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The role of informal capital on new venture formation and growth in China

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Abstract This study examines the nature and role of informal capital used by micro-firms in the dynamic emerging market of China. Using a unique source of data for 260 urban entrepreneurs, this study provides empirical evidence that entrepreneurs' personal savings and family funding are important sources of start-up capital. However, household income was found to be the most important funding source in driving firm growth over time. This research directly addresses the lacuna of studies on entrepreneurship in emerging economies and contributes to our understanding of the critical role informal capital plays in the Chinese entrepreneurial process. Overall findings suggest that informal capital is still predominantly used over formal capital sources for financing firm start-up, underscoring the slow transition in China from an emerging to a modern economy.

Keywords Informal capital · New venture growth · Emerging markets · China

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1 Introduction and motivation

According to resource-based theories on new venture development, financial resources provide a competitive advantage to young firms to start-up and grow over resource-constrained competitors. While many studies have found a positive relationship between financial resources and firm growth (Vanacker et al. 2011; Bhide 2000; Van Auken and Neeley 1996), studies on the nature and dynamics of entrepreneurial firm start-up and growth in emerging economies are generally lacking in the literature compared to developed countries. In fact, Bruton et al. (2008) found that <1 % of articles published in nine top academic journals contained studies on entrepreneurship in emerging economies. Yang and Li (2008) note in their recent survey article on the development of entrepreneurship: "There is an urgent need for systematic knowledge of the characteristics and growth patterns in China."[1] Ahlstrom and Bruton and Ahlstrom (2003) explicitly point out that given the "inherently chaotic and unpredictable nature of institutional transition in China, the creation and newness

[1] Their survey of the literature was from 1980 to 2005 of 11 leading English language journals. Of these 68 studies on China's transition economy, only 13 were either firm-level or micro-level studies.

of entrepreneurship activities could be very different than those in more advanced economies studies." In a related paper, Allen, Qain and Qain (AQQ) (2005) note in their overview of the Chinese financial system "it is important to explore what other channels of financing are playing the role of substituting external capital markets and standard textbook financing channels."[2] This paper addresses these calls for research, using a unique source of entrepreneurial-level data collected from surveys conducted in five large Chinese cities to empirically examine the importance of informal capital for firm start-up and subsequent growth in China.

This study builds on the existing literature by explicitly identifying the various sources of informal capital used by entrepreneurs for 260 Chinese entrepreneurial firms from 2007 to 2011. By employing an economic growth framework to empirically examine the role of informal capital over time, our study builds on previous findings that self-financing accounts for up to 84 % of start-up capital in China (Xiao 2011, 225).[3] An important nuance of our empirical inquiry is the study's ability to distinguish between the importance of funding sources used to *start* firms from that used to *grow* firms. This distinction is relevant because many studies fail to distinguish between these two related but different economic activities/policy outcomes. We need to understand which sources of capital are most commonly used for both the start-up *and* ongoing growth of firms, as each of these are important sources of economic growth and employment within an emerging economy.

1.1 Theoretical foundations

The theoretical foundation for this study uses insights from both institutional and economic theories. Institutional theory suggests that beliefs, goals, and actions are strongly influenced by the institutions within the individual's or firm's environment. These may include both formal and informal institutions which have been more specifically categorized as normative, regulatory, and cognitive in nature (Scott 2005).

Bruton and Ahlstrom (2003) use an institutional framework for examining venture capitalists in China concluding that while reforms have improved the investment climate, investment by venture capitalists remains a complex process and one that is markedly different than that in the West.[4] This paper complements this line of research by incorporating and contributing to a deeper understanding of the importance of local context for entrepreneurial behavior and financing.[5]

In the Lingelbach et al. (2005) paper titled "What's Distinctive about Growth-Oriented Entrepreneurship in Developing Countries?" the authors conclude that entrepreneurship is distinctive in emerging markets and call for more empirical research to be conducted on the "linkage between personal finance and firm formation", explicitly citing the importance of undertaking studies to examine key beliefs and underlying relationships to further our understanding of the funding and growth process in emerging economies.[6]

Our work contributes to the literature by providing a systematic examination of entrepreneurial financing choices within the context of both the formal and informal institutions that make up the environment of the entrepreneurial firm in modern China. The empirical approach used stems directly from neoclassical growth theory grounded in the economics literature. The definition of growth is derived from Sutton (1997, p. 40) which interprets "Gibrat's Law" as an empirically verifiable relationship between a firm's size and growth. We examine this relationship for Chinese firms using a modified growth model which includes additional terms for testing the potential importance of financial resources on growth. We then broadly compare with these findings with those from other countries as summarized in the literature including Caves (1998), Geroski (1995), and Sutton (1997).[7]

[2] AQQ (2005) also emphasized the importance of studying micro-firms noting that "firm-level studies are needed to ascertain the sources and importance of other capital used by firms in China, especially high-growth private firms."

[3] Xiao (2011) reports on the frequency of informal capital sources for 74 small high-technology firms in two Chinese provinces, Guangdong and Guangxi.

[4] Also see Bruton et al. (1999).

[5] For a discussion on the importance of local context for entrepreneurial activity, see Feldman (2014), Tavassoli & Carbonara (2014), among others.

[6] Bhide (2000) and others find that start-up capital can be rather modest in developing countries.

[7] For more details on growth theory foundations and evidence for the USA, see Hall (1987).

Key results of our study show that financial factors do play a crucial role in Chinese small firm start-up and growth, one that is quite different than that for more developed countries for which results of this model have been analyzed.[8] Specific insights from applying this model to the institutional environment in China reveal that informal capital is still the primary means of firm start-up and growth, consistent with findings of Xiao and North (2012). Empirical estimates provide evidence that Chinese firms do not make extensive use of financial markets, banks, and credit cards as primary sources of capital for starting up their firm as is commonly the case in market-based financial systems like the USA or Germany (Audretsch and Elston (AE), 2006).[9] Our empirical evidence indicates that the entrepreneur's personal savings are the leading primary source of start-up capital for entrepreneurs, while household income is the most important source of funds for growing the firm. These findings have important implications for policy makers who are attempting to target specifically start-up or growth activities using market-based incentives or institutional reforms.[10]

In the next section, we will examine the context of the Chinese firms by examining the link between financial institutions, financing choices, and entrepreneurship. Section 2 explores the theoretical framework for examining the relationship between firm size, growth, the sources of firm financing and develops a model for empirical testing. Section 3 discusses the survey data collection process and measurement issues. Section 4 discusses the nature of the data and details regarding the variable coding and construction process. Section 5 contains empirical results of our model, and finally, Sect. 6 contains a summary of key findings and suggests potentially fruitful directions for future studies.

2 Sources of financing and entrepreneurship

During the past several decades, China's central authority has actively implemented policies of market-based institutional reform and a steady decentralization of its economic power to regional authorities, so that many regional economies with relatively autonomous industrial structures and markets are emerging (Logan 2002). This institutional reform has been expected to positively impact both firm growth opportunities and resources, including financial resources, in regional centers (Lau and Busenitz 2001). Because of the potential importance of these regional growth centers in this dynamic economy, this study has intentionally surveyed micro-firms in several highly urbanized cities to improve our understanding of the relationship between firm growth and financing sources in these geographic areas.

There are of course many ways in which Chinese financial institutions and markets differ sharply from those in the USA or EU. In a developing economy like China, where capital markets are smaller and more poorly developed compared to Western counterparts, this is likely to increase the difficulty in obtaining the capital to grow.[11] While stock exchanges are growing in China, their scale and importance are not comparable to those in the West. So it is unclear whether these formal financial institutions in China have developed sufficiently to provide support for small firm growth. Regarding start-up capital, even in mature economies, institutional financing is rather limited for new firm start-ups.[12]

[8] For example, historically in Germany, larger firms grew faster until about 1990s, when the growth of high-technology firms was documented as exceeding that of the older manufacturing sector (AE, Audretsch and Elston 2006).

[9] In one study, US high-technology entrepreneurs used earnings from a second job, and loans from either individuals or banks are their most common sources of capital to start a firm (Elston and Audretsch 2010).

[10] Although Daunfeldt and Halvarsson (2015) find empirical evidence that high-growth firms may be "one hit wonders" as high rates of firm growth were often followed by periods of low growth in their Swedish sample. This finding questions the efficacy of using policies to promote consistent high firm growth over time.

[11] Unlike many countries in the West, institutional investors such as pension and mutual funds and insurance companies play a relatively minor role in China (Eun and Resnick 2012). The newly established Shanghai Stock Exchange, Shenzhen Stock Exchange, and the more established Hong Kong Stock Exchange are all growing with newly listed firms from all over China, but are not expected to be the primary funders of micro-firms.

[12] In a study on US entrepreneurial ventures, Becker-Blease and Sohl (2015) find that quality top management teams, advisors, and developed products are viewed more favorably by angel investors and likely have better access to these investors, suggesting that firm quality also impacts access to capital.

Our sample firms range from 1 to 30 employees, and as micro-firms, their sources of capital are expected to be different and potentially more informal than funding sources for larger firms, as firm size also impacts access to capital (Audretsch and Elston 2002). Our data show that these entrepreneurs started firms with relatively small amounts of financing. For instance, 104 of our entrepreneurs, or more than 40 %, said they used ¥50,000 (US $7813) *or less* to start-up their firm. This finding is consistent with AQQ Allen et al. (2005) which finds that the most important source of firm financing was self-fundraising (67.6 %) in China using aggregated national data. Distant alternative sources for fixed investment in their study included domestic loans (19.2 %), foreign investment (6.7 %), state subsidy (6.2 %), IPO (3.2 %), and corporate bonds (0.5 %).[13]

China's sustained high level of domestic savings (estimates vary between 40 and 50 % of income) directly enables the ability to self-invest from personal savings as is observed in our data. Higher rates of personal savings are common in some developing countries, including China, because they seem to act as a sort of insurance mechanism for the individual (Lingelbach et al. 2005).

2.1 Definitions, sources, and dimensions of financing

Broadly speaking, the provision of financial services to micro-entrepreneurs and firms which generally have limited access to banking and related financial services is referred to as informal capital. This limited access is due in no small part to the high transaction costs associated with serving smaller/poorer clientele who lack collateral and an ability to borrow against their future income due to a lack of credit history. Generally speaking, the informal sources of capital involve relatively small amounts of capital lent to relatively small firms. While the US Small Business Administration defines small firms as those having fewer than 500 employees, our owner-managed firms average 5 employees and can thus be considered micro-firms/entrepreneurs. Traditional definitions of formal or informal capital are based on both characteristics of the source of capital and identity of the borrower. Figure 1 depicts a mapping of these sometimes overlapping terms and categories to illustrate structure of the relationship between these dimensions.

From Fig. 1, we can operationalize our definition of formal capital as that derived from banks and financial institutions, which is characterized by formal contractual obligations (including terms, due dates, collateralization, interest, fees) which are regulated by banking or governmental authorities. As such formal capital might come from such institutions as banks, equity markets, venture capitalists, insurance companies, angel or venture capital funds, government or intergovernmental programs, or credit cards agencies—as long as they meet these criteria. Informal capital sources in this paper will therefore include personal savings, household income, funds from family, friends, neighbors, work colleagues, employers, accounts payable, and possibly illegal or other sources. Small firm financing in this study is therefore generally but not exclusively deemed as that from informal or semi-formal sources.[14]

Internal/external finance is another important dimension of funding sources. Internal funds in the finance literature usually refer to retained earnings of the firm, but for the young entrepreneur for whom there is little or no distinction between firm and self, we can define internal funds as those from personal savings or household income, and depending on specific circumstances, funding from family, friends, colleagues, and neighbors. In this context, external capital would be capital from institutions as banks, equity markets, venture capitalists, insurance companies, angel or venture capital funds, government or intergovernmental programs, credit cards, and long-term credit lines from suppliers. As such, this study is not exhaustive but hopefully informative in its ability to provide insight on funding sources for entrepreneurial firm start-up and growth in China.

This research will also contribute to the literature by allowing us to comment on the consistency of our empirical findings with two stylized facts from the literature on financing in emerging markets. First, that entrepreneurs in emerging markets tend to finance using

[13] AQQ (2005) conclusions are based on data and figures from the Chinese Securities and Futures Statistical Yearbook (2001) and the Chinese Statistical Yearbook (2000).

[14] Noted exceptions include micro-financing from institutions such as the Grameen Bank founded Mohammed Yunis to provide small amounts of credit to uncollateralized entrepreneurs in Bangladesh.

Degree of Formality	Regulatory/Legal Environment	Sources of Capital	Principle Clientele
Formal banks	Licensed by central bank	Commercial & development banks	Large firms
			Government
Specialized non-bank financial institutions			
		Rural banks	Large rural firms
		Savings & loans	Salaried workers
		Deposit banks	Small & Medium Enterprises (SMEs)
		Equity markets	
Semi-formal	Legally registered, but not necessarily licensed as financial institution by central bank authority	Credit unions	Microfirms
		Microfinance NGOs	Entrepreneurs (opportunity based)
Informal	Not legally registered at national level	Personal savings & credit	
		Moneylenders	Entrepreneurs (need based)
		Household income,	Poor
		Funds from: relatives, friends, neighbors, colleagues, employers	
		Accounts payable	

Fig. 1 Formal and informal sources of finance. Financial services may be provided by a variety of financial intermediaries categorized as formal or semi-formal, or informal based primarily on whether there is a legal or regulatory infrastructure that provides recourse to lenders and protection to depositors. Formal financial services are provided by financial institutions chartered by the government and subject to banking regulations and supervision; semi-formal financial services are not regulated by banking authorities but are usually licensed and supervised by other government agencies. Informal financial services are those provided outside the structure of government regulation and supervision. *Source*: Modified from Aryeetey (2008)

internal rather than external funds—in the finance literature, this is often referred to as the "pecking order hypothesis." And second, firms in emerging markets rely heavily on informal sources rather than formal sources of capital to start their firm. Estimates of external capital sourced from the informal sector range from 87 to 100 % (Frederick and Bygraves 2004). This suggests a more limited role for formal financial institutions such as banks, venture capital, and other financial service firms that are common sources of funding in more mature economies.

3 Empirical growth model

The plethora of empirical studies on the relationship between firm size and growth has produced such an extensive body of evidence (Caves 1998; Sutton 1997; Geroski 1995) to interpret and digest the wealth of empirical results. The fundamental question addressed by these studies is whether firm growth during a specified period is the same for all firms regardless of their size at the beginning of the period. Many earlier studies included only large firms, but more recent studies have included a broader spectrum of firm sizes and differing country or institutional environments for examining the relationship between firm size and growth; however, a very few have used this framework for examining the importance of the role of financing sources (AE 2006).

3.1 Modified empirical growth model

The empirical growth equations which are well established in the growth literature suggest that the

present size of firm i in period t may be decomposed into the product of a "proportional effect" based on the initial firm size. Annual percentage firm growth can be then measured using number of employees, firm revenues, or firm profits[15] in a model which tests the hypothesis that initial firm size, age, and financial resources impact firm growth as follows:

$$\begin{aligned}\text{Growth}_{\text{it}} = {} & B_1 \ln\left(\text{Size}_{i,t-1}\right) + B_2 \ln\left(\text{Size}_{i,t-1}\right)^2 \\ & + B_3 \text{Age}_{i,t-1} + B_4 \text{Funding source}_{i,t-1} \\ & + B_5 \text{Wealth}_{i,t-1} + e_t \end{aligned} \quad (1)$$

where the dependent variable $Growth_{\text{it}}$ refers to changes in, for example, the number of firm employees between periods t and $t-1$ firm divided by number of firm employees in $t-1$. $Size_{i,t-1}$ is measured as the natural log of the number of employees, and we include a squared term to control for potential nonlinearity in the data. *Age* measures the life span of the entrepreneur in 2011, and *Funding Source* measures the impact of various sources of financial support on firm growth. *Wealth* refers to the wealth of the entrepreneur which is proxied by the household income of the entrepreneur, and e_t is a stochastic error term for period t. The entrepreneurship literature has established that wealth may be important for several reasons, either because low levels of wealth create an incentive for need-based entrepreneurship or because high levels of wealth may enable the entrepreneur to start-up a firm (Gentry and Hubbard 2000). Since the literature has used several different measures of size and we want to insure robustness of results, our estimates of Eq. 1 are run for three different measures of firm size: number of employees, revenues, and profits.

4 Data and variables

The data for this study were collected from surveys of Chinese entrepreneurs for years 2007–2011. This source of data is significant because unlike many other sources of Chinese data, this source is both firm level and includes a times series dimension (panel data) for key variables. The surveys were conducted in the Mandarin language, in the Hubei and Zhejiang provinces using a team of students from the local Wuhan and Zhejiang Universities. Survey results were then later translated back into English in the USA.

4.1 Survey questions

The questionnaire for this study comprised three sections with both closed- and open-ended questions. Nine questions included a screening question ("Are you a business owner, manager, or both?") and questions covering such matters as business type (service only in this study), amount and source of initial investment for firm start-up, years in business under current ownership, growth rate of annual revenue, number of permanent employees, types of employees, various investment sources, demographic information including age, gender, and household income.[16] Some questions sometimes had to be reworded after the first attempts at data collection to achieve desired results. For example, asking how old somebody was not deemed as polite and respondents were not comfortable answering this question. Interviewers contacted us, and we immediately switched out this question with another question asking for the respondent's birth year, which was deemed a more culturally acceptable question and yielded the same information without causing problems in completing the survey.[17]

4.2 Sample selection

Because random sampling is difficult, if not impossible in an emerging market like China where small business directories are not publicly available, and most people are unfamiliar and often uncomfortable with the purpose of data collection, convenience sampling was used instead. Small business owners were interviewed in five major cities: Wuhan, Changsha, Yueyang, Zhangjiajie, and Huizhou. The interviewers approached potential respondents using a scripted introduction, which included, among other details, a confidentiality

[15] Growth of the firm can be estimated using any of these three proxies for firm size where $\text{Growth}_{i,t} = [\ln(S_{i,t}) - \ln(S_{i,t-1})]/\ln(S_{i,t-1})$.

[16] Section 2 of the survey included three sets of questions asking about motives in starting up the business, business operation goals, and perceived barriers to starting and operating a business, which were not utilized in this study.

[17] Initially, we conducted a pilot study with 10 small business owners in a small city located in Hubei Province to refine the clarity and suitability of all survey questions before finalizing the data collection process.

assurance and the principal researcher's contact information in the USA. Data were collected by survey instrument which contained questions regarding historical information about themselves and their firm. Study participants filled out the survey while the interviewer clarified questions if necessary and ensured all relevant questions were answered.

Incomplete survey forms and non-entrepreneurs were then removed from the sample yielding a final sample of 260 valid surveys retained for data analyses. These were exclusively service industry firms, mostly restaurants, and as such likely do not represent manufacturing or other industry subsectors.

Consistent with other studies on Asian firms, our firms had a rather high concentration of family ownership, a fact which suggests that corporate governance issues may be addressed by this governance structure/mechanism rather than market forces or legal infrastructure (Claessens et al. 2000). The importance of the family governance structure in reducing agency problems for the firm remains a potentially fruitful direction for future studies on Chinese entrepreneurship.

4.3 Demographics of survey respondents

This sample included more males than females (87.4 vs. 12.6 %), which reflects the dominance of traditional gender roles in Chinese society, where financial matters are often still deemed primarily the responsibility of the adult male. Most respondents were married, with a mean age of 40, and more than 82 % falling between 31 and 50 years of age. With respect to education, the largest group of respondents (40.9 %) reported to have only finished junior high school, and high school or vocational school (32.3 %). Only 1.2 % of respondents reported having received a 4-year degree or more. Insufficient formal education is common among people born in the 1960s and 1970s (most respondents being aged 31–50) in China, where formal admission to college through the open *National College Entrance Examination* was officially resumed only in 1977 after about a two-decade interruption. More than 60 % of the respondents' pretax annual household income ranged between ¥30,000 and ¥201,000 (equivalent to US $4687 and US $31,250, respectively), and for the overwhelming majority of respondents, their small firm was their main income source.

As for employment, more than half of the firms had only 2–5 employees in 2011, and over 45 % said that they had hired at least some family members. An examination of the initial investment put into each business for start-up purposes revealed that most businesses were micro in scale. For instance, more than 40 % of our entrepreneurs used funds of capital of ¥50,000 (US $7813) or less to start-up their firm. Sixty-six percentage of the firms had an initial investment of only ¥100,000 (about US $15,625) *or less*, amounts which may seems somewhat larger compared to some developing countries like India, but clearly below threshold amounts needed by industrial countries. The main investment sources for these respondents' funds were their own personal savings and money from family members and relatives. Only one respondent indicated the use of a financial institution to secure external funds. These findings on the sources of start-up capital are consistent with stylized facts about funding sources in emerging markets (AQQ 2005).

4.4 Variable coding and measurement issues

The survey questions were transformed as follows for model estimates, with variable names in *italics*.

Gender was coded male = 0, *Female* = 1.

Age is the respondent's age in 2011, deduced from the birth year provided by respondent.

Education is the respondents highest level of educational attainment; 1 = illiterate, 2 = primary, 3 = junior high, 4 = high/vocation school, 5 = 2-year technical school, 6 = 3-year college, 7 = 4-year college degree, 8 = graduate scholarly work (MA, Ph.D.).

Size is measured three ways, with natural logs of data taken to avoid multicollinearity problems when also using age in the same regression. *Size* as measured by the number of firm employees in 2009 is referred to as *Size_E*, *Size_R* if using firm revenues and *Size_P* if using firm profits. $Size^2$ is simply the square of the size term, included to control for nonlinearities in the data. Table 1 which includes descriptive statistics for the survey data shows that the range of firm size was 1–30 employees, and 90 % of the firms had been in operation less than five years, while the average age of the entrepreneur was about 40 years old.

Wealth is the respondent's annual household income measured in 1000s (k, RMB). Household income is used as a proxy for a measure of the individual's wealth.

Table 1 Descriptive statistics of key variables

Variable	*N*	Mean	SD	Minimum	Maximum
Size_E	249	5.24	4.32	1.00	30.00
Size_R	238	704.93	995.47	3.00	8000.00
Size_P	229	150.80	183.52	4.00	1400.00
Growth_E	249	0.18	0.32	−0.50	1.81
Growth_R	238	0.04	0.32	−0.55	4.58
Growth_P	229	0.04	0.19	−0.78	1.72
Funding	250	2.19	0.92	1.00	3.00
Female	260	1.13	0.34	1.00	2.00
Education	260	3.37	1.05	1.00	7.00
Wealth	252	216.07	176.62	30.00	800.00
Age	260	39.58	7.13	20.00	59.00

Size and growth measures are measured three ways: (1) as number of employees and changes in the number of employees or Size_E/Growth_E, (2) firm revenues and changes in revenues Size_R/Growth_R, and (3) firm profits and changes in profits Size_P/Growth_P. Age measures the entrepreneur's age in 2011, Funding is coded 1–5 for source of start-up funds, Education is coded 0 for none and up to 8 for graduate level. Wealth refers to the total wealth of the entrepreneur

Funding Source is the respondents stated main source of firm start-up funds, which was not mutually exclusive, but generally respondents picked only 1 choice. As such we coded this variable as follows: 1 = personal savings only, 2 = family/relatives only, 3 = personal savings and family/relatives, 4 = personal savings, family/relatives, and neighbors, 5 = other choices.[18] It is striking that 86 of the respondents said that *own savings* was at least one of their primary sources, while 37 said that family or relatives were, and only 4 listed neighbors as their primary source of capital. *Other* sources as listed on the survey are not known since the survey did not allow write-ins, but it may include illegal sources of capital, inheritance, or lottery winnings. Our data do support the findings in the literature that suggest that Chinese entrepreneurs have varied of sources of informal capital with which to finance their firms (Tsai 2004).

The dependent variable in all regressions is firm growth. *GROWTH_E* is the growth of firm as measured by employees, calculated as [ln(*Size_E_2010*) − ln(*Size_E_2009*)/ln(*Size_E_2009*)].[19]

4.5 Descriptive statistics

Table 1 lists means and standard deviations of key variables in the study. Initial firm size is quite small, averaging 5 employees, with a level of entrepreneurial wealth equal to about 145 % of 1 year of firm profits. Correlation coefficients in Table 2 indicate that age, education, and sometimes firm size and funding source are correlated with firm growth rates across all growth measures. However, personal wealth and funding source coefficients are comparatively larger and more consistently correlated with initial firm size than growth rates.

5 Empirical results

The growth literature has included three primary measures of firm growth, which are often comparable in estimations depending on the data sample used and all are included here to improve the robust nature of any findings. In Tables 3, 4, and 5, we see that results are quite similar between the measures used in that, no matter what measure of growth is used, there is a general lack of statistical significance of demographic variables of the

[18] The "Other choices" category was recoded to include not only the "other funding sources" category on the survey, but all other low-frequency categories including funding by: colleagues = 2, banks and financial institutions = 1, employer = 1, and government programs = 0.

[19] Similarly, *GROWTH_R* is the growth of firm as measured by gross revenues, calculated as [ln(*Size_R_2010*) − ln(*Size_R_2009*)/ln(*Size_R_2009*)]. And *GROWTH_P* is the growth of the firm as measured by profits calculated as [ln(*Size_P_2010*) − ln(*Size_P_ 2009*)/ln(*Size_P_2009*)].

Table 2 Correlation coefficients

	Female	Age	Education	Growth_E	Growth_R	Growth_P	Size_E	Size_R	Size_P	Wealth	Funding
Female	1.00										
Age	−0.01	1.00									
Education	0.05	−0.44***	1.00								
Growth_E	−0.03	0.12**	−0.12**	1.00							
Growth_R	−0.03	0.22***	−0.12***	0.16	1.00						
Growth_P	−0.02	0.13**	−0.08	0.50***	0.84***	1.00					
Size_E	−0.12*	0.04	0.27***	−0.30***	−0.03	−0.08	1.00				
Size_R	−0.01	0.03	0.30***	−0.23***	−0.10	−0.11	0.82***	1.00			
Size_P	−0.08	0.03	0.31***	−0.25***	−0.14**	−0.13**	0.80***	0.96***	1.00		
Wealth	0.02	0.06	0.20***	−0.06	0.08	0.06	0.56***	0.58***	0.63***	1.00	
Funding	−0.11*	−0.05	0.08	−0.20***	−0.12*	−0.09	0.52***	0.53***	0.54***	0.30***	1.0000

*** Correlation is significant at the 0.001 level, ** at the 0.05 level, * at the 0.01 level (two-tailed)

Table 3 Firm growth (measured by number of employees)

Model	1		2		3		4		5	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Intercept	0.13	0.71	0.21	1.24	0.53***	2.62	0.56***	2.69	0.50**	2.48
Female	−0.03	−0.41	−0.08	−1.34	−0.08	−1.36	−0.10	−1.63	−0.08	−1.36
Age	4.08E−03	1.26	0.01**	2.55	0.01**	2.17	0.01**	1.96	0.01**	2.39
Education	−0.03	−1.12	0.02	1.02	0.01	0.55	0.01	0.31	0.02	0.78
Size			−0.22***	−7.05	−0.58***	−4.55	−0.59***	−4.62	−0.63***	−4.84
$Size^2$					0.11***	2.88	0.09**	2.33	0.11***	3.00
Wealth							4.3E−04***	3.31		
Funding source									0.01	1.66
R^2	0.0215		0.1882		0.2152		0.2530		0.2241	

* *t* value indicates variable significant at 10 %, ** 5 %, and *** 1 % levels

entrepreneur and apparent significance of the size and financial variables.

Specifically, robust findings across different model specifications consistently show that firm size is statistically significant and negative, indicating that smaller firms grew faster than larger firms in the study. It is important to keep in mind that since all firms in this study are micro-firms, we are only talking about relative size effects. The fact that the squared terms were positive and significant provides evidence of non-linearities in the data. These results are broadly consistent with that found in the literature, specifically for smaller firms in Germany in the 1990s when growth in the information technology sector was peaking (AE 2006).

Interestingly, Tables 3, 4, and 5 indicate that the source of start-up capital did not seem to impact firm growth by any growth measure, but individual wealth clearly did. And since wealth is measured in the time period before the growth, it stands to reason that increases in wealth increase entrepreneurial firm growth in the Granger causality context.[20]

Table 6 divides the sample up into high- and low-wealth groups, based on average wealth, to examine employment growth sensitivity to level of wealth.

[20] It is also possible that there may be feedback in the model in that when the firm grows, the entrepreneur's household income grows. Since this depends on how much money is being taken out of the firm, which is unobservable, we are unable to control for this possibility.

Table 4 Firm growth (measured by firm revenue)

Model	1		2		3		4		5	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Intercept	−0.29	−1.50	0.07	0.39	2.74***	9.42	2.72***	8.90	0.36***	2.67
Female	−0.03	−0.49	−0.08	−1.26	−0.05	−1.10	−0.08	−1.52	−0.02	−0.97
Age	0.01***	2.94	0.01***	3.86	0.01**	2.35	0.01**	1.86	2.9E–03**	2.14
Education	−0.01	−0.40	0.02	1.09	−0.02	−0.89	0.01	−1.27	−2.3E–04	−0.02
Size			−0.09***	−5.78	−0.95***	−11.81	−0.90***	−10.58	−0.17	−3.66
Size^2					0.08***	10.84	0.07***	9.04	0.02	2.88
Wealth							2.9E–04**	2.44		
Funding source									1.13E–03	0.36
R^2	0.0491		0.1683		0.4478		0.4655		0.1401	

* *t* value indicates variable significant at 10 %, ** 5 %, and *** 1 % levels

Table 5 Firm growth (measured by profits)

Model	1		2		3		4		5	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Intercept	−0.06	−0.55	0.07	0.64	0.78***	4.00	0.73***	3.67	0.75***	3.78
Female	−0.01	−0.33	−0.03	−0.81	−0.03	−0.75	−0.04	−1.21	−0.03	−0.71
Age	3.4E–03*	1.68	4.7E–03**	2.37	3.3E–03*	1.73	2.7E–03	1.40	3.6E–03*	1.87
Education	−0.01	−0.42	0.01	0.72	−0.01	−0.39	−0.01	−0.85	−3.2E–03	−0.22
Size			−0.05***	−4.53	−0.34***	−5.10	−0.29***	−4.12	−0.34***	−5.01
Size^2					0.03***	4.41	0.02***	2.92	0.03***	4.11
Wealth							2.9E–04***	3.25		
Funding source									4.7E–03	1.03
R^2	0.0191		0.1012		0.1733		0.2130		0.1772	

* *t* value indicates variable significant at 10 %, ** 5 %, and *** 1 % levels

Results are highly comparable to those in Table 3 which serves as a robustness check, with one exception that being a male in the high-wealth group increases firm growth, whereas gender is not significant in any of the other employment growth equations.[21] In other words, there may be some further benefit to firm growth from being a wealthy male versus a wealthy female, which suggests a potentially fruitful direction for future research. Table 7 provides a more nuanced examination of the impact of wealth on growth grouping entrepreneurs by primary source of start-up capital.

Table 7 includes growth model estimates by primary funding source group, which suggests that wealth is only important for growing firms that were primarily financed with the entrepreneur's personal savings or funding from family and relatives. This is a striking result because it suggests that not only is personal savings and funding from family and relatives the most common ways to fund the start-up, but those firms are precisely those for whom wealth/household income is important in order to grow the firm. This finding is consistent with the

[21] While we control for gender in our study, the role of gender in financing is undoubtedly more nuanced, and worthy of future examination. For example, in a related study examining US-based venture capital, Becker-Blease and Sohl (2007) find that US women seek angel financing at rates substantially lower than that of men, but have an equal probability of receiving investment.

Table 6 GLM estimations of employee firm growth by high-wealth and low-wealth groups

Parameter	1		2	
	High-wealth group		Low-wealth group	
	Estimate	*t* test	Estimate	*t* test
Intercept	0.44*	1.68	1.33***	3.81
Female	−0.13*	−1.75	−3.00E–04	−0.00
Age	0.01**	2.22	3.00E–03	0.67
Education	4.00E–03	0.13	−0.02	−0.68
Size	−0.54***	−2.96	−1.18***	−5.43
$Size^2$	0.09	1.57	0.23***	4.07
R^2	0.2019		0.4073	
Observations	151		94	

High-wealth and low-wealth groups are defined as those above and below the average wealth for the total sample. Variable definitions: female = 1 if the gender of the entrepreneur is female and 0 otherwise. Education is coded 1(low)… to 7(high). Size is the number of employees in 2009. Age measures the age of the entrepreneur in 2009, and Wealth refers to the wealth of the entrepreneur

* *t* value indicates variable significant at 10 % level, ** at the 5 % level, and *** indicates significant at the 1 % level

Table 7 GLM estimations of firm growth by primary source of start-up funding

Parameter	1		2		3		4		5	
	Personal savings only		Family or relatives only		Personal savings and family or relatives		Personal, family or relatives, and neighbors		Other sources	
	Estimate	*t* test	Estimate	*t* test	Estimate	*t* test	Estimate	*t* test	Estimate	*t* test
Intercept	−0.10	1.39	0.33	0.44	1.25***	2.85	1.16***	3.85	0.81	1.36
Female	−0.23*	−1.83	−0.17	−0.83	0.12	1.05	4.4E–03	0.08	0.33**	2.31
Age	3.2E–03	0.51	0.01	1.16	0.01*	1.83	2.9E–03	0.83	0.00	0.14
Education	−0.05	−0.97	0.03	0.44	0.05	1.41	0.02	0.75	−0.07	−1.10
Size	−0.31	−0.34	−0.82	−1.24	−2.03***	−4.53	−1.06***	−4.01	−0.92*	−1.80
$Size^2$	−0.05	−0.14	0.18	0.79	0.53***	3.28	0.19***	3.40	0.21	1.22
Wealth	9.6E–04**	2.36	6.2E–04*	1.67	3.6E–04*	1.77	2.1E–04***	2.62	1.5E–04	0.17
R^2	0.1988		0.2418		0.6119		0.5868		0.5152	
Observations	74		36		61		36		33	

* *t* value indicates variable significant at 10 % level, ** at the 5 % level, and *** at the 1 % level. Note: Growth in this table is measured by changes in employees. Model 3 is not the sum of 1 and 2, but rather reflects that both personal savings and family money were used as the primary source(s) of start-up capital. Model 4 reflects that respondents said that the combination of personal savings, family funds, and neighbors was the primary source(s) of start-up capital. Variable definitions: Female = 1 if the gender of the entrepreneur is female, Education is coded 1(low) to 7(high), and Size is number of employees in 2009. Age measures the age of the entrepreneur, and Wealth refers to the wealth of the entrepreneur

interpretation that those entrepreneurs with wealth are better able to grow their firms. Apparently these entrepreneurs do not dip back into savings or borrow from family to finance firm growth once the firm is started. Whether they have these options are unclear, but this finding is generally consistent with finance theory's well-tested pecking order hypothesis, which states that firms prefer to use internal funds over external funds to fund firm growth.[22]

In terms of policy initiatives to support small firm growth, this also suggests that liquidity or access to

[22] In this context, household income or wealth is internal where bank credit, institutional loans, or equity would be external.

financial resources is an important issue in supporting small firm growth.

6 Conclusions

Our survey data are consistent with findings in the AQQ 2005 study, in that most of the entrepreneurs we surveyed did not use financial markets or financial institutions (formal financing sources) for financing firm start-up. These firms used informal funding sources: particularly personal savings and to a lesser degree funds from family, a finding which is more consistent with that found in other emerging market economies. It is also striking that household income is the most important source of funds for growing the entrepreneurial firm in our study, suggesting that the market reforms for providing institutional support for firm growth in China may not yet be effective.

Overall, this study's results are highly consistent with stylized facts from the literature on financing in emerging markets. Specifically, our results provide empirical validation to support the assertion that entrepreneurs in emerging markets tend to finance using informal (household income) rather than formal funds. Wealth also plays an important role positively impacting firm growth in this context. This mirrors the well-known stylized fact that firms generally prefer to use internal rather than external funding, supporting the presence of a "pecking order" in financing. And second, our study provides evidence that firms in emerging markets must rely heavily on informal sources rather than formal sources of capital to start their firm. These findings suggest a more limited role in China for formal financial institutions such as banks, venture capital, and other sources of finance that are common in more developed economies.

6.1 Study limitations

It is also important to mention the limitation of our study and caveats for generalization of results. This study did not examine non-service firms, which are a different type of firm that is of particular importance for understanding China's recent explosive growth in the manufacturing sector. More broadly on a macroeconomic level, China's economic development can also be attributed to other economic and non-economic factors which we were not able to include in this particular study. Other potentially relevant factors for explaining high levels of economic growth include high population growth and an increasing labor force participation rate (Keng 2006). Overall, it is important to study China's extraordinary growth and transition at all levels (individual, firm, and macro or country level) to better understand both the common and unique characteristics of its growth process.

Key results of our study show that financial factors do play a crucial role in Chinese small firm start-up and growth. Specific insights from applying a modified growth model to Chinese firms reveals that informal capital is still the primary means of firm start-up and growth. Estimates provide empirical evidence that micro-entrepreneurial Chinese firms do not make extensive use of formal or external capital, which suggests that in spite of dynamic market-based incentives and institutional reforms aimed at providing financial resources for entrepreneurs, financing early-stage start-up and growth remains a significant challenge.

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