.046]	[0.046]	[0.046]
Constant	0.712***	0.786***	0.792***	0.732***	0.797***	0.823***
	[0.256]	[0.260]	[0.262]	[0.257]	[0.260]	[0.264]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,970	1,970	1,970	1,970	1,970	1,970
R-squared	0.045	0.048	0.048	0.047	0.049	0.050

$$Sales\ Growth = b_0 + b_1 Finance + b_2 Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variable is *Sales Growth*. *Informal* equals 1 if Informal Finance is positive, 0 otherwise; *Formal* equals 1 if Formal Finance is positive, 0 otherwise; *Informal_Family Members and Friends* equals 1 if loans from family members and friends are positive, 0 otherwise; *Informal_ROSCAs, Moneylenders and Informal Banks* equals 1 if 1 if loans from ROSCAs, Moneylenders and Informal Banks positive, 0 otherwise; *Formal_State Banks* equals 1 if loans from state-owned banks are positive, 0 otherwise; *Formal_Private Banks* equals 1 if loans from private banks are positive, 0 otherwise; *Size* is log(1+sales in 2004); *Age* is the age of the firm; *Partnership, Limited Liability, Corporation* equals 1 if a firm is registered as partnership, limited liability company and public stock-holding corporation respectively, 0 otherwise; industry and province fixed effects are included but their coefficients are not reported. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% levels, respectively.

The informal financing coming from family members and friends may be different from the informal financing obtained from ROSCAs, moneylenders and informal banks (Allen, Qian and Xie, 2013). We account for the sources of informal finance in Model (4) of Table

4, which shows that neither type of informal finance matters for firm growth. Furthermore, Chong, Lu and Ongena (Forthcoming) shows that the branch presence of joint-stock and city commercial banks is more efficient than state-owned banks in alleviating the credit constraints of SMEs in China. We therefore categorize the bank loans into those from private banks (i.e. joint-stock, city commercial and foreign banks) and others from state-owned banks. Model (5) of Table 4 shows that in this case there is no heterogeneous effect between private banks and state-owned banks. Model (6) confirms the above results when including all financing sources in the regression specification.[29] In sum, we neither find heterogeneous effects within the informal finance nor the formal finance. In testing our different hypotheses, we will therefore not consider heterogeneity within the different modes of external finance, but will discuss robustness in Section 6.

5.2 Informal finance for small firms: Test of hypothesis 1

Beck, Demirgüç-Kunt, Laeven and Levine (2008) show that financial development may exert a disproportionately positive effect on small firms. To account for the heterogeneous impact of external finance depending upon firm size (Hypothesis 1), we add interaction terms of our finance and size variables (i.e., *informal* × *size* and *formal* × *size*).[30] Model (1) in Table 5 shows that having informal finance is associated with a 5.3 percentage points higher sales growth for a firm with its size at the 25th percentile, while 8.7 percentage points lower at the 75th percentile,[31] which is also economically significant (i.e. the average sales growth rate is 27%). In contrast, Model (2) shows that formal finance is associated with a higher sales growth rate,[32] and that the marginal effect is lower for large firms, though neither the formal finance nor the interaction term is statistically significant. We find similar results in Model (3) when we include *Informal*, *Formal,* and their interaction terms with *Size*.

[29] An F test of the difference between the two types of informal finance is insignificant at conventional levels in Model (6) of Table 4, which is also similar for the two types of formal finance.
[30] We also included the internal financing sources such as profits retained from the previous year, but found that it did not change the results for external financing sources substantially. Neither internal finance nor its interaction term with the firm size variables is statistically significant. For the sake of brevity, we thus suppress internal financing sources, and focus exclusively on external finance.
[31] For a firm of a size at the 25th percentile (*Size* = 14.39), the aggregate effect of having informal finance is calculated as: 0.816 − 0.053 × 14.39 = 0.053. For a firm of a size at the 75th percentile (Size = 17.03), the effect is calculated as: 0.816 − 0.053 × 17.03 = -0.087.
32 The coefficient of formal finance is insignificant due to its interaction term with firm size, while the two terms are jointly significant at the 1% level.

Table 5 Finance and sales growth: Heterogeneity across firm size.
The table provides OLS estimations for the model

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal	0.816***		0.780**	0.101**		0.092*
	[0.316]		[0.311]	[0.049]		[0.048]
Formal		0.087	0.053		0.081*	0.066
		[0.280]	[0.275]		[0.049]	[0.048]
Finance Variables × Size Variables						
Informal × Size	-0.053***		-0.051***			
	[0.020]		[0.020]			
Formal × Size		-0.001	0.001			
		[0.017]	[0.017]			
Informal × Large Firm				-0.211***		-0.203***
				[0.063]		[0.062]
Formal × Large Firm					-0.029	-0.011
					[0.058]	[0.057]
Control Variables						
Size	-0.024**	-0.040***	-0.030**			
	[0.010]	[0.013]	[0.014]			
Large Firm				-0.073**	-0.128***	-0.085*
				[0.034]	[0.041]	[0.044]
Constant	0.545**	0.778***	0.633**	0.214	0.201	0.214
	[0.258]	[0.301]	[0.310]	[0.221]	[0.223]	[0.220]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,970	1,970	1,970	1,970	1,970	1,970
R-squared	0.050	0.048	0.053	0.051	0.047	0.053
F-Test						
Difference for Small Firm						
Informal - Formal = 0	·	·	·	·	·	0.026
Difference for Large Firm						
Informal + Informal × Large Firm - Formal - Formal × Large Firm = 0	·	·	·	·	·	-0.165***
Effect for Large Firm						
Informal + Informal × Large Firm = 0	·	·	·	-0.110***	·	-0.111***
Formal + Formal × Large Firm = 0	·	·	·	·	0.052	0.055*

$$Sales\ Growth = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variable is *Sales Growth*. *Informal* equals 1 if Informal Finance is positive, 0 otherwise; *Formal* equals 1 if Formal Finance is positive, 0 otherwise; *Size* is log(1+sales in 2004); *Large Firm* equals 1 if *Size* is above the sample median, 0 otherwise; *Age, Partnership, Limited Liability, Corporation*, and industry and province fixed effects are included but their coefficients are not reported. F-tests for the difference of coefficients are reported with the significance in stars. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% levels, respectively.

We confirm heterogeneity across firm size by categorizing firms into two groups: *Large Firm* with firms above the sample median in annual sales, and *Small Firm* below.[33] Model

33 The threshold for annual sales (the sample median) is RMB 6 million (about US$ 750,000). The threshold for "Enterprises above Designated Size" (above which the enterprises must file annual financial reporting to

(4) in Table 5 shows that having informal finance is associated with a 10.1 percentage points higher sales growth for small firms, but a 11.0 percentage points lower growth rate for *Large Firm* (i.e. the sum of 0.101 and -0.211), which is also statistically significant at 1% level using an F-test. Model (5) shows that having formal finance is associated with a sales growth that is 8.1 percentage points higher for small firms and 5.2 percentage points higher for large firms, although the interaction term of *Formal* with *Large Firm* is statistically insignificant. We find similar results in Model (6) when we include *Informal*, *Formal*, and their interaction terms with *Large Firm*.

We next examine the relative importance between informal and formal finance. Table 5 shows that informal finance is indistinguishable in its effect on growth from formal finance for small firms, while it is inferior to formal finance for large firms (according to the reported F-tests). Formal finance, however, does not display heterogeneity across firm size. The interaction terms of formal finance with firm size variables in Models (3) and (6) are insignificant, although a joint test of formal finance and the interaction term is significant at the 10% level in Model (3) and marginally significant (P-value 0.107) in Model (6) of Table 5.

Although Ayyagari, Demirgüç-Kunt and Maksimovic (2010) show that informal finance is irrelevant for firm growth, their conclusions may be based on the average effect across all firms (small and large) in their dataset. [34] In contrast, we find that when assessing the effect of financing across firm size, informal finance is associated with a higher sales growth rate for *Small Firm*, but not for *Large Firm*.

the National Bureau of Statistics in China) is RMB 5 million. In addition, the threshold for annual sales of small firms ranges from RMB 5 million to 60 million depending on the industry, while the threshold of microenterprises ranges from RMB 500,000 to RMB 5 million depending on the industry under the SME Promotion Law of China. Put differently, firms with annual sales of RMB 6 million or less are small firms that are often not covered by government statistics and less subject to government regulation. We also try to categorize the firms into terciles, and define firms in the upper (lower) tercile as large (small) firms. The results are mostly the same.

[34] To investigate the robustness of our results across datasets, we have also estimated a similar specification for the *WBICS* dataset used in Ayyagari, Demirgüç-Kunt and Maksimovic (2010). These results are in line with those reported in Table 5 and Hypothesis 2 (i.e. informal finance is associated with a higher sales growth for small firms but not for large firms). The results are omitted for brevity and are available upon request.

5.3 Co-funding for small firms: Test of hypothesis 2

To test our second hypothesis, i.e., the potential complementary effect between informal and formal finance, we categorize the finance status into four types: *Informal Only*, *Formal Only*, *Co-funding*, and *No Finance*. *Informal Only* is a dummy variable equal to one when a firm employs only informal finance and thus no formal finance, and zero otherwise. *Formal Only* is a dummy variable equal to one when a firm employs only formal finance and thus no informal finance, and zero otherwise. *Co-funding* is a dummy variable equal to one when a firm borrows from both informal and formal finance sources, and zero otherwise. As mentioned above, *No Finance* indicates that a firm without borrowing from informal or formal financing sources. The *No Finance* is omitted in the regression analysis and serves as the reference group. We compare the main characteristics of firms with each type of financing status in Appendix 6, which shows that the *No Finance* firms are quite similar to firms with some other financing status.[35]

Turning our attention to Hypothesis 2, Table 6 shows the estimation results for co-funding. Model (1) of Table 6 shows that *Formal Only* is associated with a 9.2 percentage points higher sales growth. However, the difference among *Informal Only*, *Co-funding*, and *Formal Only* is statistically insignificant. In addition, Model (2) of Table 6 shows that the marginal effect of *Co-funding* decreases with firm size. In particular, *Co-funding* is associated with an 11.6 percentage points higher sales growth for a firm at the 25th percentile in size, but 2.4 percentage points lower growth for a firm at the 75th percentile (the average sales growth rate is 27%). Furthermore, Model (3) shows that *Co-funding* is associated with a 15.4 percentage points higher sales growth for *Small Firm*, but a 5.6 (i.e., the sum of 0.154 and -0.210) percentage points lower growth rate for *Large Firm* (although this sum is statistically insignificant). In addition, *Formal Only* is associated with higher growth rates than *Informal Only* and *Co-funding* for *Large Firm* when employing an F-test to assess their difference, while we do not find a significant difference for *Small Firm*. We also find that *Informal Only* has similar heterogeneity over firm size (the interaction term of *Informal Only* and firm size is marginally significant (the P-value 0.167) in Model (2) and significant at the 5% level in Model (3)), while the effect of *Formal Only* is homogeneous to the firm size variables in Table 6.

[35] Cole (2011) shows that US firms using no credit are significantly smaller, more profitable, more liquid and have better credit quality, yet hold fewer tangible assets. We do not find similar differences for the no-credit firms in China.

Table 6 Finance and sales growth: Co-funding. The table provides OLS estimations for the model

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal Only	0.033	0.580	0.099	0.033	0.580	0.099
	[0.048]	[0.420]	[0.061]	[0.048]	[0.420]	[0.061]
Co-funding	0.048	0.879*	0.154**			
	[0.046]	[0.518]	[0.077]			
Formal Only	0.092***	-0.003	0.072	0.092***	-0.003	0.072
	[0.032]	[0.301]	[0.054]	[0.032]	[0.301]	[0.054]
$\text{Co}-\text{funding}_{\text{Informal}>\text{Formal}}$				-0.007	0.250	0.054
				[0.065]	[0.446]	[0.093]
$\text{Co}-\text{funding}_{\text{Informal}<\text{Formal}}$				0.067	1.146*	0.197**
				[0.055]	[0.658]	[0.097]
Finance Variables × Size Variables						
Informal Only × Size		-0.037			-0.037	
		[0.028]			[0.028]	
Co-funding × Size		-0.053*				
		[0.032]				
Formal Only × Size		0.005			0.005	
		[0.018]			[0.018]	
Informal Only × Large Firm			-0.201**			-0.201**
			[0.096]			[0.096]
Co-funding × Large Firm			-0.210**			
			[0.092]			
Formal Only × Large Firm			-0.014			-0.014
			[0.065]			[0.065]
$\text{Co}-\text{funding}_{\text{Informal}>\text{Formal}}\times$ Size					-0.017	
					[0.028]	
$\text{Co}-\text{funding}_{\text{Informal}<\text{Formal}}\times$ Size					-0.069*	
					[0.041]	
$\text{Co}-\text{funding}_{\text{Informal}>\text{Formal}}\times$ Large Firm						-0.130
						[0.127]
$\text{Co}-\text{funding}_{\text{Informal}<\text{Formal}}\times$ Large Firm						-0.248**
						[0.111]
Control Variables						
Size	-0.041***	-0.033**		-0.041***	-0.033**	
	[0.009]	[0.015]		[0.009]	[0.015]	
Large Firm			-0.085*			-0.085*
			[0.047]			[0.047]
Constant	0.796***	0.666**	0.213	0.796***	0.666**	0.213
	[0.263]	[0.312]	[0.223]	[0.263]	[0.312]	[0.223]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,970	1,970	1,970	1,970	1,970	1,970
R-squared	0.049	0.053	0.053	0.049	0.053	0.053
F-Test						
Difference for Small Firm						
Co-funding - Informal Only = 0	0.015	•	0.055	•	•	•
Co-funding - Formal Only = 0	-0.044	•	0.082	•	•	•
Informal Only - Formal Only = 0	-0.059	•	0.027	-0.059	•	0.027
$\text{Co}-\text{funding}_{\text{Informal}>\text{Formal}}$ - Informal Only = 0	•	•	•	-0.040	•	-0.045
$\text{Co}-\text{funding}_{\text{Informal}<\text{Formal}}$ - Formal Only = 0	•	•	•	-0.025	•	0.125

$Co-funding_{Informal< Formal}$ - $Co-funding_{Informal> Formal}$ = 0	•	•	•	0.074	•	0.143
Difference for Large Firm						
Co-funding + Co-funding × Large Firm - Informal Only - Informal Only × Large Firm = 0	•	•	0.046	•	•	•
Co-funding + Co-funding × Large Firm - Formal Only - Formal Only × Large Firm = 0	•	•	-0.114***	•	•	•
Informal Only + Informal Only × Large Firm - Formal Only – Formal Only × Large Firm = 0	•	•	-0.160***	•	•	-0.160***
$Co-funding_{Informal> Formal}$ + $Co-funding_{Informal> Formal}$ × Large Firm - Informal Only - Informal Only × Large Firm = 0	•	•	•	•	•	0.026
$Co-funding_{Informal< Formal}$ + $Co-funding_{Informal< Formal}$ × Large Firm - Formal Only - Formal Only × Large Firm = 0	•	•	•	•	•	-0.109**
$Co-funding_{Informal< Formal}$ + $Co-funding_{Informal< Formal}$ × Large Firm - $Co-funding_{Informal> Formal}$ - $Co-funding_{Informal> Formal}$ × Large Firm = 0	•	•	•	•	•	0.025
Effect for Large Firm						
Co-funding + Co-funding × Large Firm = 0	•	•	-0.056	•	•	•
Informal Only + Informal Only × Large Firm = 0	•	•	-0.102	•	•	-0.102
Formal Only + Formal Only × Large Firm = 0	•	•	0.058	•	•	0.058
$Co-funding_{Informal< Formal}$ + $Co-funding_{Informal< Formal}$ × Large Firm = 0	•	•	•	•	•	-0.051
$Co-funding_{Informal> Formal}$ + $Co-funding_{Informal> Formal}$ × Large Firm = 0	•	•	•	•	•	-0.076

$$Sales\ Growth = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation\ Dummies + b_7 Province\ Dummies + b_8 Industry + e$$

The dependent variable is *Sales Growth*. *Informal Only* equals 1 if Informal Finance is positive and Formal Finance equals 0, 0 otherwise; *Co-funding* equals 1 if both Informal Finance and Formal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance equals 0and Formal Finance is positive, 0 otherwise; $Co-funding_{Informal> Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise $Co-funding_{Informal< Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise; the omitted group is firms without either informal or formal finance. *Size* is log(1+sales in 2004); *Large Firm* equals 1 if *Size* is above the sample median, 0 otherwise; *Age*, *Partnership*, *Limited Liability*, *Corporation*, and industry and province fixed effects are included but their coefficients are not reported. F-tests for the difference of coefficients are reported with the significance in stars. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% levels, respectively.

In sum, we find that small firms with co-funding have a higher sales growth rate, suggesting a complementary effect between informal and formal finance. This suggests that informal lenders rely on their proprietary information to screen borrowers before granting loans and monitoring them after the loan is granted. Formal lenders, in contrast, can often offer loans at a lower cost, making co-funding potentially the optimal choice for small firms.

5.4 Optimal debt structure of co-funding for small firms: Test of hypothesis 3

Although co-funding may be the best finance choice for small firms, the optimal weight of informal and formal finance is still unclear. Andersen and Malchow-Møller (2006) show that both informal and formal lenders have incentives to reduce the proportion of lending from the informal lender in a *co-funding* equilibrium, which will lead to a minority proportion of informal finance. As informal financiers may have informational and monitoring advantages over formal financiers, who are likely to have a cost advantage, a small informal loan may be sufficient to induce enough screening and monitoring to legitimize the borrower in the eyes of a formal lender. The borrower then can take a larger loan from the formal lender, thereby keeping the credit cost low for the borrower's project. To gain further insight in the optimal structure between informal and formal finance, we define $Co-funding_{\,Informal<Formal}$ which equals one if informal finance is smaller than formal finance while both are positive, and zero otherwise. Similarly, $Co-funding_{\,Informal>Formal}$ equals one if informal finance is larger than formal finance while both are positive, and equals zero otherwise. Considering Hypothesis 3, we propose that $Co-funding_{\,Informal<Formal}$may be associated with a higher sales growth rate, in particular for small firms.

Model (4) of Table 6 shows that $Co-funding_{\,Informal<Formal}$ is associated with a 6.7 percentage points higher sales growth, while it is 0.7 percentage points lower for $Co-funding_{\,Informal>Formal}$, though neither the coefficients nor the difference between them are statistically significant. In addition, Model (5) shows that $Co-funding_{\,Informal<Formal}$ is associated with a higher sales growth for smaller firms, but a lower growth rate for larger firms.

Model (6) shows that $Co-funding_{Informal<Formal}$ is associated with a 19.7 percentage points higher sales growth for small firms,[36] but a 5.1 percentage points lower for a *Large Firm* though this estimate is statistically insignificant (i.e. the average sales growth rate is 27%). Besides, $Co-funding_{Informal>Formal}$ is associated with a 5.4 percentage points higher sales growth for *Small Firm*, while it is 7.6 percentage points lower for *Large Firm*, though neither $Co-funding_{Informal>Formal}$ nor its interaction term with *Large Firm* are statistically significant. The F-tests shows that none of the finance variables have a significant effect for *Large Firm*. We further find that both *Informal Only* and $Co-funding_{Informal<Formal}$ are lower than *Formal Only* for *Large Firm*, which is statistically significant at the 1% level and 5% level respectively in the F-test of Table 6. The effect of $Co-funding_{Informal<Formal}$ is larger than the effect of $Co-funding_{Informal>Formal}$, especially for *Small Firm*, although the difference is statistically insignificant.

In sum, due to the complementarity between informal and formal finance, the optimal choice for small firms generally turns out to be a combination of both financing sources. In particular co-funding with a minority proportion of informal finance is associated with a higher sales growth rate for small firms. As the information asymmetry may be more severe for small firms, they benefit from improved screening before the loan is granted and greater monitoring afterwards from the informal lender. At the same time, these firms may disproportionally benefit from cheaper funding from formal financing sources, consistent with Hypothesis 3.

6 Robustness

In this robustness section we will vary the definition, scope and measurement of informal finance. Furthermore, we will also deal with issues such as reverse causality, sample selection, and alternative measures for firm growth.

[36] The result is consistent with Robb and Robinson (2012) who find that startup firms rely heavily on bank finance and less on family members and friends. This is consistent with a co-funding financing profile with a minority proportion of informal finance.

6.1 Different definition, scope and measurement of informal finance

The main analysis excluded *trade credit* in our measure of informal finance. Trade credit is often included as part of informal finance in China (Cull, Xu and Zhu, 2009). We conduct a robustness check by broadening our concept of informal finance by including trade credit.[37] Table 7 displays the results. Models (2)-(3) show similar effects for *Informal* and *Formal*. *Informal* is associated with a higher sales growth for *Small Firm* but a lower growth for *Large Firm*, and the difference between *Informal* and *Formal* is negative and statistically significant for *Large Firm* (always using the F-test). However, we still find that *Co-funding* is associated with a higher sales growth for *Small Firm*, but a lower growth for *Large Firm* (and insignificant) in Model (6).[38] We find no difference between *Informal Only*, *Co-funding*, and *Formal Only* for *Small Firm*. However, *Co-funding* is better than *Informal Only* at the 10% level, while both are smaller than *Formal Only* at the 10% and 1% level for *Large Firm*. We therefore conclude that our results are robust to the inclusion of trade credit as a type of informal finance.

Family members and friends may be different from other informal finance sources such as ROSCAs, moneylenders and informal banks. Allen, Qian and Xie (2013) show that informal borrowings from family members and friends enhance firm growth while those from moneylenders are not associated with firm growth. Family members and friends are more likely to extend long-term loans with a low interest rate. Family members and friends are also more likely to have much more proprietary information about the borrowers and can enforce repayment through reputation and relationship, or renegotiate terms if repayment becomes an issue. Moneylenders, in contrast, may lack softer means of coercion and thus resort to illegal means to recover loans from a non-performing borrower. Family members and friends may have implicit equity ownership in the firm and non-economic incentives, while moneylenders may not have these considerations. These differences may affect the channel through which informal lenders can screen and monitor the borrowers.

[37] Trade credit is calculated as accounts payable. We get similar results if we substitute it with the accounts payable net of accounts receivable.
[38] Biais and Gollier (1997) show the bank will extend more credit if the supplier offers trade credit to the firm. As the supplier has more proprietary information than the bank, the offering of trade credit is a good signal about the firm.

Table 7 Trade Credit Included in Informal Finance. The table provides OLS estimations for the mode

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal	0.006	0.632**	0.097**			
	[0.027]	[0.258]	[0.044]			
Formal	0.073**	0.075	0.071			
	[0.030]	[0.273]	[0.049]			
Informal Only				0.051	0.845**	0.128**
				[0.042]	[0.374]	[0.055]
Co-funding				0.078*	0.646	0.155**
				[0.040]	[0.418]	[0.069]
Formal Only				0.113***	0.291	0.117**
				[0.036]	[0.310]	[0.059]
Finance Variables × Size Variables						
Informal × Size		-0.040**				
		[0.016]				
Formal × Size		-0.000				
		[0.017]				
Informal × Large Firm			-0.167***			
			[0.053]			
Formal × Large Firm			-0.008			
			[0.058]			
Informal Only × Size					-0.053**	
					[0.024]	
Co-funding × Size					-0.037	
					[0.025]	
Formal Only × Size					-0.013	
					[0.019]	
Informal Only × Large Firm						-0.223***
						[0.077]
Co-funding × Large Firm						-0.165**
						[0.080]
Formal Only × Large Firm						-0.068
						[0.073]
Control Variables						
Size	-0.038***	-0.022		-0.038***	-0.017	
	[0.009]	[0.014]		[0.009]	[0.015]	
Large Firm			-0.057			-0.037
			[0.047]			[0.052]
Constant	0.726***	0.489	0.182	0.723***	0.418	0.183
	[0.264]	[0.313]	[0.226]	[0.266]	[0.321]	[0.227]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,918	1,918	1,918	1,918	1,918	1,918
R-squared	0.049	0.053	0.054	0.050	0.054	0.055
F-Test						
Difference for Small Firm						
Informal - Formal = 0	-0.067	·	0.026	·	·	·
Co-funding - Informal Only = 0	·	·	·	0.027	·	0.027
Co-funding - Formal Only = 0	·	·	·	-0.035	·	0.038
Informal Only - Formal Only = 0	·	·	·	-0.062	·	0.011
Difference for Large Firm						
Informal + Informal × Large Firm - Formal - Formal × Large Firm = 0	·	·	-0.133***	·	·	·
Co-funding + Co-funding × Large Firm - Informal Only - Informal Only × Large Firm = 0	·	·	·	·	·	0.085*
Co-funding + Co-funding × Large Firm - Formal Only - Formal Only × Large Firm = 0	·	·	·	·	·	-0.059*
Informal Only + Informal Only × Large Firm - Formal Only - Formal Only × Large Firm = 0	·	·	·	·	·	-0.144***

Effect for Large Firm						
Informal + Informal × Large Firm = 0	•	•	-0.070**	•	•	•
Formal + Formal × Large Firm = 0	•	•	0.063*	•	•	•
Co-funding + Co-funding × Large Firm = 0	•	•	•	•	•	-0.010
Informal Only + Informal Only × Large Firm = 0	•	•	•	•	•	-0.095*
Formal Only + Formal Only × Large Firm = 0	•	•	•	•	•	0.049

$$Sales\ Growth\ = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variable is *Sales Growth*. *Informal* equals 1 if Trade Credit plus Informal Finance is positive, 0 otherwise; *Formal* equals 1 if Formal Finance is positive, 0 otherwise; *Informal Only* equals 1 if Formal Finance equals 0 and Trade Credit plus Informal Finance is positive, 0 otherwise; *Co-funding* equals 1 if both Formal Finance and Trade Credit plus Informal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Formal Finance is positive and Trade Credit plus Informal Finance is zero, 0 otherwise; the omitted group is firms without either formal finance, trade credit or informal finance; *Size* is log(1+sales in 2004); *Large Firm* equals 1 if *Size* falls above sample median, 0 otherwise; *Age*, *Partnership*, *Limited Liability*, *Corporation*, and industry and province fixed effects are included but their coefficients are not reported. F-tests for the difference of coefficients are reported with the significance in stars. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% level, respectively.

For these reasons we restrict the informal financing to loans from family members and friends (i.e. the results in Appendix 7). We find similar results for the role of informal finance, formal finance and co-funding, although the coefficients of the financing variables are insignificant in some specifications. In contrast with Allen, Qian and Xie (2013), it seems that loans from family members and friends are not so different with those from other informal financing sources in enhancing firm growth, which is consistent with the results on the two types of informal finance in Table 4.[39]

We now discuss the robustness to an alternative measurement of finance: loan size. While we up to now distinguish finance by category, loan size is conceivably relevant for firm growth. Depending on the firm size and financing source, loan size could motivate the lender's screening and monitoring activities. In other words, to harness the proprietary information advantage of informal lenders and the cost advantage of formal lenders, a $1 loan offers less motivation than a $ 1 million loan. Thus, we estimate an econometric model with loan size as the finance variable.

[39] We have also restricted informal finance to ROSCAs, moneylenders, and informal banks, and the results are qualitatively similar to Table 5 (i.e. informal finance from ROSCAs, moneylenders, and informal banks enhance firm growth for small firms but not large firms). It is inconsistent with Allen, Qian and Xie (2013) who show that informal finance from moneylenders endangers firm growth. One potential reason is that they focus on the average effect across small and large firms and that their sample firms are larger than ours (as Table 1 shows). Due to the high interest rates of moneylenders, large firms go to the moneylenders only when they are severely credit constrained and cannot obtain proper financing from family members and friends (i.e. these are firms with worse credit scores). This may lead to the negative association between the informal finance from moneylenders and firm growth.

Table 8 Loan outstanding and sales growth. The table provides OLS estimations for the model

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal Loan Outstanding	0.000		-0.000	0.010**		0.009**
	[0.003]		[0.003]	[0.004]		[0.004]
Formal Loan Outstanding		0.006***	0.006***		0.009**	0.007*
		[0.002]	[0.002]		[0.004]	[0.004]
Finance Variables × Size Variables						
Informal Loan Outstanding × Large Firm				-0.018***		-0.017***
				[0.005]		[0.005]
Formal Loan Outstanding × Large Firm					-0.005	-0.004
					[0.005]	[0.005]
Control Variables						
Size	-0.035***	-0.045***	-0.045***			
	[0.009]	[0.009]	[0.010]			
Large Firm				-0.065*	-0.119***	-0.070
				[0.035]	[0.041]	[0.045]
Constant	0.708***	0.848***	0.849***	0.215	0.204	0.218
	[0.256]	[0.265]	[0.267]	[0.221]	[0.223]	[0.220]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,970	1,970	1,970	1,970	1,970	1,970
R-squared	0.045	0.050	0.050	0.053	0.049	0.056
F-Test						
Difference for Small Firm						
Informal Loan Outstanding - Formal Loan Outstanding = 0	·	·	-0.006**	·	·	0.002
Difference for Large Firm						
Informal Loan Outstanding + Informal Loan Outstanding × Large Firm - Formal Loan Outstanding - Formal Loan Outstanding × Large Firm=0	·	·	·	·	·	-0.011***
Effect for Large Firm						
Informal Loan Outstanding + Informal Loan Outstanding × Large Firm = 0	·	·	·	-0.008***	·	-0.008*
Formal Loan Outstanding + Formal Loan Outstanding × Large Firm = 0	·	·	·	·	0.004*	0.003*

$$Sales\ Growth = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variable is *Sales Growth*. *Informal Loan Outstanding* is log(1+Informal Finance); *Formal Loan Outstanding* is log(1+Formal Finance); *Size* is log(1+sales in 2004); *Large Firm* equals 1 if *Size* is above the sample median, 0 otherwise; *Age*, *Partnership*, *Limited Liability*, *Corporation*, and industry and province fixed effects are included but their coefficients are not reported. F-tests for the difference of coefficients are reported with the significance in stars. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% level, respectively.

Model (1) in Table 8 shows that the size of the informal loan outstanding is irrelevant on average for firm growth, while Model (2) shows that the formal loan outstanding is associated with a higher sales growth rate. We confirm these results in Model (3) where we include both informal and formal loans outstanding, where the effect of informal loan out-

standing is assessed to be smaller than that of formal loan outstanding using an F-test. When adding the interaction terms with *Large Firm*, Model (4) in Table 8 shows that informal loan outstanding is associated with a higher sales growth rate for *Small Firm*, but a lower sales growth for *Large Firm* (both significant at the 1% level). In addition, Model (5) shows that the positive effect of formal loan outstanding is homogeneous over firm size as the interaction term is insignificant. We confirm the results in Model (6), where the estimate of informal loan outstanding is smaller than formal loan outstanding for *Large Firm*, and significant at the 1% level. There is no difference for *Small Firm* in the F-test. Overall, our tests confirm the robustness of the previous results with respect to the measurement of the finance variables.

6.2 Further robustness

This subsection deals with the following robustness-related issues: reverse causality, sample selection, and alternative measures for firm growth.

The potential reverse causality problem runs from firm growth to the finance variables. The finance variables are measured at the end of 2005 and *Sales Growth* is taken over the period 2004 to 2005. We deal with this problem by examining the effect of the mode of financing in the year of establishment of the firms on sales growth, and the annual employment growth rate from the year of establishment to 2005. Model (1) in Table 9 shows that the marginal effect of *Co-funding* in the year of establishment decreases with firm size, but is positive for sufficiently small firms and negative for sufficiently large firms. Model (3) confirms the results when restricting the sample to firms that are no more than three years old.[40] We find similar results in Model (5) for the annual employment growth rate (though statistically insignificant), and Model (7) when restricting the sample to firms no more than three years old. In addition, we find that *Co-funding* is better than *Informal Only* and *Formal Only* for *Small Firm* in Models (2) and (4) of Table 9, and the difference with *Formal Only* for *Small Firm* is significant at the 5% level in the F-test in Model (2). We find similar results in Models (6) and (8) for the annual employment growth rate. These findings indicate the main results are not driven by reverse causality.

[40] We restrict the sample to firms less than or equal to three years old in order to capture the effect of more recent financing. However, the results are robust to other cutoffs for firm age (e.g., four years).

Table 9 Finance in the year of establishment and firm growth. The table provides OLS estimations for the model

Dependent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sales Growth				Employment Growth			
	Full Sample		Subsample		Full Sample		Subsample	
Finance Variables								
Informal Only	0.070	0.040	0.524	0.090	0.016	0.002	0.191	0.023
	[0.090]	[0.045]	[0.324]	[0.125]	[0.041]	[0.021]	[0.164]	[0.074]
Co-funding	0.172*	0.060	0.833*	0.232	0.035	0.013	0.512**	0.192
	[0.094]	[0.050]	[0.462]	[0.191]	[0.046]	[0.026]	[0.230]	[0.123]
Formal Only	-0.025	-0.077	0.881**	0.086	-0.039	-0.040	0.232	0.033
	[0.118]	[0.060]	[0.437]	[0.146]	[0.047]	[0.026]	[0.161]	[0.076]
Finance Variables × Size Variables								
Informal Only × Size	-0.023		-0.176		-0.010		-0.072	
	[0.027]		[0.124]		[0.011]		[0.049]	
Co-funding × Size	-0.049*		-0.291**		-0.014		-0.150***	
	[0.027]		[0.139]		[0.011]		[0.056]	
Formal Only × Size	0.000		-0.293**		0.003		-0.079*	
	[0.031]		[0.148]		[0.011]		[0.044]	
Informal Only × Large		-0.096		-0.251		-0.036		-0.131
		[0.066]		[0.275]		[0.029]		[0.122]
Co-funding × Large		-0.101		-0.640**		-0.057*		-0.365***
		[0.068]		[0.294]		[0.032]		[0.138]
Formal Only × Large		0.090		-0.363		0.012		-0.147
		[0.077]		[0.280]		[0.032]		[0.109]
Control Variables								
Size	0.027		0.193		-0.037***		0.011	
	[0.022]		[0.122]		[0.009]		[0.044]	
Large Firm		0.043		0.266		-0.055***		0.087
		[0.048]		[0.232]		[0.021]		[0.087]
Constant	0.166	0.224	-0.286	0.175	0.237**	0.158	0.822***	0.917***
	[0.238]	[0.224]	[0.509]	[0.424]	[0.113]	[0.106]	[0.266]	[0.240]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,199	2,199	320	320	1,833	1,833	409	409
R-squared	0.038	0.039	0.205	0.187	0.131	0.112	0.173	0.162

F-Test								
Difference for Small Firm								
Co-funding - Informal Only = 0	•	0.020	•	0.142	•	0.011	•	0.169
Co-funding - Formal Only = 0	•	0.137**	•	0.146	•	0.053*	•	0.159
Informal Only - Formal Only = 0	•	0.117*	•	0.004	•	0.042	•	-0.010
Difference for Large Firm								
Co-funding + Co-funding × Large Firm - Informal Only - Informal Only × Large Firm = 0	•	0.015	•	-0.247	•	-0.010	•	-0.065
Co-funding + Co-funding × Large Firm - Formal Only - Formal Only × Large Firm = 0	•	-0.054	•	-0.131	•	-0.016	•	-0.059
Informal Only + Informal Only × Large Firm - Formal Only - Formal Only × Large Firm = 0	•	-0.069	•	0.116	•	-0.006	•	0.006
Effect for Large Firm								
Co-funding + Co-funding × Large Firm = 0	•	-0.041	•	-0.408**	•	-0.044**	•	-0.173**
Informal Only + Informal Only × Large Firm = 0	•	-0.056	•	-0.161	•	-0.034*	•	-0.108
Formal Only + Formal Only × Large Firm = 0	•	0.013	•	-0.277	•	-0.028	•	-0.114

$$Sales\ Growth\ /\ Employment\ Growth\ = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variables are *Sales Growth* in Models (1)-(4), and *Employment Growth* which are calculated from the year of establishment to 2005 in Models (5)-(8). Firms younger than or equal three years are included in Models (3)-(4) and (7)-(8). *Informal Only* equals 1 if Informal Finance at the year of establishment is positive and Formal Finance at the year of establishment equals 0, 0 otherwise; *Co-funding* equals 1 if both Informal Finance and Formal Finance at the year of establishment are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance at the year of establishment equals 0 and Formal Finance at the year of establishment is positive, 0 otherwise; the omitted group is firms without either informal or formal finance at the year of establishment. *Size* is log (1+number of employees in the year of establishment), and *Large Firm* equals 1 if *Size* falls above sample median, 0 otherwise; *Age*, *Partnership*, *Limited Liability*, *Corporation*, and industry and province fixed effects are included but their coefficients are not reported. F-tests for the difference of coefficients are reported with the significance in stars. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% level, respectively.

Table 10 Heckman selection model. The table provides estimations for a Heckman selection model with the main equation

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal	-0.007	0.814***	0.090**			
	[0.031]	[0.305]	[0.042]			
Formal	0.063**	0.035	0.052			
	[0.028]	[0.254]	[0.043]			
Informal Only				0.042	0.766*	0.110**
				[0.044]	[0.392]	[0.052]
Co-funding				0.037	0.825*	0.130**
				[0.043]	[0.473]	[0.063]
Formal Only				0.087***	0.060	0.069
				[0.032]	[0.297]	[0.053]
Finance Variables × Size Variables						
Informal × Size		-0.054***				
		[0.020]				
Formal × Size		0.001				
		[0.016]				
Informal × Large Firm			-0.207***			
			[0.061]			
Formal × Large Firm			0.007			
			[0.052]			
Informal Only × Size					-0.049*	
					[0.026]	
Co-funding × Size					-0.051*	
					[0.030]	
Formal Only × Size					0.000	
					[0.018]	
Informal Only × Large Firm						-0.217**
						[0.096]
Co-funding × Large Firm						-0.188**
						[0.084]
Formal Only × Large Firm						-0.006
						[0.062]
Control Variables						
Size	-0.028***	-0.017		-0.029***	-0.018	
	[0.008]	[0.013]		[0.008]	[0.013]	
Large Firm			-0.055			-0.052
			[0.039]			[0.042]
Constant	0.282	0.117	-0.119	0.287	0.121	-0.119
	[0.287]	[0.324]	[0.250]	[0.289]	[0.320]	[0.253]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,808	3,808	3,808	3,808	3,808	3,808
Wald-Statistic for Rho=0	50.86***	52.67***	53.44***	51.19***	52.49***	53.37***

$$Sales\ Growth\ = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

and the selection equation:

$$Selected\ = c_0 + c_1 CEO\ Age + c_2 Province\ Dummies + e'$$

The dependent variable is *Sales Growth* in the main equation, and *Selected* in the selection equation. *Selected* equals 1 if an observation is used in the main equation, 0 otherwise; *Informal Only* equals 1 if Informal Finance is positive and Formal Finance equals 0, 0 otherwise; *Co-funding* equals 1 if both Informal Finance and Formal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance equals 0 and Formal Finance is positive, 0 otherwise; $Co-funding_{Informal>Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise $Co-funding_{Informal<Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise; the omitted group is firms without either informal or formal finance. *Size* is log(1+sales in 2004); *Large Firm* equals 1 if *Size* is above the sample median, 0 otherwise; *Age*, *Partnership*, *Limited Liability*, *Corporation*, and industry and province fixed effects are included but their coefficients are not reported. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% level, respectively.

Next we consider the potential sample selection problem. Our full sample consists of 3,837 observations, but only 1,970 were used in the analysis. We deal with the sample selection bias using a Heckman selection model. As older CEOs may respond more actively than younger ones, less data items are missing in the questionnaires answered by older CEOs. We examine the probability of an observation being used in the regression using the CEO age and province dummies. Table 10 shows the results of the Heckman selection model.[41] Although the selection factor is statistically significant (Wald-Statistic for Rho=0), we still find similar coefficients for the finance variables as those in Tables 5 and Table 6.

Finally, we employ another measure for firm growth by examining the effect of finance on the *profit reinvestment rate*, as in Ayyagari, Demirgüç-Kunt and Maksimovic (2010). A higher profit reinvestment rate shows that the firm commits its own resources to finance growth rather than using the external funds to extract resources from the firm.[42] The results are reported in Table 11. Models (1)-(3) show that *Co-funding* is associated with a higher profit reinvestment rate and that the marginal effect decreases with firm size. In addition, we find that *Co-funding* is better than both *Informal Only* (significant at the 5% level) and *Formal Only* (significant at the 10% level) in the F-test in Model (1), and Model (3) for *Small Firm*. Again, we find consistent results suggesting that *Co-funding* is an optimal choice for the firms when looking at the profit reinvestment rate, as firms that have co-funding are willing to commit more of their own resources to finance firm growth.

[41] Due to the missing value for the age of the CEO, the full sample in the Heckman selection model consists of 3,808 (out of 3,837) observations, while the subsample in our analysis consists of 1,964 (out of 1,970) observations.
[42] See Cull and Xu (2005) on the role of contract enforcement, external finance and reinvestment decisions in China.

Table 11 Finance and profit reinvestment rate. The table provides OLS estimations for the model

	(1)	(2)	(3)
Finance Variables			
Informal Only	0.036	0.400	0.046
	[0.033]	[0.321]	[0.040]
Co-funding	0.115***	0.557**	0.159***
	[0.030]	[0.253]	[0.041]
Formal Only	0.067***	0.472***	0.086***
	[0.022]	[0.152]	[0.031]
Finance Variables × Size Variables			
Informal Only × Size		-0.024	
		[0.022]	
Co-funding × Size		-0.029*	
		[0.016]	
Formal Only × Size		-0.026***	
		[0.010]	
Informal Only × Large Firm			-0.030
			[0.070]
Co-funding × Large Firm			-0.093
			[0.059]
Formal Only × Large Firm			-0.042
			[0.043]
Control Variables			
Size	0.003	0.018**	
	[0.005]	[0.007]	
Large Firm			0.036
			[0.033]
Constant	0.271*	0.111	0.354*
	[0.163]	[0.160]	[0.182]
Province Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Observations	1,571	1,571	1,566
R-squared	0.092	0.097	0.092
F-Test			
Difference for Small Firm			
Co-funding - Informal Only = 0	0.079**	•	0.113**
Co-funding - Formal Only = 0	0.048*	•	0.073*
Informal Only - Formal Only = 0	-0.031	•	-0.040
Difference for Large Firm			
Co-funding + Co-funding × Large Firm - Informal Only - Informal Only × Large Firm = 0	•	•	0.050
Co-funding + Co-funding × Large Firm - Formal Only - Formal Only × Large Firm = 0	•	•	0.022
Informal Only + Informal Only × Large Firm - Formal Only - Formal Only × Large Firm = 0	•	•	-0.028
Effect for Large Firm			
Co-funding + Co-funding × Large Firm = 0	•	•	0.066
Informal Only + Informal Only × Large Firm = 0	•	•	0.016
Formal Only + Formal Only × Large Firm = 0	•	•	0.044

$$Profit\ Reinvestment\ Rate = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variable is Profit Reinvestment Rate in 2005, calculated as the profit reinvested over the profit after tax in 2005 for firms with positive profit after tax, and winsorized at 1 if the ratio is larger than 1. Informal Only equals 1 if Informal Finance is positive and Formal Finance is zero, 0 otherwise; Co-funding equals 1 if both Informal Finance and Formal Finance are positive, 0 otherwise; Formal Only equals 1 if Informal Finance is zero and Formal Finance is positive, 0 otherwise; the omitted group is firms without either informal or formal finance. Size is log (1+sales in 2004); Large Firm equals 1 if Size falls above sample median, 0 otherwise; Age, Partnership, Limited Liability, Corporation, and industry and province fixed effects are included but their coefficients are not reported. F-tests for the difference of coefficients are reported with the significance in stars. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% level, respectively.

7 Discussion of results

How much can banks glean from their awareness of informal borrowing activity by one of their prospective clients? Loan officers at banks typically must base their loan decision on hard information such as accounting statements, credit history, and other information from credit registries, as well as soft information such as information gained directly through long-term relationships with the borrowers, or indirectly through from a third-party hearsay. If a loan applicant has already obtained an informal loan, the loan officer may seek to learn more about it by asking the applicant directly or by discussing with third parties that are aware of the informal loan. Furthermore, some banks actually extend loans to informal lenders themselves that are intermediated to final borrowers, thus enabling the banks to track the informal borrowing activities of certain applicants and clients. In principle, banks have numerous opportunities to learn about and follow the informal borrowing activities of their customers.

Banks can also get informal lenders involved in a borrower's project by providing partial financing. Put differently, banks can promise a certain share of the borrower's credit demand, thereby forcing the borrower to ask informal lenders for the remainder. In addition, borrowers can only run the projects if they can obtain the rest of the funds from the informal lenders. Using an Indian sample of firms in 1999, Banerjee and Duflo (2012) show that 60% of the lines of credit are below the maximal credit limits calculated by the bank based on firm sales (i.e. credit demand). It seems that banks often provide partial financing to the firms, maybe pushing them to borrow the rest of the funds from informal lenders who can screen the borrowers using proprietary information. Of course, banks can still finance a worthy or potentially profitable project without observing any informal borrowing activity by its customer.

Does informal finance enhance social welfare? Allen and Qian (2010) argue that informal financing channels may be optimal in emerging economies as China and India. However, while informal finance can enhance firm growth by complementing formal finance, it is not necessarily a means to enhance social welfare. As the enforcement of informal finance often involves coercion and violence, the net effect of informal finance on social welfare is unclear.

Co-funding may also apply to other parts of the financial market as large firms raise funds from banks and markets (Houston and James, 1996; Krishnaswami, Spindt and

Subramaniam, 1999). Banks have an informational advantage while markets have a cost advantage (Carey and Rosen, 2000). This may explain the widespread presence of both financing sources in the financial markets. The results from the co-funding of informal and formal finance in China can therefore also cast light on the mix of public and private debt of firms in the industrial countries.

8 Conclusion

The relative impacts of informal and formal finance on firm growth have been widely discussed among policymakers. In this study, we employ a detailed Chinese survey dataset to reconcile mixed findings in the literature by demonstrating that informal finance is associated with a higher sales growth rate for small firms, and lower sales growth rate for large firms. Furthermore, we identified a complementary effect between informal and formal finance for small firms, but no such effect for large firms. Our results are robust to the inclusion of trade credit in the definition of informal finance, and also to different types and alternative measures of informal finance. Endogeneity, sample selection, or alternative measures of firm growth do not seem to drive our findings. The co-existence of informal and formal finance for the same firm may be an optimal choice for small firms, which may explain the persistent existence of informal credit markets in emerging economies such as China, where information asymmetries may remain fairly severe.

While government policies are sometimes geared to stamp out informal finance, it may be the case that a certain amount of informal finance actually enhances the growth of small firms due to the informal financier's advantages in screening potential borrowers and tracking borrower performance. While information asymmetries make lending to small firms difficult for banks, the problem can often be surmounted through the inclusion of informal financing in the mix. Notably, the role of informal finance does not scale up with firm size, and may even turn detrimental for the growth of larger firms.

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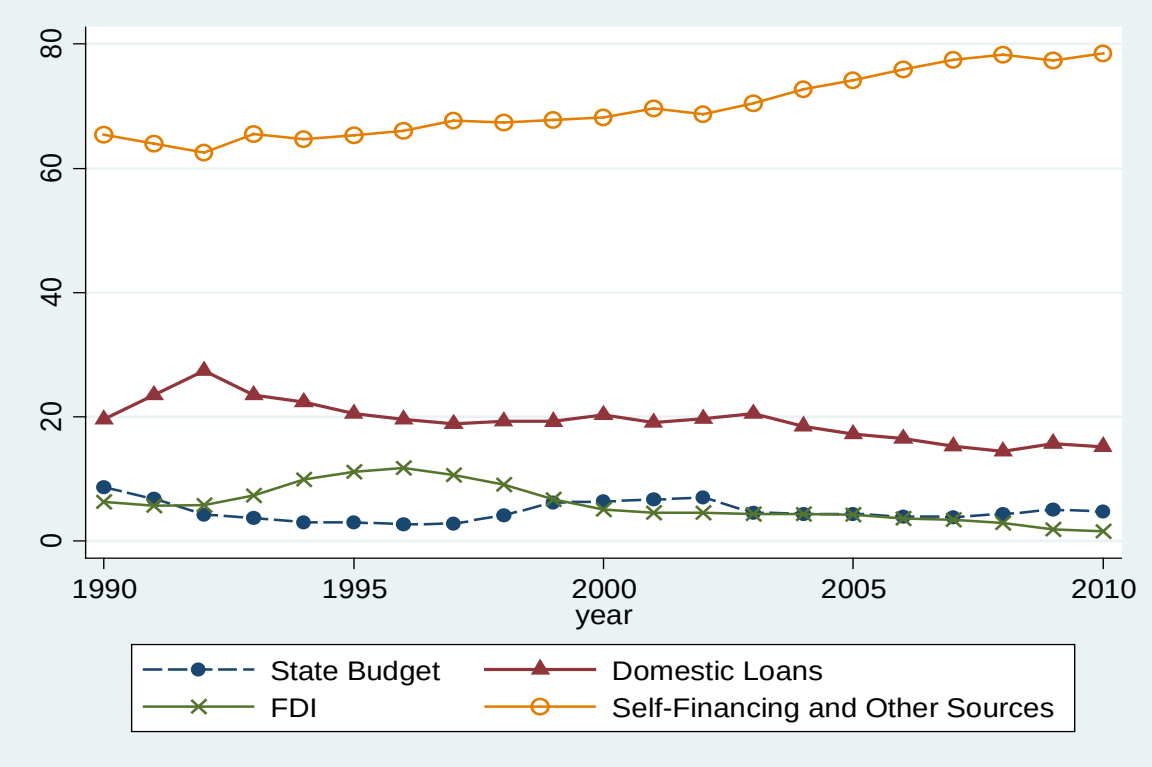
Appendix 1 Selected literature on finance and growth

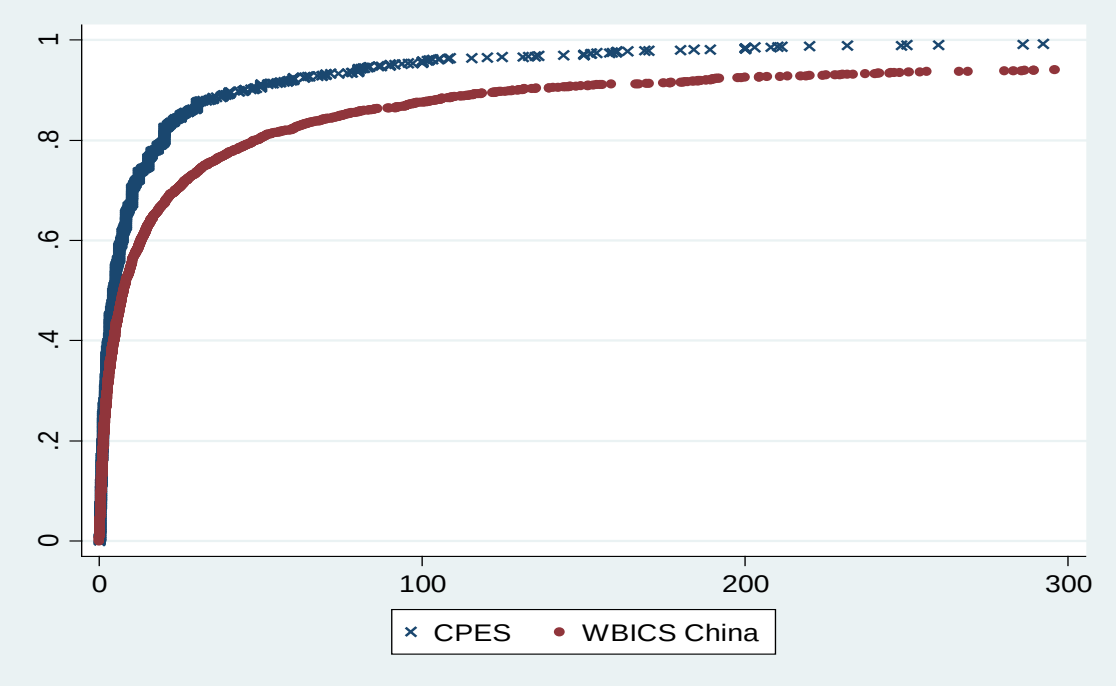
Paper	Sample			Analysis	
	Countries	Period	# Obs.	Level	Summary of Findings
This Paper	China	2005	3,837	Firm	Informal finance and co-funding are associated with higher growth for small firms; this is not the case for large firms.
Empirical Literature on China					
Allen, Qian and Qian, 2005	China	2002	17	Firm	Alternative financing channels and governance mechanisms such as those based on reputation and relationships support the growth of the private sector.
Ayyagari, Demirgüç-Kunt and Maksimovic, 2010	China	2002	2,400	Firm	Bank finance is associated with faster firm growth; informal finance is not.
Cheng and Degryse, 2010	China	1995-2003	243	Province - Year	Bank development (particularly bank credit) greatly contributes to provincial economic growth. The development of non-bank financial institutions, which have characteristics of both formal and informal finance, is not correlated with growth.
Turvey and Kong, 2010	China	2008	1,565	Household	Informal finance among family members and friends may outcompete formal and semi-formal finance in the Chinese context.
Micro Empirical Literature on Other Countries					
Gine, 2011	Thailand	1997	2,535	Household	The limited ability of banks to enforce contracts (beyond transaction costs) is responsible for the coexistence of formal and informal lending in rural financial markets.
Melzer, 2011	U.S.	1997, 1999, 2002	42,000	Household	Payday loan access with a high debt service burden can exacerbate the difficulties of some low-income households struggling to pay mortgage, rent and utility bills.
Macro Empirical Literature on Other Countries					
Beck, Demirguc-Kunt, Maksimovic, 2005	54 Countries	1995-1999	4,255	Firm	Growth rates of the smallest firms are most constrained by the financial, legal, and corruption obstacles. Financial and institutional development weakens these constraining effects, thereby benefiting small firms the most.
Beck, Demirguc-Kunt, Laeven and Levine, 2008	44 Countries	1980-1990	1,231	Country - Industry	Financial development exerts a disproportionately positive effect on small firms.
Guiso, Sapienza and Zingales, 2004	Italy	1992-1998	326,950	Firm-Year	Local financial development enhances the probability that an individual starts a business, favors the entry of new firms, increases competition, and promotes growth. These effects are weaker for larger firms.
King and Levine, 1993	80 Countries	1960-1989	80	Country	The level of financial development is associated with real per capita GDP growth, the rate of physical capital accumulation, and improvements in the efficiency of physical capital.
Rajan and Zingales, 1998	41 Countries	1980-1990	1,217	Country - Industry	Industries that are relatively more in need of external finance develop disproportionately faster in countries with more developed financial markets. This may reduce the costs of external finance for firms.

Appendix 2 Proportion of Financing Sources for Fixed Asset Investment in China



Note: In percentage points. Data source: National Bureau of Statistics of China.

Appendix 3 A comparison of sample distribution for annual sales



Note: The figure plots the sample distribution functions of annual sales in 2000 for the *China Private Enterprise Survey* (CPES) versus the annual sales in 2000 for the *World Bank Investment Climate Survey* in China (WBICS China). Distribution functions are only plotted for firms with annual sales less than or equal RMB 300 million, a typical threshold of the definition for small and medium-sized enterprises (SMEs) in China.

Appendix 4 Dynamics of finance status

		Finance Status at the End of 2005 (All Firms)				
		Informal Only	Co-funding	Formal Only	No Financing	Total
Finance Status in Year of Establishment	Informal Only	21.91%	13.07%	23.14%	41.87%	100%
	Co-funding	8.10%	29.05%	44.41%	18.44%	100%
	Formal Only	4.94%	12.50%	57.85%	24.71%	100%
	No Finance	6.98%	7.55%	31.62%	53.85%	100%

		Finance Status at the End of 2005 (Small Firm)				
		Informal Only	Co-funding	Formal Only	No Financing	Total
Finance Status in Year of Establishment	Informal Only	29.34%	9.78%	9.78%	51.10%	100%
	Co-funding	13.07%	33.33%	32.03%	21.57%	100%
	Formal Only	8.76%	12.41%	43.07%	35.77%	100%
	No Finance	8.51%	7.45%	16.76%	67.29%	100%

		Finance Status at the End of 2005 (Large Firm)				
		Informal Only	Co-funding	Formal Only	No Financing	Total
Finance Status in Year of Establishment	Informal Only	12.45%	17.27%	40.16%	30.12%	100%
	Co-funding	4.39%	25.85%	53.66%	16.10%	100%
	Formal Only	2.42%	12.56%	67.63%	17.39%	100%
	No Finance	5.21%	7.67%	48.77%	38.34%	100%

These tables show the proportion of finance status at the end of 2005 sorted by the categories of the finance status in the year of establishment of the firm. A firm is a *Small Firm* if *Size* falls above sample median, and a *Large Firm* if *Size* falls below sample median; *Informal Only* equals 1 if Informal Finance is positive and Formal Finance is zero, 0 otherwise; *Co-funding* equals 1 if both Informal Finance and Formal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance equals 0 and Formal Finance is positive, 0 otherwise; *No Finance* equals 1 if firms with neither informal nor formal finance. All finance variables are calculated using the data both from the establishment year and at year-end 2005. Informal Finance in the year of establishment includes loans from moneylenders, loans and gifts from relatives and friends, fund-raising, and other sources; Informal finance at the end of 2005 includes loans from family members and friends, ROSCAs, moneylenders, and informal banks.

Appendix 5 Correlation coefficients

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
Sales Growth	[1]	1													
Informal	[2]	0.0214	1												
Formal	[3]	0.0271	0.0645*	1											
Informal Only	[4]	0.0231	0.6121*	-0.3537*	1										
Co-funding	[5]	0.0059	0.6957*	0.4019*	-0.1421*	1									
Formal Only	[6]	0.0240	-0.4342*	0.7515*	-0.2658*	-0.3021*	1								
$\text{Co}-\text{funding}_{\text{Informal}>Formal}$	[7]	-0.0058	0.3322*	0.1919*	-0.0679*	0.4775*	-0.1442*	1							
$\text{Co}-\text{funding}_{\text{Informal}<Formal}$	[8]	0.0102	0.5883*	0.3399*	-0.1202*	0.8456*	-0.2554*	-0.0652*	1						
Informal Loan Size	[9]	0.0220	0.9916*	0.0770*	0.5861*	0.7088*	-0.4305*	0.3445*	0.5957*	1					
Formal Loan Size	[10]	0.0280	0.0382	0.9831*	-0.3477*	0.3636*	0.7615*	0.1385*	0.3288*	0.0563*	1				
Size	[11]	-0.1058*	-0.1224*	0.3534*	-0.1726*	0.0036	0.3654*	-0.0325	0.0238	-0.0805*	0.4452*	1			
Age	[12]	-0.0621*	-0.0726*	0.1175*	-0.0717*	-0.0258	0.1409*	0.0060	-0.0329	-0.0601*	0.1354*	0.2048*	1		
Partnership	[13]	-0.0294	0.0023	-0.0128	-0.0144	0.0160	-0.0249	-0.0138	0.0265	-0.0005	-0.0240	-0.0862*	-0.0210	1	
Limited Liability	[14]	0.0032	0.0060	0.0571*	-0.0238	0.0292	0.0384	-0.0329	0.0531*	0.0213	0.0869*	0.2222*	-0.0380	-0.3568*	1
Corporation	[15]	-0.0205	-0.0110	0.0562*	-0.0192	0.0037	0.0559*	0.0175	-0.0065	-0.0057	0.0686*	0.1337*	0.0175	-0.0657*	-0.3680*

The table presents pair-wise correlation coefficients for all variables. *Sales Growth* is the log difference of the annual sales in 2005 and 2004; *Informal* equals 1 if Informal Finance is positive, 0 otherwise; *Formal* equals 1 if Formal Finance is positive, 0 otherwise; *Informal Only* equals 1 if Informal Finance is positive and Formal Finance is zero, 0 otherwise; *Co-funding* equals 1 if both Informal Finance and Formal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance equals 0 and Formal Finance is positive, 0 otherwise; $Co-funding_{Informal>Formal}$ equals 1 if Informal Finance is larger than Formal Finance and both are positive, 0 otherwise; $Co-funding\ Informal<Formal$ equals 1 if Informal Finance is smaller than Formal Finance and both are positive, 0 otherwise; *Informal Loan Size* is log(1+Informal Finance); *Formal Loan Size* is log(1+Formal Finance); *Size* is log(1+sales in 2004); *Age* is firm age; *Partnership*, *Limited Liability*, *Corporations* equals 1 if a firm is registered as partnership, limited liability company, and public stock-holding corporation respectively, 0 otherwise. Significance * at 5% level.

Appendix 6 Firm characteristics by financing sources

No Finance

Variable Name	N	Mean	Median	Std.Dev	Min	P25	P75	Max
Sales Growth	766	0.24	0.18	0.60	-2.85	0.04	0.37	5.82
Size	766	15.03	15.04	1.78	10.31	13.85	16.12	21.36
Age	766	7.34	6	4.10	2	4	9	21
Partnership	766	0.07	0	0.25	0	0	0	1
Limited Liability	766	0.64	1	0.48	0	0	1	1
Corporation	766	0.05	0	0.22	0	0	0	1

Informal Only

Variable Name	N	Mean	Median	Std.Dev	Min	P25	P75	Max
Sales Growth	219	0.31	0.22	0.61	-2.56	0.07	0.46	3.32
Size	219	14.69	14.73	1.64	10.82	13.59	15.80	20.66
Age	219	6.87	6	3.72	2	4	10	19
Partnership	219	0.05	0	0.22	0	0	0	1
Limited Liability	219	0.63	1	0.48	0	0	1	1
Corporation	219	0.05	0	0.22	0	0	0	1

Co-funding

Variable Name	N	Mean	Median	Std.Dev	Min	P25	P75	Max
Sales Growth	274	0.28	0.20	0.66	-3.75	0.06	0.42	5.88
Size	274	15.67	15.79	1.82	9.90	14.40	16.95	19.81
Age	274	7.46	7	4.03	2	4	10	21
Partnership	274	0.07	0	0.25	0	0	0	1
Limited Liability	274	0.70	1	0.46	0	0	1	1
Corporation	274	0.07	0	0.25	0	0	0	1

Formal Only

Variable Name	N	Mean	Median	Std.Dev	Min	P25	P75	Max
Sales Growth	711	0.29	0.22	0.47	-4.01	0.10	0.44	2.89
Size	711	16.60	16.81	1.87	11.29	15.42	17.90	21.77
Age	711	8.54	8	4.57	2	5	11	21
Partnership	711	0.05	0	0.22	0	0	0	1
Limited Liability	711	0.69	1	0.46	0	0	1	1
Corporation	711	0.08	0	0.27	0	0	0	1

Appendix 7 Informal finance: family members and friends

	(1)	(2)	(3)	(4)	(5)	(6)
Finance Variables						
Informal_Family Members and Friends	-0.029	0.569*	0.054			
	[0.034]	[0.323]	[0.050]			
Formal	0.073**	0.072	0.071			
	[0.030]	[0.283]	[0.050]			
Informal Only				0.015	0.407	0.075
				[0.052]	[0.452]	[0.066]
Co-funding				0.015	0.525	0.090
				[0.043]	[0.459]	[0.065]
Formal Only				0.079**	-0.113	0.053
				[0.031]	[0.302]	[0.054]
Finance Variables × Size Variables						
Informal × Size		-0.039*				
		[0.021]				
Formal × Size		-0.000				
		[0.017]				
Informal × Large Firm			-0.166**			
			[0.065]			
Formal × Large Firm			-0.017			
			[0.059]			
Informal Only × Size					-0.027	
					[0.030]	
Co-funding × Size					-0.033	
					[0.029]	
Formal Only × Size					0.011	
					[0.018]	
Informal Only × Large Firm						-0.181*
						[0.101]
Co-funding × Large Firm						-0.150*
						[0.083]
Formal Only × Large Firm						0.006
						[0.064]
Control Variables						
Size	-0.042***	-0.034**		-0.041***	-0.039**	
	[0.009]	[0.014]		[0.009]	[0.015]	
Large Firm			-0.095**			-0.104**
			[0.043]			[0.046]
Constant	0.806***	0.684**	0.215	0.794***	0.764**	0.213
	[0.263]	[0.306]	[0.220]	[0.263]	[0.315]	[0.223]
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,970	1,970	1,970	1,970	1,970	1,970
R-squared	0.048	0.051	0.051	0.048	0.051	0.050

The table provides OLS estimations for the model:

$$Sales\ Growth\ = b_0 + b_1 Finance + b_2 Size + \theta_1 Finance \times Size + b_3 Age + b_4 Partnership + b_5 Limited\ Liability + b_6 Corporation + b_7 Province\ Dummies + b_8 Industry\ Dummies + e$$

The dependent variable is *Sales Growth*. *Informal_Family Members and Friends* equals 1 if Informal Finance from family members and friends are positive, 0 otherwise; *Formal* equals 1 if Formal Finance is positive, 0 otherwise; *Informal Only* equals 1 if Informal Finance from family members and friends is positive and Formal Finance equals 0, 0 otherwise; *Co-funding* equals 1 if both Informal Finance from family members and friends and Formal Finance are positive, 0 otherwise; *Formal Only* equals 1 if Informal Finance from family members and friends equals 0 and Formal Finance is positive, 0 otherwise; the omitted group is firms without either Informal Finance from family members and friends or Formal Finance. *Size* is log(1+sales in 2004); *Large Firm* equals 1 if *Size* is above the sample median, 0 otherwise; *Age*, *Partnership*, *Limited Liability*, *Corporation*, and industry and province fixed effects are included but their coefficients are not reported. Heteroskedasticity robust standard errors are in brackets, significance * at the 10%, ** at the 5%, *** at the 1% level, respectively.

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