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Understanding informal financing☆

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ABSTRACT

This paper offers a framework to understand informal financing based on mechanisms to deal with asymmetric information and enforcement. We find that constructive informal financing such as trade credits and family borrowing that relies on information advantages or an altruistic relationship is associated with good firm performance. Underground financing such as money lenders who use violence for enforcement is not. Constructive informal financing is prevalent in regions where access to bank loans is extensive, while its role in supporting firm growth decreases with bank loan availability. International comparisons show that China is not an outlier but rather average in using informal financing.

1. Introduction

The focus of this paper is on the role played by informal financing—that is, financing that occurs without a formal financial intermediary between savers and borrowers—in economic growth. Kandori (1992) and Udry (1994) emphasize the nature of self-enforcing contracts as opposed to social sanctions for repayment to differentiate formal from informal financing. In empirical studies, informal financing often includes but is not restricted to: trade credit, interpersonal borrowing (money from friends or families), private money houses, pawnshops, community cooperatives, and so forth. These sources meet the criteria usually suggested by the existing theoretical definitions of informal financing through social sanctions and the lack of formal intermediation. Our study explicitly specifies informal financing as operating within social or business networks in the absence of a formal financial intermediary. In an economy in which formal financing is also available, what is the role of informal financing in supporting the growth of firms and the economy? The purpose of this paper is to confront this question empirically. Our focus is on China, but we also examine data for twelve other emerging market countries.

We distinguish between "constructive informal financing" and "underground financing" (loan sharks and the like; see Greenbaum et al. (2015) for a discussion of the role played by such lenders vis à vis formal lenders). Our main result is that constructive informal financing, which serves smaller, younger firms, is associated with positive growth of firms and the economy. Underground financing is not.

We start with the observation that for a financing channel to play an effective role, it needs to overcome adverse selection and moral hazard problems associated with asymmetric information, and to deal with recourse in case of default. It is widely acknowledged that banks' and markets' failures in these dimensions for small and medium size enterprises (SMEs) lead to inadequate financing for them. The theoretical work on informal financing typically assumes that the informal sources (investors) have superior information through business relations or social networks to help monitoring and enforcement, and hence reduce moral hazard and/or adverse selection problems.[1]

Our classification of informal financing is based on whether there exists an information advantage to overcome frictions and whether enforcement methods are non-violent. We define constructive informal financing as those transactions that derive their information and

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[1] For example, Banerjee et al. (1994), Jain (1999), Stiglitz (1990), and Varian (1990) study the information advantage in some informal sources. Gine (2011), Mookherjee and Png (1989), and Prescott (1997) stress the importance of risk assessment. Finally, Ghatak (1999) focuses on how to overcome adverse selection.

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enforcement technology from business or social relationships, mainly trade credits and family borrowing. This type of financing typically aims at supporting business operations and uses business or social relationships to reduce asymmetric information and to assist collection, recovery or recourse. The pricing of such loans considers the credit worthiness, collateral usage, and risk of production and recovery. For example, Biais and Gollier (1997) and Petersen and Rajan (1997) argue that trade credit can solve the asymmetric information problem associated with bank financing, which precludes small or young firms from bank credits, because usage of trade credits incorporates private information between suppliers and their customers. Informal financing based on social networks may also involve an altruistic relationship (Lee and Persson, 2016).

Underground financing, on the other hand, we define as being transactions which have no superior information advantage and may rely on a network only in a loose sense. This type of financing is often made to speculative activities, charges extremely high interest rates or fees, and employs violence rather than legal recourse to collect payments or renegotiate in the case of delinquency. In terms of pricing, contract, and enforcement, these financing channels operate within a grey area or beyond legal boundaries, e.g., loan sharks.

There are also informal sources that are hard to classify unconditionally, for example, rotating savings and credit associations (Besley et al., 1993). These group lending methods increase members' welfare under certain conditions but may have a negative implication on social relationships, including violence in some circumstances (Ghatak and Guinnane, 1999; Montgomery et al., 1996).

Using the World Banks' survey on SMEs, we empirically examine the role of each category above in supporting firm and economy growth. We choose Chinese firms as our primary sample because the literature's controversy regarding the role of informal financing mainly comes from Chinese evidence, and also because there are a variety of informal financing practices and large across region variations in China. Nevertheless, we use the international sample to verify that the Chinese case is not an outlier.

Clearly, financing and firm growth are endogenous. We address this issue by controlling for propensity score in regressions and applying a matching method in the sample. In the former approach, we control for the selection bias in examining the finance and growth relation. In the latter approach, taking firms that actually use a particular financing source as the treatment sample, we match each treatment firm with a control firm that has the same propensity to use this source but factually does not. We then draw the inference about the finance-growth relation within the matched sample. We also examine the cross sectional implications of the finance-growth argument to address the potential alternatives associated with unobservable variables.

We find that the usage of informal financing is more popular in smaller, younger, and less audited firms. Constructive informal financing is positively associated with firm growth but underground financing is not. Furthermore, constructive informal financing is prevalent in regions where access to bank loans is extensive and business-government relationships are good. Both constructive financing and bank financing are positively associated with firm growth, however, their interactive role in supporting firm growth decreases as they become large. Data on 12 largest emerging economies covered by the same World Bank survey show that China is an average rather than an outlier in using informal financing.

Admittedly, constructive informal financing's positive role in supporting firm growth may be size-dependent, as constructive informal financing is more popular in smaller firms that typically have limited access to bank loans. This size-dependence is arguably under-estimated in our study because our sample covers Chinese private firms that are on average smaller than SOEs and firms in developed countries such as US and UK. Degryse et al. (2016) illustrate the size-dependent advantage of informal financing in more detail. They find that informal financing is positively associated with asset growth in small firms, but not in large firms. As constructive informal financing has an informational advantage and formal financing is more scalable, firms should attempt to take advantage of both.

Our classification of informal financing into constructive and underground financing and evidence on their respective roles in supporting firm growth offers empirical support to the large strand of theoretical literature that emphasizes superior information and monitoring technology in explaining the popularity of informal financing. They are consistent with the predictions in Allen et al. (2017) that model formal and informal financing in a general theoretical framework based on mechanisms used to deal with information production and contract enforcement and solve for entrepreneurs' financing choices and project outcomes.

Our unique approach and findings also reconcile the contradictory evidence in the empirical literature on the economic role of informal financing. In particular, while Allen et al. (2005, AQQ 2005 subsequently) document informal financing as the driving force in supporting the private sector in China; Ayyagari et al. (2010, ADM 2010 subsequently) show that bank financing, not informal financing, is associated with the growth of Chinese firms. We reconstruct ADM (2010)'s key tables but differentiate constructive informal financing from underground financing. We find that the constructive informal financing is positively associated with firm growth.[2]

Our findings also shed light on the debate in the literature on whether firms use informal financing as a second-best choice when formal financing is unavailable or prefer a particular source due to specific firm conditions. Though our paper does not address this question directly, our mechanism-based classification provides a framework that makes informal financing and bank financing more comparable. As both sources rely on agents' sophistication in dealing with asymmetric information, monitoring, and recourse effectively, the development of constructive informal financing and bank finance are complementary. Consistent with this premise, we show that firms operating in regions with extensive bank loan access have prevalent access to constructive informal financing. Song and Thakor (2010) model the interaction of markets and banks with substitution, complementarity, and co-evolution. The analogue between interactions of banks with markets and banks with informal financing is intuitive. While the literature has not offered a clear understanding of co-evolution of bank financing and informal financing, it is possible to argue that the new developments in FinTech such as P2P and crowd-funding attempt to draw on the intermediation advantages of bank financing and the information advantage of financing within social and business networks.

With regard to destructive underground financing, its existence in business financing is possibly due to severe temporary liquidity constraints. Indeed, we find that the usage of underground finding is popular only in small firms that are experiencing extremely difficult financial conditions. Allen et al. (2017) shows that although underground financing motivates entrepreneurs to exert higher effort than bank financing does, its potential optimality in terms of the project outcome and social welfare depends on how the loan interest is determined by the capital market, through competition or government regulation and the parameter values of the cost of enforcement through social sanctions.

Studies on China's financial system reform debate whether the government's ban on some informal financing in the 1990s was

[2] Another data treatment issue that drives the different results in AQQ (2005) and ADM (2010) is how the unidentified sources "other" are labeled. AQQ (2005) treat them as part of informal financing since all the formal sources have been exhausted in the grouping. ADM (2010) however treat it as internal financing, possibly due to the reason that this treatment makes the internal financing level comparable to other countries. In our paper, we exclude the "other" from analysis in the first part of the paper since the sources hence the mechanisms are not identified. Later in the paper, we consider the components of "other".

politically or economically driven. Our mechanism-based approach offers a benchmark to evaluate the two positions.

Similar to the development of capital market, wealth accumulation and informal financing are endogenous. Therefore, family value and interpersonal/community trust provide not only a funding opportunity but also possibly a pooling function, both of which might exogenously trigger a positive feedback effect on wealth accumulation and the role of informal financing.

Finally, our study provides a generic lesson that information acquisition and enforcement capacity play key roles for financial intermediaries to work regardless of the specific formality. While banks use collateral to reduce risk, suppliers who lend to client firms can use their implicit equity stake in the firms to provide protection. Broadly speaking, the effect of financial intermediation depends on its underlying information mechanism rather than whether it is formal or informal.

The remainder of the paper is organized as follows. In Section 2, we discuss various sources of informal financing, the mechanisms they rely on, and the role they play in supporting firm growth. Section 3 introduces the data. Section 4 presents the empirical results. Section 5 conducts robustness checks in the international sample. Section 6 concludes the paper.

2. Informal financing mechanisms and classifications

The role of financial intermediaries such as banks and direct financing through equity markets is to bridge the gap between economic agents with a surplus and those with a deficit of capital. However, asymmetric information between banks/markets and firms may preclude financing for valuable projects. The asymmetric information problem is particularly severe for small firms, firms without bank relationships, and during credit tightening periods. It is also particularly severe in developing countries that usually have less developed financial systems, inadequate business laws, and insufficient intermediary service.

China provides a rich paradigm to study informal finance. The development of the financial system lags behind the fast-growing economy and the informal sector nurtured millions of small firms that are usually not lent to by banks and financial markets. Government policy is for banks to prioritize state-owned firms in terms of credit allocation and empirical evidence shows that this is indeed the case. The rationale for the bank policies to bias towards state-owned firms and against the private sector include the state ownership of banks, asymmetric information between banks and private firms, the lack of sound accounting practices and credit evaluation methods, and the problem of contract enforcement. To overcome financing constraints, private firms in China have widely adopted many alternative financing sources.

Tsai (2004) is one of the pioneering works on informal financing in China. Through rich field interviews, she documents a broad set of informal sources used by Chinese entrepreneurs: interpersonal lending, trade credits, money lenders, loan sharks, rotating savings, credit organization, pawnshops, indigenous banks, money houses, mutual assistance societies, and so forth.[3] She also documents many anecdotal stories on how informal financing is used to support entrepreneurship. She differentiates these informal sources mainly along legal lines. For example, interpersonal lending and trade credit, the most basic strategies that entrepreneurs use to satisfy short-term liquidity needs, are legal because the interest rate does not exceed the government required ceiling.[4] In contrast, loan sharks and private money houses charge much higher interest rates or fees and these loans are regarded as illegal by the People's Bank of China. Some informal sources' legal status varies over time and across regions. For example, rotating savings was once a praised practice in rural China but now is banned in most Chinese cities. Some pawnshops are legally registered, while some others are registered with non-financial regulators and may or may not engage in lending practices deemed to be illegal.

We want to classify informal financing sources, ex-ante, based on the mechanisms they rely on for the purpose of information production and repayment enforcement. This is because the effectiveness of these informal sources in supporting firm operation largely depends on how they overcome asymmetric information. The mechanism they use needs to address the moral hazard and adverse selection problems that drive away formal financing in the first place.

Based on our definition of informal financing through social/business networks and social sanctions in repayment, we adopt two criteria to separate constructive informal financing from underground financing: (a) information technology for monitoring, risk control, and pricing, and (b) the coercion and violence mechanism in case of delinquency. The first category, namely constructive informal financing, includes trade credit, small loan companies, banks' credit extension arms, registered pawnshops or financing companies, direct and informed lending between direct family members and close relatives. These informal sources use personal, community, or business relationships to reduce asymmetric information and reduce risk through economic collateral. The price of funding reflects both the risk and the closeness of the relationship – the value of social bonding. In the case of delinquency or default, there are sufficient economic and social connections that facilitate renegotiation and resolutions. The second category, namely underground financing with a coercion mechanism, includes loan sharks, unregistered pawnshops, lending agencies and loan brokers. These informal sources have little information technology to rely on. They are less concerned about the risk of the project and even less to monitor or control risk. The pricing of loans is usually fixed at a predatory rate. In the case of delinquency, violence may be used to force repayment. We present the categorization in Table 1.

Given regulators' concern with the social impacts of informal financing institutions, our classification is naturally correlated with these financing channels' legal status and lending targets. The constructive sources are often legally permitted and target entrepreneurship activities. Underground sources, on the other hand, are often illegal and target speculative activities such as gambling.

Nevertheless, our mechanism-based approach is still distinct from the issue of legality. One example is credit cooperatives such as rotating savings, credit organizations, rural cooperative foundations, and mutual benefit funds that existed in China till the late 1990s. These indigenously organized informal institutions played an extremely important role in the early stage of China's reform especially in allowing rural households to transition from agriculture to entrepreneurship (Qian and Huang, 2016). However, they were declared to be illegal by

[3] We borrow one example from Tsai (2004) about an owner of a factory with more than 30 employees, in Zhejiang province. Owner Lin never borrowed from formal sources, as he said, "It's not worth it to me to apply for a loan from a state bank or rural credit cooperative because the credit officers are dirty and rip me off given my family background. If I applied for a 100,000 RMB (US $12,000) loan, I would only receive 60,000 RMB (US$7200) because the credit officer would pocket the other 40,000 RMB (US$4800). Meanwhile, I would still be expected to pay interest on 100,000 RMB". Lacking official connections and thus less interested in formal finance, Owner Lin managed to invest 700,000 RMB (US$84,000) in his motorcycle parts factory by using 100,000 RMB (US$12,000) of his own savings, borrowing 200,000 RMB (US$24,000) interest free from his four older siblings, and borrowing 400,000 RMB ($48,000) at 24% annual interest through moneylenders. The latter loans were guaranteed by his sisters who have good credit among moneylenders in the textile sector.

[4] By the law established by the Chinese Supreme Court and enacted since August 1991, the ceiling for interest rates is four times the rate for a similar bank loan.

Table 1
Classification of informal financing.

	Constructive informal financing	Underground financing
Criterion 1: Informational mechanisms		
Information technology	Personal relationship, social relationship, or business relationship	No relationship or indirect network
Monitoring and risk assessment	Social collateral Economic collateral	None
Pricing	Linked to risk and collateral	Fixed predatory rate or fees
Criterion 2: Repayment/Enforcement		
Recourse/renegotiation in case of delinquency	Restructuring arrangement	Violence
Correlated issues		
Lending targets	Entrepreneurship, business operation, production	Speculation, consumption, or gambling
Legal status	Legal or socially acknowledged	Illegal or socially impermissible
Examples	Trade credit, small loan company, banks' credit extension arms, registered pawnshops or financing companies, interpersonal lending between family and relatives	Loan sharks, unregistered pawnshop, self-claimed lending agency or loan broker

the People's Bank of China in the late 1990s and were banned. Despite their illegal status, if financing in these forms were identified, our classification rule would label them constructive informal financing because of their relationship based nature, their purpose to support entrepreneurship, and their mutual monitoring mechanism to reduce risk and facilitate recourse.

Our mechanism-based classification offers a general framework to understand informal financing. Applying this unified framework, we can identify constructive informal financing in different information environments: Although their specific form may change over time or across countries, the essential mechanisms share similarities. This approach predicts ex-ante whether a specific informal source fills the financing gap for SMEs and supports economic growth effectively by verifying whether this source has a mechanism to address informational issues – the difficulty in information production and risk control that cause formal financing through banks and markets to fail. On the other hand, financing sources that fail these measures are not likely to have any positive effect on firm performance. In what follows, we empirically test the above hypothesis using survey data on Chinese SMEs.

3. The data

3.1. The survey

We use the same survey data for Chinese firms as in ADM (2010). This World Bank Investment Climate survey[5] was undertaken in early 2003 in collaboration with the Enterprise Survey Organization of the Chinese National Bureau of Statistics. It is part of the World Bank Enterprise Surveys which use standardized survey instruments and a uniform sampling methodology to investigate the investment climate of countries across the world. The Enterprise Surveys sample from the universe of registered businesses using a stratified random sampling methodology in each country.

The Chinese survey covers 2400 firms from 18 cities that are representative of a wide range of regions in China. The firms are randomly selected from both manufacturing and services industries with a restriction on minimum firm size measured by the number of employees. The minimum number of employees was set at 20 for manufacturing firms, and at 15 employees for services firms.

There are two sections in the survey questionnaires. The first section asks for general information about the firm, its relations with clients, suppliers and government, and the manager's opinion on the business environment. The general information allows us to identify firms' registration status: state-owned enterprises (SOEs), incorporated, collectives or cooperatives, and other legal structures; ownership structure – domestic or foreign – and detailed percentages owned by individuals, managers, institutional investors, firms and banks. The second section is based on interviews with the firm's accountant and personnel manager and asks for balance sheet information and other quantitative information on employee training, schooling, and wages. While most of the qualitative questions pertain only to the year 2002, a short panel from 1999 to 2002 is available for the quantitative questions.

On the firms' financing situation, the interviewees are asked to identify various sources that finance firms' working capital and new investment respectively and the proportionate contribution of each source. The financing sources include: state-owned commercial banks, other commercial banks, urban credit cooperatives, rural credit cooperatives, foreign-owned commercial banks, trade credits from suppliers or customers, investment funds, special development funds, state services, retained earnings, loans from family and friends, moneylenders, informal banks, sales of stock to the management or legal persons, public issue of marketable shares to outside investors, and other unidentified sources. The interviewees indicate the percentage of each source over the total funding used. These percentages add up to 100% for working capital and new investment, respectively.

3.2. Sample descriptions

We describe the sample firms in Table 2. Sample firms are mostly small with average total assets of 19.11 million USD (median of 2 million USD) in the year 2002 (USD/CNY8.28 in 2002). They are highly leveraged with debt/equity ratio mean at 0.61. Although small, they are not necessarily start-ups, because the sample mean age is 16 years (median 10 years). 40% of the sample firms are incorporated and almost a quarter of them are state-controlled. They grow fast, with mean sales growth from 2001 to 2002 of 34.47% or median of 7.13%. Only 24% of the sample firms have borrowed from banks. Based on the survey answers, the application process is extremely inefficient. For long-term bank loans, it takes on average 43 days from filing the application to being able to withdraw funds. The combination of not so young but small and high growth may be rare for listed firms or firms in developed countries, but intuitively makes sense for private firms in China that started private ownership less than 20 years ago in an economy growing at double-digit rates when the survey was conducted.

3.3. Group of informal financing sources

We group trade credit and personal lending as constructive informal financing, because they use social or business relationships to reduce asymmetric information. In case of delinquency and default, the social collateral and implicit stake arising from business transactions serve as natural mechanisms for renegotiation and restructure solutions. In both channels, reputation arising from repeated games can also serve as a risk-reducing mechanism. A total of 262 firms report usage of constructive finance, with 189 using family loans and 88 using trade

[5] The survey is described at http://microdata.worldbank.org/index.php/catalog/602/study-description and access through Enterprise Surveys (http://www.enterprisesurveys.org), the World Bank.

Table 2
Descriptions of sample firms in the survey.

We describe the surveyed sample firms in this table. For the 2400 Chinese firms covered in the survey, we summarize their size (total assets), leverage (debt/equity), fixed assets, sales, age, and their ownership structure in the year 2002. The observations of total assets, fixed assets, leverage, sales, productivity, re-investment rate, profit margin, interest burden, and bank loan interest are winsorized at the 1% level on both sides. The amount of total asset, fixed asset and sales are converted from RMB to USD dollar based on the exchange rate in 2002: USD/RMB = 8.28. We also describe their sales growth and productivity growth from year 2001 to 2002, reinvestment rate, interest burden, profit margin, etc. in year 2002. Sales growth = (sales in 2002/sales in 2001)-1; Labor productivity = (Sales-total materials cost)/total number of workers; Labor productivity growth = ln(productivity in 2002/productivity in 2001). Interest burden = interest payment/revenue; Margin = profit/revenue. Finally, we describe their bank loan access: the percentage firms with bank loan access, approval time (Long Term Loan) and approval time (Short Term Loan) are the days it takes from filing loan application to drawing funding. The loan interest rate is the actual interest rate in the loan contract.

Variable	*N*	Mean	Median	Std.	Min	Max
Total asset (USD million)	2119	19.11	1.95	63.75	0.01	487.03
Fixed asset (USD million)	2077	9.49	0.74	31.55	0.00	238.97
Leverage (debt/equity)	2119	0.61	0.60	0.33	0.02	1.83
Age (year)	2119	16.24	10.00	14.45	3.00	53.00
Sales (USD million)	2119	12.17	1.16	43.26	0.00	326.32
# of employees	2119	545.04	124.00	2581.15	15.00	70169.00
Dummy (SOE)	2119	0.22	0.00	0.41	0.00	1.00
Dummy (corporate)	2119	0.40	0.00	0.49	0.00	1.00
Dummy (cooperative/collectives)	2119	0.16	0.00	0.36	0.00	1.00
Sale growth (%)	2119	30.47	7.13	121.28	−87.24	849.64
Labor productivity factor growth (%)	1446	0.67	3.92	68.70	−320.24	209.11
Re-investment rate (%)	1877	18.78	0.00	33.12	0.00	100.00
Margin (profit/revenue %)	2117	−10.51	0.65	59.47	−482.49	45.08
Interest burden (%)	2118	2.60	0.00	8.34	−0.37	60.26
Dummy (bank loan access)	2119	0.24	0.00	0.43	0.00	1.00
Approval time (days, long term loan)	873	43.07	30.00	58.05	1.00	547.00
Approval time (days, short term loan)	1124	23.39	15.00	28.76	1.00	300.00
Bank loan interest rate (%)	1087	5.13	5.46	2.08	0.07	11.00

credits. Consistent with commonly accepted practice, our sample shows that trade credits are often used for working capital (85 firms) rather than for new investment (28 firms). We use the "other informal" item to measure underground financing. Presumably, money lenders, pawnshops, and informal banks are all in this group. As we discussed in Section 2, while some of these sources are illegal and destructive, some others actually work in a constructive way. Since the survey does not differentiate between them, we can only take them all in the underground financing in our empirical analysis. This treatment will create a bias against finding distinctive roles between constructive informal financing and underground financing. In other words, our results would be stronger if we could tell them apart. A total of 83 firms use underground financing with 79 (39) for working capital (new investments).

Even though the survey questionnaires cover all the various financing sources that World Bank surveyors are aware of, the largest financing component (37–41%) for Chinese firms is still unidentified "other" sources. In ADM (2010), this component is put in internal financing and in AQQ (2005), informal financing. Based on our field experiences, these sources include but are not limited to informal financial institutions that operate beyond China's current regulatory boundary, such as the cooperatives and credit organizations that are banned by the central bank. These sources may or may not use constructive mechanisms. They may also include sources that are specified in the questionnaire but the entrepreneurs simply do not want to disclose, or may be misclassifications. Unable to identify the source and the corresponding working mechanisms, we treat them neither as internal financing nor as informal financing in the analysis. However, in the later part of this part, we use our own self-conducted survey to investigate what exactly this item covers.

While ADM (2010) use only observations on working capital financing, we investigate both working capital and new investment in new land, buildings, machinery and equipment. We are particularly interested in the new investment category, because it is much more striking to use informal financing to support long-term investment than for operational purposes. For example, Lee and Persson (2016) suggest that family borrowing may be only used in less risky projects, as entrepreneurs do not want to impose excess risks on families which carry other important social values. Therefore, evidence of how informal financing is used potentially contributes fresh insights and new perspectives to this literature.

3.4. Summary statistics of financing sources

We summarize the usage of various financing sources to fund new investment and working capital, respectively. To understand who use informal financing, we compare firm characteristics by the usage of informal financing. We also compare the usage of informal financing across regions and firm characteristics and present the results in the Internet Appendix.

3.4.1. Usage of financing sources

Table 3 describes the percentage of each financing component, with panel A for each individual form, panel B, groupings, and panel C, the correlations among these sources and their correlations with firm growth. As panel A shows, while the "other" category ranks first, the second largest source is bank loans, which is 28% for working capital and 21% for new investment with most of them coming from local banks. Retained earnings are the third largest source covering 13% for working capital and 16% for new investments. The equity financing comes next, with the majority coming from selling shares to other legal entities that raises around 7%. Funds raised from employees through equity are also significant covering more than 3% of the working capital and new investment, while the public issuance of equity only counts for about 1% of the funding. The distribution pattern paints a clear picture that the most important and largest components of the financial system in China – the state owned banks and public equity market – contribute little to financing private firms.

Panel B shows that disclosed informal financing contributes about 8–10% to total financing for firms' working capital as well as new investments. The majority, 6.8–7.8% is in the constructive category and about 1.8% is in underground financing.

Finally, panel C shows that firms' sales growth is positively associated with the usage of constructive informal financing in both new investment and in working capital. Bank financing and underground informal financing, however, have negative or very minimal correlations with firms' sales growth. The usages of constructive informal

Table 3
Financing components of surveyed firms.

We describe the percentage of each financing component contributed to firms' working capital and new investment. In panel A, we present the percentage of each detailed component. In panel B, we present the percentage of each group. The six groups are: (1). Bank Financing, which includes local commercial banks and foreign commercial banks; (2). Equity Financing, which includes the private issuance of equity to both management, employees, other agents and public issuance of equity to outside investors; (3). Government support which includes investment funds or special development financing or other state services; (4).Internal funding which includes retained earnings and others; (5) Constructive informal financing which includes trade credit and loans from family and friends; (6). Underground financing takes "other informal" item, presumably include money lender, pawnshops, loan sharks and informal banks, etc. Panel C describes the correlation among financing sources and firm growth. *Log (Sale growth)* equals to log (sales in 2002/sales in 2001).

Panel A: Percentage of each financing component

	No. of obs.	Local banks	Foreign banks	Equity fin. (employees)	Equity fin. (legal person)	Equity fin. (public issue)	Retained earnings	Trade credit	Inter perso nal	Other infor mal	Govt. fund	Others
New investment	1,220	21.27	0.14	2.97	7.67	1.21	15.76	1.13	5.71	1.87	0.60	41.66
Working capital	1,730	27.74	0.18	3.15	7.13	0.74	13.29	2.32	5.49	1.84	0.42	37.71

Panel B: Percentage of each financing source group

	No. of obs.	Bank financing	Equity financing	Government fund	Retained earnings,	Other financing	Constructive informal financing	Underground financing
New investment	1220	21.41	11.85	0.60	15.76	41.66	6.85	1.87
Working capital	1730	27.92	11.02	0.42	13.29	37.71	7.80	1.84

Panel C: Correlation among financing sources and firm growth

	Log (sale growth)	Bank loan dummy	Constr. informal financing	New investment	Working capital	Under. financing
Log (sale growth)	1					
Bank loan dummy	0.03	1				
Constructive informal financing	0.06**	0.03	1			
– New investment	0.07**	−0.06**	0.79***	1		
– Working capital	0.06**	0.03	0.98***	0.76***	1	
Underground financing	−0.01	−0.04	0.09***	0.08***	0.09***	1

Table 4
Firm characteristics by their usage of informal financing.

In this table, we report the comparison of firm characteristics by their usage of constructive informal financing (panel A) and underground informal financing (panel B). The constructive informal financing includes interpersonal loans and trade credit. The underground financing takes the item "Other informal" in the survey.

Panel A: Firms using constructive informal financing versus firms that do not use

	Using constructive informal financing?				Diff. in Mean (Yes–No)	*t*-stat of the difference in mean
	Yes (# = 262)		No (# = 1857)			
	Mean	Median	Mean	Median		
Log (asset)	9.122	8.907	9.827	9.793	−0.705	−4.89
Log (age)	2.181	2.079	2.488	2.303	−0.307	−7.29
Dummy (neg equity)	0.069	0	0.074	0	−0.005	−0.3
Dummy (SOE)	0.042	0	0.24	0	−0.198	−12.47
Dummy (corporate)	0.603	1	0.375	0	0.228	7.05
Dummy (cooperative/collectives)	0.111	0	0.163	0	−0.052	−2.45
Dummy (< 16 comp.)	0.305	0	0.347	0	−0.042	−1.37
Dummy (16 ~ 100 comp.)	0.187	0	0.235	0	−0.048	−1.83
Dummy (> 100 competitors)	0.508	1	0.418	0	0.09	2.72
Past sales growth (1999–2001)	0.253	0.172	0.16	0.114	0.093	2.84
Past margin (2001)	−0.034	0.01	−0.115	0.006	0.081	2.83
Dummy (has external auditor)	0.598	1	0.734	1	−0.136	−4.23
Government relation	6.322	5.85	5.988	5.79	0.334	4.57
Marketization of credit allocation	4.665	3.64	3.796	3.34	0.869	4.36
Service of intermediary institutions	1.907	1.74	1.595	1.4	0.312	4.8

Panel B: Firms using underground informal financing versus firms that do not use

	Using underground informal financing?				Diff. in Mean (Yes–No)	*t*-stat of the difference in mean
	Yes (# = 83)		No (# = 2,036)			
	Mean	Median	Mean	Median		
Log (asset)	9.271	9.443	9.759	9.704	−0.488	−2.22
Log (age)	2.361	2.303	2.453	2.303	−0.092	−1.12
Dummy (neg equity)	0.072	0	0.073	0	−0.001	−0.03
Dummy (SOE)	0.169	0	0.218	0	−0.049	−1.15
Dummy (corporate)	0.566	1	0.397	0	0.169	3.04
Dummy (cooperative/collectives)	0.133	0	0.157	0	−0.024	−0.64
Dummy (< 16 comp.)	0.361	0	0.341	0	0.02	0.37
Dummy (16–100 comp.)	0.181	0	0.231	0	−0.05	−1.15
Dummy (> 100 competitors)	0.458	0	0.428	0	0.03	0.54
Past sales growth (1999–2001)	0.208	0.137	0.17	0.119	0.038	0.76
Past margin (2001)	−0.141	0.005	−0.104	0.007	−0.037	−0.53
Dummy (has external auditor)	0.687	1	0.718	1	−0.031	−0.6
Government relation	6.048	5.73	6.029	5.79	0.019	0.17
Marketization of credit allocation	3.94	3.57	3.902	3.53	0.038	0.13
Service of intermediary institutions	1.836	1.4	1.625	1.4	0.211	2.01

financing in new investment and in working capital are highly correlated.

3.4.2. Firm Characteristics by usage of informal financing

Table 4 describes firm characteristics in subsamples of firms grouped by their usage of informal financing. In panel A, we group firms based on whether constructive informal financing is used in funding firms' new investment or working capital in the year 2002. We find that firms that use constructive informal financing are smaller, younger, and more likely non-SOEs. Consistent with the notion that informal financing works in an environment where social networks prevail in conducting business, we find that firms that use constructive informal financing are less likely to have external auditors, operate in more competitive industries (i.e., firms with more than 100 competitors), and have better operating performance in the past, i.e., higher past sales growth (during 1999–2001) and a higher profit margin (in year 2001). Surprisingly, these firms also express better government relationships and access to financial intermediation services.

Panel B compares characteristics of firms that use underground financing with those that do not. We find that firms that use underground financing are smaller and more likely to be corporations. There is no significant difference across the subsamples in terms of past operating performance, likely due to inefficient bank financing allocating funds to underperforming firms. However, when comparing panel A and panel B, the performance difference between firms that use underground financing and firms that use constructive informal financing is noticeably large. This pattern is consistent with the conventional notion that underground financing is likely used for riskier projects by firms with worse past fundamentals.

4. Empirical analysis

This main empirical part of our paper investigates four questions. First, what determines the usage of informal financing? Second, what are the respective roles of constructive informal financing versus underground financing in supporting firm growth? Third, are there further differences between family borrowing and trade credits among the constructive informal financing category and why they could behave differently from what the conventional literature suggests? Finally, are informal financing and formal financing substitutes or compliments?

Table 5
Determinants of informal financing sources.

We explain the usage of informal financing in year 2002 (the dependent variable equals 1 if a particular type of informal financing is used by the firm, otherwise 0) with firm characteristics: log*(assets)*, log*(age)*, profitability (past *sales growth* and *profit margin*), ownership structure (dummy for Corporate, Cooperatives/Collectives, or SOEs. *Dummy(SOE)* takes the value of 1 if the state owns more than 50% of the company), product market competition (by # of competitors), firms' reliance on informal mechanism (the existence of external auditor)), and regional institutional development (market proportion of credit allocation and Legal and Accounting institutional development in the city). *Dummy (Negative equity)* equals 1 if the firm's equity value is negative, otherwise zero. The city level institutional development index is computed using surveys conducted by the China's National Economic Research Institute (NERI) and the China Reform Foundation (CRF). We report the marginal effect. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent =	Dummy (constructive informal financing)			Dummy (underground informal financing)		
	(1)	(2)	(3)	(4)	(3)	(4)
Log (asset)	−0.012***	−0.015***	−0.015***	−0.005**	−0.006***	−0.006**
	(−3.46)	(−4.26)	(−4.33)	(−2.15)	(−2.70)	(−2.52)
Log (age)	−0.028***	−0.025**	−0.026***	0.001	0.001	0.001
	(−2.69)	(−2.48)	(−2.65)	(0.08)	(0.19)	(0.10)
Dummy (neg equity)	0.053*	0.046	0.041	0.000	−0.003	−0.001
	(1.77)	(1.60)	(1.49)	(0.00)	(−0.20)	(−0.10)
Dummy (SOE)	−0.076***	−0.070***	−0.070***	0.007	0.009	0.009
	(−3.94)	(−3.73)	(−4.00)	(0.53)	(0.77)	(0.75)
Dummy (corporation)	0.033**	0.039***	0.028**	0.026**	0.027***	0.027**
	(2.28)	(2.82)	(2.16)	(2.49)	(2.62)	(2.57)
Dummy (cooperation)	−0.036*	−0.034*	−0.025	−0.001	−0.002	0.003
	(−1.91)	(−1.84)	(−1.41)	(−0.08)	(−0.17)	(0.21)
Dummy (16 ~ 100 comp.)	−0.019	−0.017	−0.019	−0.014	−0.013	−0.014
	(−1.11)	(−1.07)	(−1.26)	(−1.33)	(−1.29)	(−1.42)
Dummy (> 100 competitors)	0.034**	0.036**	0.027*	−0.003	−0.001	−0.003
	(2.23)	(2.39)	(1.91)	(−0.29)	(−0.16)	(−0.33)
Sales growth (1999–2001)	0.018	0.016	0.019	0.005	0.003	0.004
	(1.41)	(1.32)	(1.64)	(0.69)	(0.49)	(0.61)
Profit margin (2001)	0.017	0.020	0.016	−0.006	−0.006	−0.004
	(1.13)	(1.24)	(1.03)	(−0.91)	(−0.90)	(−0.54)
Dummy (has external auditor)	−0.029*	−0.025*	−0.029**	0.004	0.005	0.007
	(−1.93)	(−1.72)	(−2.04)	(0.42)	(0.51)	(0.72)
Marketization of credit allocation	0.008***	−0.015***		0.000	−0.008**	
	(3.91)	(−2.95)		(0.39)	(−2.47)	
Government relation		0.036***			0.011	
		(3.51)			(1.60)	
Service of intermediary institutions		0.051***			0.023***	
		(5.02)			(3.45)	
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	No	No	Yes	No	No	Yes
Observations	2013	2013	2013	2013	2013	1791
Pseudo *R*-squared	0.13	0.15	0.18	0.03	0.05	0.08

4.1. Choice of informal financing

In Table 5, we run logit regressions to explore the determinants of informal financing choices. The dependent variable is a dummy variable, which equals one if a particular type of informal financing is used by the firm and zero otherwise.[6] For example, the variable *Dummy (constructive informal financing)* equals one if the surveyed firm uses constructive informal financing in funding its working capital or new investment in the year 2002, otherwise zero. The explanatory variables include firm size, age, leverage, profitability, ownership structure, product market competitiveness, and industry fixed effect. We also control for firms' reliance on informal mechanisms using dummy variables that capture whether the firm has an external auditor. Finally, we also explore the effect of regional institutional development on the popularity of informal financing. We choose three indices from those developed by China's National Economic Research Institute (NERI) and the China Reform Foundation (CRF) for this purpose. They are the relation with the government (a ranking of perception by the entrepreneurs), the market proportion of credit allocation (the portion of bank credits that goes to the private sector), and legal and accounting institutional development (a cross region rank by the number of law firms and accounting firms in the city). The indices are computed based on their annual surveys around the country since 1997. We use the 2001 values.

As Table 5 shows, the likelihood of using informal financing is negatively associated with firm size, with a marginal effect around −1.5% for constructive informal financing (column 2) and −0.6% for underground financing (column 5). Both effects are significant at the 1% level. The likelihood of using constructive informal financing is also lower in the SOEs, old firms, and firms that have external auditors. In particular, SOEs are 7% less likely to use constructive informal financing. This effect is again significant at the 1% level. The likelihood of using constructive informal financing is also positively associated with the market proportion of credit allocation, relation with government, and legal and accounting institution development. In particular, the market proportion of credit allocation has a substitutive as well as a complementary relation with constructive informal financing: when we control for other complementary institutional development in the region, its coefficients turn from positive to negative. Our findings on the determinants of informal financing choices are consistent with Chinese government policies, our field observations, and evidence in existing literature that government biases resource allocation towards the state sector and large firms, leaving private firms and small firms significantly constrained in obtaining financing. The changing relation between private credits and the usage of constructive informal financing suggests that bank loans and informal financing, though naturally

[6] The results presented are based on analyses that treat the usage of informal financing as zero if unreported. The results are robust when removing these firms from the analyses.

Table 6
Informal financing and firm growth – OLS.

We examine the relation between sales growth and financing. The dependent variable is firms' log sale growth in year 2002 (it equals to log(sales in 2002/ sales in 2001). The explanatory variables include firm characteristics: log*(assets)*, log*(age)*, ownership structure (dummy for Corporate, Cooperatives/ Collectives, or SOE), and product market competition (by # of competitors). *Dummy(SOE)* takes the value of 1 if the state owns more than 50% of the company) and zero otherwise.. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent variable =	Log (sales growth in year 2002)			
	(1)	(2)	(3)	(4)
Dummy (Constructive informal financing	0.080**		0.082**	0.064*
	(2.24)		(2.28)	(1.74)
Dummy (Underground financing)		−0.021	−0.032	−0.030
		(−0.41)	(−0.63)	(−0.58)
Bank loan dummy	0.041	0.045	0.041	0.030
	(1.41)	(1.51)	(1.39)	(1.01)
Log (asset)	−0.010	−0.011*	−0.010	−0.011
	(−1.49)	(−1.69)	(−1.50)	(−1.56)
Log (age)	−0.042**	−0.044**	−0.042**	−0.045**
	(−2.29)	(−2.38)	(−2.29)	(−2.43)
Dummy (neg equity)	−0.152***	−0.150***	−0.152***	−0.137**
	(−2.62)	(−2.59)	(−2.62)	(−2.40)
SOE	0.027	0.021	0.027	0.028
	(0.73)	(0.58)	(0.74)	(0.75)
Corporation	−0.019	−0.014	−0.018	−0.024
	(−0.65)	(−0.49)	(−0.62)	(−0.79)
Cooperation	−0.053	−0.058	−0.053	−0.043
	(−1.34)	(−1.45)	(−1.34)	(−1.04)
Dummy (16–100 comp.)	−0.043	−0.044	−0.043	−0.047
	(−1.27)	(−1.31)	(−1.28)	(−1.39)
Dummy(> 100 competitors)	−0.100***	−0.097***	−0.100***	−0.102***
	(−3.22)	(−3.09)	(−3.22)	(−3.23)
Constant	0.326***	0.354***	0.328***	0.354***
	(3.92)	(4.29)	(3.93)	(3.37)
Industry FE	Yes	Yes	Yes	Yes
City FE	No	No	No	Yes
Observations	2119	2119	2119	2119
R-squared	0.02	0.02	0.02	0.03

substitutes for each other, may actually have a complementary relation in terms of their development and availability. We will explore this issue further in Section 4.4.

4.2. Informal financing and firm growth

Endogeneity is always a concern in examining the finance-and-growth relationship. On the one hand, firms with access to finance can take investment opportunities and grow; on the other hand, firms that grow will have easy access to finance. Leading or lagging variables is one way to shed light on the causality question. The best leading-lagging relation offered by this survey data is to use financing during year t to explain the sales change at the end of year t over the end of year $t-1$,[7] which should be conservatively interpreted as a contemporary association. Therefore, in addition to baseline OLS regressions, we control for propensity score and construct a matched sample to address this endogeneity problem.[8]

[7] This argument in testing that financing leads to growth is the same as in ADM (2010).

[8] We thank an anonymous referee for suggesting this approach. For all the regressions on financing and growth relation in this paper, we have conducted the tests with OLS, propensity score, matched sample, and Heckman approaches and the results are robust in all these approaches.

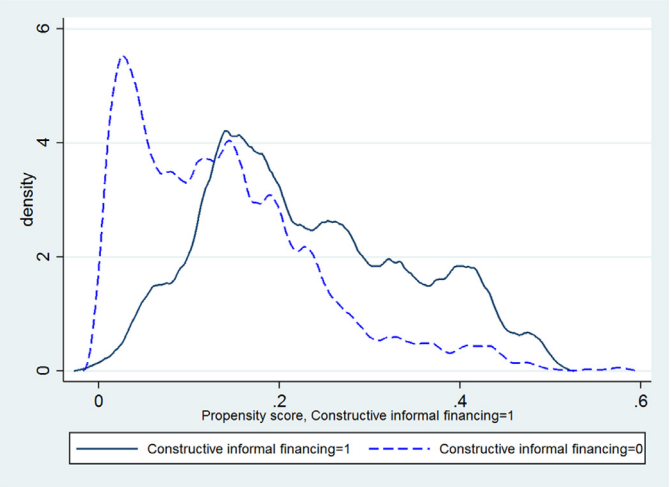

Fig. 1. Estimated density of predicted probabilities of using constructive informal financing.
We plot the density of estimated likelihood of using constructive informal financing, *Prop. Score*, for two groups of firms that have *Dummy (constructive informal financing)* = 1 or 0. Estimation of the likelihood follows the regression specification as in Table 5 column 3. The *x*-axis represents the *Prop. Score*, predicted probabilities of using constructive informal financing. The *y*-axis is the density values corresponding to particular levels of *Prop. Score*. The solid (dash) curve is the density curve of the predicted probabilities for firms that actually (do not) use constructive informal financing.

4.2.1. The OLS baseline result

In Table 6, we present the relation between firm sales growth and financing estimated from OLS regressions. In all specifications, the explanatory variables are firm characteristics: log(assets), log(age), ownership structure (dummy for Corporate, Cooperatives/Collectives, or State), product market competition, usage of bank financing and alternative type of informal financing, and industry fixed effects. Column 1 shows that the usage of constructive informal financing is associated with 8% higher sales growth, and the effect is significant ($t = 2.24$). Column 2 shows that the usage of underground financing is associated with lower sales growth but the effect is insignificant. We control for usage of other financing in column 3 and find that the positive effect of constructive informal financing still holds. In column 4, we add city fixed effects to capture any omitted variables associated with local factors, and the results remain similar.

4.2.2. Results that control for propensity score

We first estimate the likelihood of firms using constructive informal financing, *Prop. Score*, with a regression specification as in Table 5 column 3. We then test the overlap assumption by plotting in Fig. 1 the density of estimated likelihood for two groups of firms that have *Dummy(constructive informal financing)* = 1 or 0, i.e., the distribution of the estimated *Prop. Score* for users and non-users of constructive informal financing. The *x*-axis represents *Prop. Score*, the predicted probabilities of using constructive informal financing. The *y*-axis is the density value corresponding to particular levels of *Prop. Score*. The solid (dash) curve plots density of the predicted probabilities for firms that actually (do not) use constructive informal financing. As Fig. 1 shows, the two density curves have most of their respective masses in regions where they overlap each other, suggesting that there are both treatment and control observations within these ranges of propensity scores. Therefore, the overlap assumption is satisfied (Imbens and Wooldridge, 2009).

We regress sales growth on *Dummy(constructive informal financing)*, the propensity score, and the interactions between *Dummy(constructive informal financing)* and the demeaned propensity score. The demeaned propensity score equals the firm's estimated propensity score minus the

Table 7
Informal financing and firm growth –Propensity score controlled and matched sample.

For the analyses in Panel A, we first estimate the likelihood of firms using constructive informal financing, *Prop. Score*, with a regression specification as Table 5 column 3. We then add the propensity score, the actual usage of constructive informal financing noted with *Dummy(Constructive informal financing),* and the interaction between *Dummy(Constructive informal financing)* and the demeaned propensity score to explain firm growth in year 2002. The demeaned propensity score equals the firms' *Prop. Score* minus average *Prop. Score* over the full sample. For the analyses in Panel B and C, we construct a matched sample by matching each treatment firm that uses constructive informal financing with a control firm that has operates in the same industry, whose total asset to fall in the same tercile rank, who takes the same value of *Dummy (Neg Equity),* ownership type measured by *Dummy(SOE), Dummy(Corporation), Dummy(Cooperation),* and the level of production market competition measured by *Dummy(16 ~ 100 Comp.),* and *Dummy(> 100 Competitors),* and the closest age as the treatment firm. The control firms are selected with replacement. In panel B, we present parallel trend in the characteristics of treatment and control firms. In panel C, we present the regression results on firm growth within the matched sample. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Panel A: OLS results controlling for propensity score and its interaction in full sample

Dependent =	Log (Sales growth)		
	(1)	(2)	(3)
Dummy (constructive informal financing)	0.075**	0.072*	0.070*
	(2.05)	(1.78)	(1.74)
Prop. score	0.198	0.189	0.197
	(1.39)	(1.21)	(1.26)
Demeaned prop. score *		0.062	0.070
Dummy (constructive informal financing)		(0.17)	(0.20)
Dummy (underground financing)			−0.032
			(−0.61)
Bank loan dummy			0.042
			(1.50)
Constant	0.036*	0.037	0.027
	(1.68)	(1.63)	(1.13)
Observations	2119	2119	2119
R-squared	0.004	0.004	0.005

Panel B: Comparison of firm characteristic in the matched sample

	Treatment (firms that use constructive informal financing, # = 261)		Control (# = 261)		Diff. in Mean (Treatment – Control)	*t*-stat of the difference in mean
	Mean	Median	Mean	Median		
Log (asset)	9.127	8.914	9.232	8.884	−0.105	−0.56
Log (age)	2.179	2.079	2.186	2.079	−0.007	−0.14
Dummy (neg equity)	0.065	0	0.065	0	0	0
Dummy (SOE)	0.042	0	0.042	0	0	0
Dummy (corporation)	0.602	1	0.602	1	0	0
Dummy (cooperation)	0.111	0	0.111	0	0	0
Dummy(16–100 comp.)	0.188	0	0.188	0	0	0
Dummy(> 100 competitors)	0.51	1	0.51	1	0	0

Panel C: Results in the matched sample

Dependent =	Log (sales growth)			
	(1)	(2)	(3)	(4)
Dummy (constructive informal financing)	0.137***	0.126***	0.124***	0.099**
	(2.90)	(2.67)	(2.70)	(2.01)
Dummy (underground financing)		0.084	0.088	0.053
		(1.17)	(1.32)	(0.73)
Dummy (bank loan)		0.111**	0.107*	0.090
		(2.09)	(1.89)	(1.51)
Log (asset)			−0.015	−0.007
			(−1.14)	(−0.43)
Log (age)			−0.107***	−0.100**
			(−2.64)	(−2.33)
Dummy (neg equity)			−0.161	−0.192
			(−1.45)	(−1.64)
Dummy (SOE)			−0.057	−0.021
			(−0.41)	(−0.14)
Dummy (corporation)			−0.049	−0.030
			(−0.78)	(−0.43)
Dummy (cooperation)			0.038	0.055
			(0.42)	(0.56)
Dummy (16–100 comp.)			−0.057	−0.053
			(−0.79)	(−0.72)
Dummy(> 100 competitors)			−0.137**	−0.150**

(*continued on next page*)

Table 7 (*continued*)

Panel C: Results in the matched sample				
Dependent =	Log (sales growth)			
	(1)	(2)	(3)	(4)
			(−2.18)	(−2.31)
Constant	0.012	−0.017	0.501***	0.382**
	(0.36)	(−0.45)	(2.94)	(2.03)
Industry FE	No	No	Yes	Yes
City FE	No	No	No	Yes
Observations	522	522	522	522
R-squared	0.02	0.03	0.07	0.12

Table 8
Cross sectional implication for the finance and growth relation.

In this table, we analyze the finance and growth relation in the subsample of firms. Four subsamples are constructed. They are (1). Non-SOEs; (2). SOEs; (3) Firm age < median; (4). Firm age > median. *Family loan dummy* equals one if family loan is used in either working capital or new investment. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent var. =	Log (Sales growth in year 2002)			
	Non-SOE (1)	SOE (2)	Age < Median (3)	Age > Median (4)
Family loan dummy	0.099**	−0.004	0.136**	0.042
	(2.55)	(−0.01)	(2.45)	(0.72)
Bank loan dummy	0.025	0.090	0.017	0.059
	(0.77)	(1.38)	(0.37)	(1.56)
Log (asset)	−0.008	−0.003	−0.007	−0.013
	(−1.06)	(−0.22)	(−0.71)	(−1.33)
Log (age)	−0.063***	−0.004	−0.032	−0.056*
	(−3.03)	(−0.12)	(−0.46)	(−1.82)
Dummy (neg equity)	−0.123*	−0.175	−0.092	−0.166**
	(−1.80)	(−1.59)	(−0.93)	(−2.32)
Dummy (SOE)			−0.024	0.046
			(−0.31)	(1.08)
Dummy (corporate)			−0.053	0.022
			(−1.25)	(0.53)
Dummy (coop./coll.)			−0.091	−0.040
			(−1.26)	(−0.81)
Dummy (16 ~ 100 competitors)	−0.032	−0.088	−0.020	−0.062
	(−0.82)	(−1.41)	(−0.40)	(−1.38)
Dummy(> 100 competitors)	−0.111***	−0.073	−0.120**	−0.083**
	(−3.17)	(−1.07)	(−2.52)	(−1.99)
Constant	0.354***	0.104	0.324*	0.369***
	(3.89)	(0.52)	(1.88)	(2.86)
Industry FE	Yes	Yes	Yes	Yes
Observations	1662	457	1010	1109
R-squared	0.02	0.03	0.02	0.02

Table 9
Within constructive informal financing: trade credit and personal borrowing from family and relatives.

In this table, we explain firm growth with financing sources, firm characteristics, and product market competition. We separate constructive informal financing into trade credit and interpersonal (family) borrowing. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent var. =	Log (sales growth)			
Usage of informal finance	Working capital		New investment	
	(1)	(2)	(3)	(4)
Family loan dummy	0.109***		0.129**	
	(2.60)		(2.19)	
Trade credit dummy		0.003		0.114
		(0.04)		(1.24)
Bank dummy	0.043	0.045	0.044	0.045
	(1.46)	(1.51)	(1.50)	(1.52)
Log (asset)	−0.009	−0.011*	−0.009	−0.011*
	(−1.26)	(−1.68)	(−1.31)	(−1.70)
Log (age)	−0.043**	−0.044**	−0.043**	−0.043**
	(−2.37)	(−2.37)	(−2.35)	(−2.37)
Dummy (neg equity)	−0.151***	−0.150***	−0.151***	−0.151***
	(−2.60)	(−2.58)	(−2.60)	(−2.61)
Dummy (SOE)	0.023	0.021	0.023	0.023
	(0.64)	(0.58)	(0.62)	(0.63)
Dummy (corporate)	−0.024	−0.015	−0.021	−0.015
	(−0.81)	(−0.51)	(−0.71)	(−0.50)
Dummy (coop./coll.)	−0.054	−0.058	−0.054	−0.057
	(−1.35)	(−1.44)	(−1.35)	(−1.41)
Dummy (16–100 Competitors)	−0.043	−0.044	−0.043	−0.042
	(−1.29)	(−1.30)	(−1.29)	(−1.25)
Dummy(> 100 competitors)	−0.100***	−0.097***	−0.101***	−0.096***
	(−3.21)	(−3.10)	(−3.22)	(−3.07)
Constant	0.319***	0.353***	0.322***	0.350***
	(3.82)	(4.28)	(3.89)	(4.24)
Industry FE	Yes	Yes	Yes	Yes
Observations	2119	2119	2119	2119
R-squared	0.02	0.02	0.02	0.02

sample mean. As Table 7 panel A shows, the coefficient on *Dummy (constructive informal financing)* is about 0.07 and significant at the 5% or 10% level, suggesting that firms that use constructive informal financing exhibit significantly higher sales growth than nonusers.

4.2.3. Characteristics matching method

In this approach, we match firms based on the fundamentals that are most related to the usage of informal financing: industry and firm size, and other related firm characteristics. The treatment sample is firms that used constructive informal financing for either new investment or working capital. The control sample is drawn from firms that do not use this particular type of informal financing. The control firm should be in the same industry, the same tercile rank of firm size, a similar insolvency measured by *Dummy (Neg Equity)*, have the same ownership type measured by *Dummy(SOE), Dummy(Corporation), Dummy (Cooperation)* and the similar level of product market competition measured by *Dummy(16–100 Comp.),* and *Dummy(> 100 Competitors), and the closest age* as the treatment firm. We then regress the firms' sales growth on the actual usage of financing sources in the matched sample with 261 × 2 observations.

We report the results for usage of constructive informal financing from the matched sample in Table 7 panels B and C. Panel B shows that there is no significant difference in firm characteristics between the treatment firms and the control firms. This pattern verifies the parallel assumption that the distribution of firm characteristics are alike and random for the treatment sample and control sample and that the matching is done correctly.

Panel C presents the regression results within the matched samples. We find that the usage of constructive informal financing in the matched sample is consistently and positively associated with firm growth,

Table 10
Role of family loans in supporting firm growth – by institutional development in the region.

In this table, we analyze the role of family loan in supporting firm growth. Each column presents the results for a sub-sample grouped by whether a particular type of city-level institutional development is high or low. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent var. =	Y = Log (sales growth)			
	Development of private sector		Legal and accounting institutions	
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Family loan dummy	0.124**	0.084	0.143**	0.082
	(2.25)	(1.35)	(2.12)	(1.61)
Trade credit dummy	0.054	−0.176	−0.006	0.015
	(0.92)	(−1.23)	(−0.08)	(0.17)
Dummy (underground financing)	−0.043	−0.040	−0.073	−0.014
	(−0.64)	(−0.49)	(−1.02)	(−0.19)
Bank loan dummy	0.023	0.060	−0.052	0.120***
	(0.61)	(1.35)	(−1.19)	(3.02)
Log (asset)	−0.004	−0.016	−0.005	−0.014
	(−0.44)	(−1.61)	(−0.48)	(−1.39)
Log (age)	−0.047*	−0.042	−0.026	−0.058**
	(−1.83)	(−1.58)	(−0.94)	(−2.29)
Dummy (neg equity)	−0.070	−0.218***	−0.207**	−0.101
	(−0.86)	(−2.67)	(−2.33)	(−1.35)
SOE	0.029	0.044	−0.030	0.066
	(0.53)	(0.87)	(−0.54)	(1.31)
Corporation	−0.038	−0.018	0.006	−0.047
	(−0.97)	(−0.38)	(0.13)	(−1.14)
Cooperation	−0.109*	−0.021	−0.067	−0.043
	(−1.74)	(−0.39)	(−1.13)	(−0.81)
Dummy (16–100 comp.)	−0.046	−0.037	−0.017	−0.058
	(−0.98)	(−0.76)	(−0.34)	(−1.27)
Dummy(> 100 competitors)	−0.114***	−0.083*	−0.110**	−0.093**
	(−2.61)	(−1.87)	(−2.33)	(−2.24)
Constant	0.331***	0.345***	0.266**	0.378***
	(2.75)	(2.90)	(2.15)	(3.30)
Industry FE	Yes	Yes	Yes	Yes
Observations	965	1,154	968	1,151
R-squared	0.03	0.02	0.03	0.02

with the magnitude around 12% and significant at the 1% or 5% level. Underground financing and bank loan have no significant relation with firm growth.

The findings from the propensity score approach and the matching method are both consistent with the baseline OLS results. Informal financing that uses business or social advantages to overcome information asymmetry and facilitate monitoring and renegotiation is an effective method of financing. Although the empirical findings here show no significant relation between underground financing and firm growth, we cannot exclude the possibility that underground financing may have a destructive effect on firm growth. This is because our empirical measurement of underground financing based on this survey data has to include some of the unidentifiable constructive sources that are banned by the central bank for regulatory purposes.

4.2.4. Cross-sectional implications

Essentially, the propensity score approach and a matching method share the same technique, which is to control for observables but not latent variables. In addressing possible endogeneity issues driven by unobservables, we try to shed light by examining the cross-sectional variation of the relation between the financing source and growth. If we suspect any latent variables drive the relations above, we would need a theory to show that these latent variables drive the cross-sectional pattern as well.

Table 11
Trade credits' role in supporting firm growth.

In this table, we explain firm growth with trade credit and its interaction with firm characteristics. *Trade Credit* equals one if the firm use trade credit in its financing, otherwise equals zero. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent var. =	Log (sales growth)			
Usage of informal finance	Working capital		New investments	
	(1)	(2)	(3)	(4)
Trade credit*log (asset)	0.069***		0.061*	
	(2.98)		(1.87)	
Trade credit*dummy (< 15 competitors)		0.226*		−0.065
		(1.92)		(−0.34)
Trade credit	−0.724***	−0.084	−0.502*	0.148
	(−2.91)	(−0.99)	(−1.78)	(0.85)
Bank dummy	0.043	0.045	0.046	0.045
	(1.45)	(1.53)	(1.54)	(1.53)
Log (asset)	−0.014**	−0.012*	−0.012*	−0.011*
	(−2.07)	(−1.72)	(−1.84)	(−1.68)
Log (age)	−0.043**	−0.044**	−0.043**	−0.044**
	(−2.31)	(−2.37)	(−2.34)	(−2.37)
Dummy (neg equity)	−0.150***	−0.150***	−0.150***	−0.151***
	(−2.59)	(−2.60)	(−2.60)	(−2.61)
Dummy (SOE)	0.023	0.024	0.024	0.023
	(0.62)	(0.65)	(0.66)	(0.63)
Dummy (corporate)	−0.014	−0.012	−0.014	−0.014
	(−0.50)	(−0.43)	(−0.49)	(−0.50)
Dummy (coop./coll.)	−0.062	−0.056	−0.058	−0.056
	(−1.55)	(−1.39)	(−1.44)	(−1.41)
Dummy (< 15 competitors)	−0.040	−0.035	−0.040	−0.043
	(−1.19)	(−1.03)	(−1.17)	(−1.27)
Dummy(> 100 competitors)	−0.096***	−0.087***	−0.095***	−0.097***
	(−3.07)	(−2.76)	(−3.04)	(−3.09)
Constant	0.377***	0.348***	0.358***	0.350***
	(4.53)	(4.21)	(4.32)	(4.23)
Industry FE	Yes	Yes	Yes	Yes
Observations	2119	2119	2119	2119
R-squared	0.02	0.02	0.02	0.02

As informal financing fills the gap for SME financing, its role in supporting growth should be stronger for smaller, younger, and non-state owned firms (Petersen and Rajan, 1997). In examining the cross sectional implication, we notice that family loans and trade credits have quite sharp differences. Therefore, in Table 8, we present the subsample relations between family loans and firms' growth. In Section 4.3 that follows, we explore the differences between family loans and trade credit further.

Results in Table 8 support the cross-sectional hypotheses. In fact, we find that the positive and significant influence of family loans on firm growth exist only in younger firms and non-state-owned firms. We run Chow tests across subsamples but the difference in the coefficients of informal financing on firm growth is unfortunately insignificant. The lack of significance in Chow tests may be due to the sample partition method or may indicate the need for careful studies on the size/age/ownership-dependent advantage of informal financing in supporting firm growth.

4.3. Family loans versus trade credit

Our constructive informal financing includes both the family borrowing in which family relationships play a key information role and trade credit in which business relationships play a key role. It is worth differentiating them to shed light on the risk and costs relevant to

Table 12
The complementary role of bank financing and constructive informal financing.

In this table, we explain firm growth with financing sources, firm characteristics, ownership, and product market competition. We include a new variable, percentage of firms in the city (in the survey sample) that have access to bank loans, and its interaction with *Dummy(constructive informal financing)*. To control for the bank financing environment, we compute the percentage of firms in the city (in the survey sample) that have access to bank loans. *T*-statistics are in the parentheses. *, **, and *** represent the significance at the 10%, 5%, and 1% level, respectively.

Dependent var. =	Log (sales growth)			
Usage of informal finance =	Working capital		New investments	
	(1)	(2)	(3)	(4)
Dummy (Constructive informal financing)	0.238*	0.069*	0.408**	0.129**
	(1.96)	(1.85)	(2.47)	(2.42)
% of firms in the city using bank loan	0.542***	0.450***	0.538***	0.463***
	(3.06)	(2.75)	(3.21)	(2.85)
% of firms in the city using bank loan * Dummy (Constructive inf. fin.)	−0.696*		−1.202**	
	(−1.68)		(−2.11)	
Bank loan dummy	0.033	0.032	0.034	0.034
	(1.11)	(1.08)	(1.14)	(1.16)
Log (asset)	−0.012*	−0.013*	−0.012*	−0.012*
	(−1.83)	(−1.90)	(−1.72)	(−1.75)
Log (age)	−0.043**	−0.043**	−0.042**	−0.043**
	(−2.33)	(−2.34)	(−2.31)	(−2.37)
Dummy (neg equity)	−0.149***	−0.149***	−0.150***	−0.150***
	(−2.59)	(−2.59)	(−2.62)	(−2.61)
Dummy (SOE)	0.028	0.028	0.027	0.028
	(0.76)	(0.78)	(0.74)	(0.76)
Dummy (Corporate)	−0.030	−0.030	−0.032	−0.032
	(−1.03)	(−1.02)	(−1.08)	(−1.10)
Dummy (Coop./Coll.)	−0.048	−0.050	−0.047	−0.049
	(−1.21)	(−1.25)	(−1.17)	(−1.22)
Dummy (16–100 Competitors)	−0.042	−0.042	−0.043	−0.041
	(−1.26)	(−1.26)	(−1.29)	(−1.22)
Dummy(> 100 Competitors)	−0.096***	−0.096***	−0.098***	−0.096***
	(−3.10)	(−3.10)	(−3.18)	(−3.11)
Constant	0.235***	0.261***	0.229***	0.250***
	(2.65)	(3.03)	(2.62)	(2.90)
Industry FE	Yes	Yes	Yes	Yes
Observations	2119	2119	2119	2119
R-squared	0.02	0.02	0.03	0.02

informal financing in today's China.

4.3.1. Family values, financing cost, and project risk

As Lee and Persson (2016) argue, family borrowing, in addition to the information available involves altruism and this makes the financing cost likely cheaper than trade credit. On the other hand, social collateral values more than the economic stakes involved in the projects, therefore pushing entrepreneurs to use it as the last resort in order to reduce the risk imposed on altruistic relatives. In summary, this theory implies that trade credits are costlier than family borrowing, while the latter is matched with less risky projects than the former.

We therefore analyze interpersonal borrowing and trade credit's relation with firm growth by coding them separately for working capital and new investment respectively. The results are reported in Table 9. We find that interpersonal borrowing from family and relatives is associated with around 11% of sales growth, and the relation is significant at the 1% level. Trade credit, however, is not significantly associated with firm growth.

This finding, from Lee and Persson's (2016) perspective, suggests that there are many low risk and profitable projects in China, but access to financing at a reasonable cost is the largest hurdle to achieve growth. This conjecture also implies that the effectiveness of family borrowing in supporting firm growth will be stronger in regions where the institutional environment is better. We empirically examine this implication to test this conjecture.

In Table 10, we report the role of family borrowing in the subsample of firms according to the regional development of the private sector and legal and accounting institutions. We find that the coefficients of family loans on sales growth are significant only in the subsample of firms located in the cities where the development of private sector and legal and accounting institutions is high. Trade credit, underground financing, and bank loans, however, do not have such a pattern. This cross-sectional pattern further confirms the conjecture that there are many low risk and profitable projects in China, but access to financing at a reasonable cost is the largest hurdle to achieving growth.

4.3.2. Trade credits, costs, and monopoly power

A natural question then is why trade credit cannot achieve the same goal. We conjecture two possible reasons. First, according to Cull et al. (2009), trade credits in China are often channeled through formal sources. The financing through the formal sector is costly. Trade credits are hence likely to be costly. Second, according to Lehar et al. (2013) firms with monopoly power over suppliers or customers are likely to use trade credits to extract surplus rather than just financing. Consistent with the two possible mechanisms mentioned above, we find that large firms and firms with bank loan access are more likely to have access to trade credit (tables are available upon request). Furthermore, trade credits in large firms and firms with fewer competitors are indeed associated with better firm growth. The results are presented in Table 11. This empirical evidence explains why trade credit cannot play an effective substitute financing role in China. As a result, family lending becomes an important factor for China's economic growth.

4.4. Substitutes or complements: bank financing and informal financing

As family transfers play an important role in supporting firm growth, economic improvement by households reinforces the advancement of the corporate sector. Therefore, our earlier findings that informal financing is more prevalent in regions where banks grant more credit to firms is quite intuitive. That is, formal and informal financing are complementary to each other in terms of their development. In this subsection, we further analyze their relation in terms of their role in supporting firm growth.

We regress firm growth on the usage of constructive informal financing, the percentage of firms in the region that access bank loans, their interactive and other control variables. As Table 12 shows, regional development in bank financing is positively and significantly associated with firm growth. The coefficient is large ranging between 45% and 46%, and always significant at the 1% level. Usage of constructive informal financing is also positively associated with firm growth with a coefficient of 7–13% on average. The coefficients on their interactions, however, are negative and significant.

These findings in Table 12 deliver two messages. First, both bank loans and constructive informal financing are positively associated with firm growth. Second, their interactive role, however, is negative. Together with the early finding that constructive informal financing is more prevalent in cities where more firms access bank loans, we can see that informal financing can effectively support economic growth when bank credit supply lags behind economic demand. Its development, however, largely depends on banking development and hence on the economic advance of householders. Therefore, formal and informal financing are both substitutes and complements.

5. Other issues

In this section, we address two important related issues with informal financing. First, whether the prevalence of informal financing is

Table 13
Financing sources by country.

This table presents the financing composition (percentage of the total financing) for each country. *Bank Financing* includes financing from domestic and foreign banks; *Operation Financing* includes Credit Card and Leasing arrangements. *Constructive informal financing* includes *trade credit* and *Interpersonal loans. Underground financing is measured with other informal financing.* In panel A and B, we report the financing composition for working capital and new investment, respectively.

Panel A: Financing in working capital (%)

Country	Year of survey	# of Firms	Bank financing	Equity financing	Government fund	Retained earnings	Operation financing	Trade credit	Inter-personal loan	Other informal	Other	Constructive + underground (TC, IPL, OI)
Bangladesh	2002	974	33.21	0.51	0.48	55.82	0.51	4.17	4.26	0.46	0.58	8.90
Brazil	2003	1,505	26.95	3.03	2.26	43.99	1.50	15.37	2.52	2.53	1.84	20.42
Chile	2004	922	27.35	0.48	1.76	52.16	1.82	6.80	0.97	0.36	8.31	8.13
China	2003	1,902	26.51	11.54	0.38	13.13	NA	2.29	5.76	1.82	38.57	9.87
Egypt	2004	704	6.05	2.66	0.20	85.62	0.28	1.67	2.49	0.09	0.94	4.25
Indonesia	2003	482	17.74	1.61	0.94	39.93	1.18	3.63	8.89	6.61	19.47	19.13
Pakistan	2002	936	4.92	12.87	1.28	65.27	1.43	4.70	6.99	1.29	1.26	12.98
Philippines	2003	650	8.48	5.99	0.29	61.87	0.62	11.54	8.25	1.09	1.87	20.89
South Africa	2003	505	15.64	0.65	0.15	66.94	1.03	11.68	1.14	0.21	2.57	13.02
Sri Lanka	2004	369	22.69	12.76	1.89	32.15	1.44	10.24	2.67	0.35	15.81	13.26
Thailand	2004	1,385	45.69	11.04	0.58	24.82	NA	13.61	1.48	1.11	1.38	16.19
Turkey	2005	599	19.65	10.23	6.40	49.25	3.72	6.57	3.56	0.16	0.46	10.29
Vietnam	2005	1,096	27.60	26.36	0.84	27.23	0.72	7.43	5.30	0.65	3.04	13.38
Total		12,029	24.36	8.43	1.21	42.72	1.26	7.75	4.10	1.31	9.10	13.16

Panel B: Financing in new investments (%)

Country	Year of survey	# of Firms	Bank financing	Equity financing	Government fund	Retained earnings	Operation financing	Trade credit	Inter-persona loan	Other informal	Others	Constructive + underground (TC, IPL, OI)
Bangladesh	2002	884	29.60	0.38	0.26	60.04	1.77	2.64	4.31	0.35	0.65	7.30
Brazil	2003	1,248	14.24	4.27	8.61	56.26	3.52	8.69	1.12	1.05	2.25	10.85
Chile	2004	655	30.74	1.21	2.55	47.48	6.08	3.51	0.60	0.23	7.60	4.34
China	2003	1,331	20.53	12.35	0.48	15.29	NA	1.04	5.93	1.78	42.60	8.75
Egypt	2004	523	6.63	3.70	0.19	87.03	0.08	0.80	0.95	0.00	0.62	1.75
Indonesia	2003	203	19.61	1.72	2.35	39.53	3.43	2.44	10.78	7.76	12.37	20.99
Pakistan	2002	222	6.70	15.95	1.28	56.97	3.50	1.96	10.20	2.71	0.72	14.87
Philippines	2003	179	13.29	4.34	0.20	57.96	1.52	7.96	10.17	0.59	3.97	18.73
South Africa	2003	462	16.12	0.09	0.50	59.51	16.25	0.62	0.84	0.22	5.86	1.68
Sri Lanka	2004	252	15.16	2.66	2.17	50.84	4.54	2.13	1.58	0.28	20.63	3.99
Thailand	2004	1,382	58.33	13.45	0.35	19.33	NA	3.53	1.82	0.68	1.95	6.03
Turkey	2005	402	23.24	9.56	5.67	46.82	7.09	4.40	2.62	0.17	0.42	7.20
Vietnam	2005	930	28.04	26.97	3.23	30.41	0.55	1.01	4.64	0.54	3.82	6.19
Total		8,673	26.52	8.96	2.39	42.13	3.98	3.23	3.34	0.93	9.58	7.50

China-specific only? Second, what is in the "other financing" category and whether unbundling this black-box can reconcile our paper's difference from ADM (2010) on the role of informal financing?

5.1. Is China an outlier?

As the World Bank Enterprise Surveys covers registered businesses across countries with similar survey questions, we are able to conduct the same empirical examination in other countries. We do not expect the results found in China to be robust in all other countries, because institutional background, social structure, and family interactions vary across countries and they play the key role in forming informal financing mechanisms. An important question is whether China is an outlier and if so to what extent China is an outlier. Therefore, we examine informal financing in another 12 emerging countries covered by the survey. These 12 countries are either among the top 10 largest emerging economies or the top 10 fastest growing emerging economies in the world.

In Table 13, we present, for these 12 countries together with China, the year when the surveys were conducted, the sample size, and the composition of financing for each country. In panel A, we present the percentage of each financing source for working capital and in panel B, new investment. Consistent with Beck's et al. (2008) description of financing patterns around the world, panel A shows that for most countries the largest financing component is "retained earnings", followed by "bank financing". The percentage of informal financing, based on our categorization of constructive financing (trade credit + personal lending) and underground financing (other informal) on average accounts for 13.02% (median) or 13.16% (mean) of total financing of working capital. It is the lowest at 4.25% in Egypt and the highest at 20.42% in Brazil. China at 9.87% actually locates in the lower middle part of the range. Panel B shows a similar pattern in the financing for new investments. In particular, the percentage of informal financing in China is 8.75%, which is comparable to the mean across countries of 7.50%. Therefore, China is not an outlier in using informal financing. In fact, it is quite an "average" country compared to other large or fast developing economies.

5.2. Reconcile the difference with ADM (2010) with "other financing"

The "other financing" item represents a quite large component of financing and is too important to ignore. AQQ (2005) and Allen et al. (2013) group the "other" item (38.57%) into informal financing. ADM (2010) instead treat it as retained earnings possibly because China's retained earnings appear to be lower than other countries'.

We conduct face-to-face surveys with entrepreneurs around the country to obtain detailed specific financing items used by the entrepreneurs and to unbundle the black-box of "other". We differentiate firms at startup and growth stages. In identifying the financing items, we use terms with which the local entrepreneurs are familiar with and

when there is any possibility of confusion, we ask the entrepreneurs to describe the financing arrangement then categorize the item accordingly ourselves. The details of the survey and the comparison statistics are contained in the Internet Appendix for this paper.

We compare the observations from our own survey to that of the World Bank to gain insights of "other financing" in the World Bank survey. While the percentage of financing coming from bank loans, state and government funds, private equity or debts are all at similar levels confirming the comparability of the two surveys, the dramatic differences show up for Family/friends borrowing, Retained earnings, and Other. Specifically, according to our survey, 67% of the financing at the startup stage comes from Family/friends borrowing and 62% if the financing at the growth stage comes from retained earnings. Correspondingly, the World Bank's survey shows 5.71% for interpersonal borrowing, 15.76% for retained earnings, and 41.66% for other. It seems that the "other" has captured mostly family/friends borrowing for firms at the startup stage and retained earnings for mature firms.

To strengthen the comparability of the sample, we also match firms on their age, size, and ownership structure. The results from the matched samples are consistent with the full sample results. As such, AQQ (2005) is right to include other in the informal financing if only for the startup firms, while ADM (2010) is also correct to include them in the internal financing if only for mature firms. Most importantly, our results on the role of informal financing classified by information mechanism are not affected by the category of "other financing".

6. Conclusion

We distinguish informal financing by whether the providers have effective information technology to overcome moral hazard and adverse selection problems that impede formal financing for SMEs and whether repayment relies on social sanction. Consistent with predictions in Allen et al. (2017), we find that constructive informal financing that has an information advantage and monitoring mechanisms through social or business networks can fix the gap between lenders and small firms, and hence support firm growth. Underground financing, on the other hand, without such mechanisms but using violence for repayment cannot achieve the same effect. We also find that the development of the banking industry complements the development of constructive informal financing. While these both play important roles in supporting economic growth, the marginal effect of each declines in the presence of the other. Combining the World Bank survey and our survey, we are also able to unbundle the black-box "other financing," that raised issues on where to include it in many previous studies.

Our approach advocates an understanding of informal financing in terms of its information and enforcement mechanisms. The empirical evidence based on this approach reconciles the differences in the existing literature in terms of the role of informal financing. Furthermore, although some studies argue that the Chinese government's ban on informal financing is largely politically driven, our findings suggest that it is partially economically justified, because it also attempts to eliminate some informal sources that involve violence and are potentially socially destructive in that they fail to bring benefits to firms and the overall economy.

Finally, the international evidence suggests that China is quite "average" in terms of using informal financing. Access to formal finance is a severe business constraint on small private firms in most large and fast-growing economics, so informal financing becomes more developed. As such, our information-mechanism-based understanding of informal financing is applicable to other countries, while the significance of its role in supporting economy growth may vary across countries.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jfi.2018.06.004.

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