Article:
Talavera, O., Weir, C. and Xiong, L. (2017) Time allocation and firm performance: The case of Chinese entrepreneurs. International Journal of the Economics of Business, 24 (1). pp. 27-51. ISSN: 1357-1516

https://doi.org/10.1080/13571516.2016.1199458

Time allocation and performance: the case of Chinese entrepreneurs

Oleksandr Talavera

School of Management,

Conduit Road

University of Sheffield

Sheffield S10 1FL

Email o.talavera@sheffield.ac.uk

T 0 114 222 3451

Charlie Weir

Aberdeen Business School,

Garthdee Road

Robert Gordon University

Aberdeen AB10 7QE

Email c.weir@rgu.ac.uk

T 01224 263812

Lin Xiong

Aberdeen Business School,

Garthdee Road

Robert Gordon University

Aberdeen AB10 7QE

Email l.xiong@rgu.ac.uk

T: 01224 263130

Corresponding author: Charlie Weir

This work was supported by the The Royal Society of Edinburgh (RSE) and The National Natural Science Foundation of China (NSFC)

Time allocation and performance: the case of Chinese entrepreneurs

Abstract

This paper analyses the effect of time allocation on the financial performance of entrepreneurial firms. We apply the Lewbel (2012) estimator to a pooled dataset of Chinese private manufacturing firms that are managed by their owners. Time is allocated between management, networking and study activities. After accounting for endogeneity, we find an inverted U-shaped relationship between management hours and firm performance and between networking and firm performance. However, no relationship between time spent studying and firm performance is observed. We also find that the managing hours-performance relationship is particularly strong for companies managed by entrepreneurs who own more than 75% of share, for companies that are managed by owners with previous experience, for male entrepreneurs and for smaller sized firms**.**

Key words
Time allocation, owner manager businesses, China
JEL codes
M21, L26 O53

1. Introduction

This study examines the effect of time allocation on the performance of Chinese owner-controlled manufacturing firms. We investigate a research question which is fundamental to the success of small business owners, namely: what is the best way to allocate the scarce resource of time? Time allocation is particularly important for entrepreneurs because their working hours are fragmented into a wide range of activities, (Florén 2006). For example, O'Gorman et al. (2005) argue that, over a day, small firm CEOs performed on average, 35 activities. In addition, they had to deal with a range of people including subordinates, suppliers and customers. Florén and Tell (2012) suggest that managers in fast growing firms spend about 40% more undisturbed time on other work than on the daily operational work of the firm. Verheul et al. (2009) find that individuals will work fewer hours if they have other income available and that the productivity of time is positively related to relevant experience. Therefore, the optimal allocation of time between different activities represents a crucial part of the decisions made by an entrepreneur.

We address the time allocation problem by analyzing how financial performance is affected by the allocation of time among three different activities, namely managing, networking and studying. In contrast to other specifications that employ a positive monotonic time-allocation-performance relationship (e.g., Ang et al. 2000; Bitler et al. 2005), we propose that there is inverted U-shaped relationship between hours allocated to different activities and firm performance. The increasing opportunity costs associated with additional hours leads to diminishing performance returns. This suggests that too many hours allocated to a specific activity, for example investment in social capital, may harm performance because too little time is being spent on other important activities such as managing the company or investing in in human capital.

The Chinese environment is well-suited to our empirical investigation for two main reasons. First, the development of the Chinese economy, with its expansion in entrepreneurial activity, provides an interesting framework within which to analyse the importance of time allocation. Even though private enterprises were not formally permitted until 1988, nowadays we observe the rapid growth and importance of Chinese SMEs (Anderson et al. 2003). For example, in 2011 they accounted for about 55% of the growth of gross domestic product and 70% of all employment (NBSC 2013). Second, the success of private enterprise development in China can be partly explained by its cultural values (Robb 2002). Persistent hard work

is regarded as a significant characteristic of Chinese entrepreneurs who are more likely to stress a strong work ethic (Morris and Schindehutte 2005).

The study contributes to the empirical literature in two important ways. First, it contributes to the entrepreneurship literature by exploring the impact of the time allocation behaviour of Chinese entrepreneurs on firm performance. The analysis of three activities, namely managing, networking and studying, provides deeper insights into how these activities affect the performance of entrepreneurial ventures. Second, the empirical analysis is based on the theoretical underpinnings of opportunity costs whereby, beyond a certain point, allocating additional hours to one activity rather than to another has an adverse effect on performance. Given that time is a constrained resource, we propose an inverted U-shaped relationship between managerial activities and the performance of entrepreneurial ventures. We also develop the analysis by linking the opportunity cost model to social and human capital theories in relation to networking hours and study hours respectively. These links are explored by employing the Lewbel (2012) estimator which addresses endogeneity issues.

Our analysis is based on two extensive nationwide surveys of Chinese private owner-controlled manufacturing enterprises across 31 provinces in 2004 and 2006. As hypothesised, we find an inverted U-shaped relationship between performance and management hours and between performance and networking hours. The optimal time spent on management activities is 6.8 hours per day (or about 34 hours per 5-days week) and on networking it is 4.9 hours per day (or about 24.3 hours per 5-days week). This evidence suggests that there are optimal time allocations for each of these activities and that beyond a certain number of hours, additional hours appear to harm firm performance. We also report qualitatively similar results for firms that have male owners. A quadratic relationship with management hours is also found in smaller firms, in firms with high ownership shareholdings and in firms with more experienced managers. However, we find no relationship between study hours and firm performance in either the whole sample or in any of the subsamples analysed.

The paper therefore provides support for a number of theoretical explanations of the time allocation-performance relationship. We find support for the typical labour-leisure trade-off theories. Excessive time spent on certain activities will have a detrimental impact on firm performance. However, the performance-effort sensitivity may be reduced by agency costs. Furthermore, initial social and human capital, measured by previous managerial experience,

enhances the effect of management effort on performance. Finally, our analysis of the importance of human capital investment produces insignificant outcomes suggesting that a longer time period and specific programs of education may be required to observe any benefits from the investment.

The rest of the paper is organized as follows. The next section provides a review of relevant literature and discusses the main hypotheses. Section 3 describes our empirical strategy. Section 4 describes the data and initial analysis. Section 5 reports the results and Section 6 presents the conclusions.

2. Theory, literature and hypotheses development

This section provides the theoretical context within which the effects of time allocation on firm performance are analysed. Time is an important concept in economics because it is a scarce resource. Becker (1965) presents a theory of the allocation of time between different activities. The concept of time allocation between different activities has been extended to analyse a number of situations including, the factors affecting the allocation of time devoted to a new venture whilst remaining employed (Burmeister-Lamp et al. 2012). Others have analysed the self-employment or employment decision (Levesque et al. 2002). In addition, there are a number of studies that have proposed a non-linear relationship between hours worked and factors such as taxation and welfare benefits (Chetty 2012), budget constraints (Beffy et al. 2014), and restrictions on the number of hours that can be worked (Ham and Reilly 2002).

There is also a strand of literature that analysed the hours allocation issue in relation to business. An entrepreneur's limited time has to be allocated among a number of activities, (O'Gorman et al. 2005). In this paper we define time allocation in terms of the share of each day spent on the following activities: management, networking and studying. Furthermore, the effects of all these activities on firm performance may differ with respect to institutional setup, for example, agency issues or in terms of the size of firms and entrepreneurs' personal characteristics such as previous managerial experience and gender.

A typical entrepreneurial model (e.g. Holmström and Tirole 1997) assumes a positive, monotonic relationship between effort and performance. In this setup, greater effort increases profit. There is evidence that increased hours spent on managing will generate benefits for the company in the form of improved performance. Bitler et al. (2005) define effort in terms of

hours worked and report that this has a positive effect on firm performance. Abernethy et al. (2013) examine the association between different types of performance measure and the time horizon of business unit managers that have profit responsibilities. They report that managers spend most time on short-term horizon activities and least time on long-term horizon activities. However, they also find that financial and non-financial performance is positively associated with management taking account of longer time horizons. Bandiera et al. (2011) find that, for Italian CEOs, time spent with insiders is positively related to firm performance whereas time spent with outsiders is not. Bandiera et al. (2013) also find a positive relationship between the number of hours worked by Indian CEOs and firm performance.

There is also limited evidence about the non-linear nature of the hours-performance relationship. Bitler et al. (2005) propose a Cobb-Douglas relationship which yields a positive relationship between hours and performance. Bandiera et al. (2011 and 2013) assume a linear-log function and report a positive relationship. This implies that increasing hours associated with any activity improves performance. However, consistent with increasing opportunity costs and diminishing marginal returns to hours allocated, we propose an inverted U-shaped relationship between activity hours and financial performance. We develop a theoretical model below to support this proposition.

2.1 Theoretical Model Framework

To underpin our econometric specification, we develop a simple theoretical framework. We assume that an entrepreneur has a C^1 utility function $U(E)$ equal to venture profit $\pi(E)$ minus opportunity costs $c(E)$. For simplicity, the profit function is assumed to be $\pi(E) = AE^{\alpha}$, where A is the exogenously defined level of an entrepreneur's ability and α is return on effort, $1 > \alpha > 0$. Opportunity costs are parametrized as the linear function of effort (E), $c(E) = \eta E$:

$$U(E) = \pi(E) - c(E) = AE^{\alpha} - \eta E$$

$$0 \leq E$$

$$E \leq \bar{E}$$

Effort is constrained not to exceed the exogenous value $\bar{E} > 0$ which corresponds to maximum number of hours that an entrepreneur could work $(E \leq \bar{E})$ and non-negativity

constraint ($0 \leq E$). The internal solution for this setup is:

$$E^* = \left(\frac{A\alpha}{\eta}\right)^{\frac{1}{1-\alpha}}$$

$$U(E^*) = \left(\frac{A\alpha}{\eta}\right)^{\frac{1}{1-\alpha}} \left((A)^{\frac{1}{1-\alpha}} \left(\frac{\alpha}{\eta}\right)^{\frac{\alpha}{1-\alpha}} - \eta \right)$$

The optimal level of effort is a positive relationship with returns to effort (α) and entrepreneurs ability (A), and a negative relationship with the opportunity costs of effort (η). In this case, we would not expect that the relationship between effort and performance to be monotonic, as assumed by a typical agency model. This outcome is consistent with the hypotheses set out below.

2.2 Hypotheses

The model therefore shows that it is neither optimal not to work (labour supply is zero) nor to work maximum hours. Diminishing marginal returns to entrepreneurial effort will eventually set in because of the increasing opportunity costs associated with working beyond the optimal time allocation.

Thus, beyond a certain number of hours, an increase in hours spent on management activities means that too little time will be available for other work activities, such as developing social and business contacts. This ultimately damages the ability of the business to develop and grow and will thus harm performance. We therefore hypothesize that, up to a point, increasing the hours allocated to work activities is likely to generate increasing returns but that negative marginal returns to the additional hours spent on a specific activity will occur beyond a certain time allocation. This enables us to estimate the optimal time allocation between these activities and to indicate maximum hours per activity. Therefore, in relation to management hours:

H1**:** *We expect an inverted U-shaped relationship between hours spent on management tasks and financial performance*

It has been argued that the success of business ventures is determined not only by entrepreneurial effort but also by financial and social capital (Bosma et al. 2004). Given that social capital can be regarded as an asset to an entrepreneur, our second hypothesis deals with

networking and the effect that increasing social capital has on firm performance. A successful manager needs not only to manage the internal operations of the firm, but has also to establish external networks and contacts. Social capital may be defined as a means of capturing the relationship between actions and outcomes associated with the interactions between groups (Adler and Kwon 2002). They differentiate between bridging social capital, external relationships, and bonding social capital, internal relationships. It is the former that is the focus of this paper and in particular the effect of investing in social capital defined in terms of networking by means such as making business contacts, attending seminars/conferences, undertaking public relations and hospitality activities and how this affects firm performance.

In relation to the returns to social capital, Bosma et al. (2004) argue that small businesses need to have stronger ties with for example, clients, investors, debtors, and subcontractors, and that therefore the expected benefits relating to social capital are high. They find that investment in social and human capital enhances entrepreneurial performance.[1] Fafchamps and Minten (2002) report a positive relationship between social connections and financial performance. Davidsson and Honig (2003) find that social capital has a positive effect on the performance of Swedish entrepreneurial firms. Lee and Tsang (2001) report a positive relationship between networking and performance for Chinese entrepreneurs in small and medium sized firms in Singapore. Cao et al. (2014) also find that social capital has a positive effect on the performance of Chinese firms.

Networking is of particular importance to Chinese firms because the *guanxi* (a form of social networking and relationship building) possessed by entrepreneurs is a critical success factor**.** State owned enterprises are able to avoid substantial bureaucratic costs and also have better access to resources in in the Chinese economy (Chen et al. 2015), and therefore *guanxi* is essential for private businesses to obtain resources and to navigate bureaucratic structures (Talavera et al. 2012). Managers' *guanxi* networks may benefit their organizational growth through providing information flows, institutional advantages and necessary resources (Sheng et al. 2011).

However, an alternative view is that the time spent with outsiders may mostly benefit the individual manager without contributing to firm's performance given that the interests of managers and firms may be misaligned (Malmendier and Tate 2009). Too much time spent on networking will therefore encroach on the time available for managerial activities. Thus, for

example, Bandiera et al. (2011 and 2013) find that hours spent networking may benefit the manager rather than the firm. However, they analysed the time allocations of CEOs whereas this paper analyses the time allocation of owner managers. Therefore, the appropriate consideration here is that too much time spent networking may prevent time being allocated to deal with strategic and operational business issues rather than time being allocated to benefit the individual manager. This is consistent with our second hypothesis that, beyond a certain time allocation, increasing opportunity costs are incurred as additional hours are spent networking:

H2: *We expect an inverted U-shaped relationship between hours spent on networking and financial performance*

Human capital may be defined as the skills and knowledge acquired through schooling, on-the-job training and experience (Becker 1975). Human capital theory therefore implies a positive monotonic relationship between human capital and performance (Florin et al. 2003). In the case of entrepreneurs, the greater the human capital, the better able that person is to exploit profitable opportunities. Cassar (2006) argue that entrepreneurs with greater human capital will be more successful than entrepreneurs with less human capital because they seek to earn a higher return on their human capital investment.

However, Davidsson and Honig (2003) argue that this is not necessarily always the case. For example, excessive human capital might affect risk-taking behaviour and decisions to invest. They find no evidence that human capital factors affect the performance of nascent entrepreneurial firms. Further, the effects of different components of human capital vary. Unger et al. (2011) suggest that performance is more likely to be affected by the outcomes of human capital investment (knowledge or skills) than by the human capital investments themselves (education or years of experience).

In addition, the effects of formal education may differ relative to the investment in specific human capital. For example, Volery et al. (2013) find that entrepreneurial education has a positive, but limited effect on human capital. Similarly, Dickson et al. (2008) suggest that the effect of general education is not clear but they do find a positive link between specific programs of entrepreneurship education and subsequent entrepreneurial success. Finally, the education–performance sensitivity might be different with respect to the stages of business development or industry characteristics.

We investigate the impact of the investment in human capital, as measured by the number of hours spent studying, has on firm performance. The impact of time spent on studying on the business success of an entrepreneur is difficult to predict theoretically. On the one hand, it may be argued that entrepreneurs that spend more time studying have a stronger commitment to running their businesses and thus the coefficient for time spent on studying is expected to be positive. This is because hours spent on studying will increase a manager's stock of human capital and will also benefit the company via an improved ability to deal with business issues. On the other hand, it could be argued that entrepreneurs that spent more time studying will have higher opportunity costs associated with spending less time on other activities such as managerial functions. There are empirical studies (e.g., Lynskey 2004 and Ganotakis 2012) that suggest an inverted U-shaped relationship between human capital and firm performance. Consistent with this, we hypothesise:

H3: *We expect an inverted U-shaped relationship between hours spent studying and financial performance*

The links between activities and performance may change depending on the organizational imperfections within entrepreneurial ventures or the personal characteristics of business owners. We develop the analysis by looking at two subsamples: the first deals with potential agency issues associated with ownership; the second with the importance of previous managerial experience.

First, we analyse potential agency issues by examining the effect of ownership stakes on the hours–performance relationship. The separation of ownership and control has long been recognised as a source of potential conflict between management and shareholders in the context of publicly owned firms (Jensen and Meckling 1976). The misalignment of interests results in agency costs being borne by the owners. However, managerial ownership will reduce the incentive to consume perquisites or to undertake sub-optimal decisions. These costs diminish as manager shareholdings increase hence leading to a convergence of interests. However, increased managerial ownership may also lead to entrenchment (Fama and Jensen, 1983), as managers become insulated from effective monitoring. There have been many studies that have analysed the effect of management ownership of the performance of publicly quoted companies, for example, Von Lilienfeld-Toal and Ruenzi (2014) for the US, McKnight and Weir (2009) for the UK, Rose (2005) for Denmark and Andres (2008) for Germany.

However, unlike quoted companies, small businesses offer a direct test of the zero agency cost model because they will yield cases of 100% ownership. This implies that firms that have managerial ownership of less than 100% will incur agency costs and that these costs will increase as managerial ownership declines. Consistent with the agency model, Ang et al. (2000) found that agency costs increased as management shareholding decreased. Bitler et al. (2005) find that, after controlling for endogeneity, there is a positive relationship between ownership, hours worked and performance for privately owned firms. Their finding is consistent with the agency model because it suggests that the incentives provided by increased ownership result in better firm performance and outweigh any potential entrenchment effects. Their model uses a logarithmic specification which shows positive, but diminishing, returns to hours worked. The positive result is consistent with the agency incentive argument. Therefore, we expect that the incentive effects associated with high managerial ownership will result in a more efficient allocation of time between managerial activities and improve firm performance.

H4: *The time allocation–performance relationship is stronger as managerial ownership increases.*

The second sample split analyses the impact of management experience on the hours-performance relationship. As discussed above, entrepreneurial effort as well as social and human capital may have a differentiated impact during different stages of firm development. Although the pooled nature of the data does not allow us to directly analyse the influence of time, we aim to incorporate a temporal element to the analysis by using previous managerial experience. This represents an accumulation of knowledge, skills and experience that have been gained over time. A number of studies (e.g. Ehrenberg and Smith 2000) suggest that there is a positive but non-linear relationship between job experience and performance. However, Sturman (2003) finds an inverted U-shaped relationship between time and performance when jobs have low complexity. We therefore hypothesis that:

H5: *The time allocation–performance relationship is enhanced by previous management experience*

3. Methodology

3.1 Econometric specification

Based on our hypotheses, we develop our baseline regression for investigating the relationship between the time allocation of managers and the performance of their companies,

$$Firm\ Performance_i = \alpha + \beta\ Hours_{ik} + \delta\ Hours^2_{ik} + \gamma Z_i + u_i \qquad (1)$$

Where i is the firm, and u_i is the error term.

$Firm\ Performance_i$, is an indicator of operating performance. Consistent with Robb and Watson (2012) we use return on assets (ROA) defined as profit after tax normalised by total assets.

Our key explanatory variable, $Hours_{ik}$, is a self-reported measure of time spent on each of three activities, $k \subset \{\ Managing, Networking, Studying\ \}$. Respondents were asked how many hours each day they spent on the following activities: managing, networking, and studying. In the analysis we report the share of hours spent on each activity (hours divided by 24).[2]

Vector Z_i includes a number of control variables that account for firm and manager characteristics. To control for firm size, we use the logarithm of total sales.[3] *Log(firm age)* is the natural log of firm age in years. Entrepreneurial characteristics are also expected to be important in the relationship between time allocation and firm performance. *Age* is the log of the age of the entrepreneur in years; *Female* is a dummy variable that is 1 if the entrepreneur is female and 0 if male; *Single* is a dummy variable that is 1 if the manager is a single decision maker and 0 if not; *Education* is 1 if entrepreneur has university education and 0 if not. *Ownership* is the share (%) of the firm owned by the entrepreneur. *Management experience* is a dummy variable that is 1 if the entrepreneur has any managerial experience before, and 0 if not. Finally, we include industry, region and year dummy variables.

Although we use data from two consecutive waves of the Chinese Enterprise Survey, we cannot make use of panel data techniques because there are no means of tracking the same firms over both waves. We, therefore, use pooled data analysis. The hours-performance relationship may be simultaneous. For example, Verheul et al. (2009) run regressions with both hours and profit as dependent variables and estimate them by using the same independent variables. To address the two-way relationship between hours and performance we utilise an instrumental variable (IV) approach. The traditional IV approach depends on the validity of the instruments however finding a suitable instrument set is not a trivial exercise.

To address this issue, we make use of the approach of Lewbel (2012) which generates a set of internal instruments.

The Lewbel (2012) procedure consists of two stages. Let us assume that we have $\varphi_1 \dots \varphi_n$ endogenous variables and $x_1 \dots x_k$ exogenous variables. In the first stage we run n OLS regressions with the endogenous variables, ϕ_i as the dependent variables and the exogenous variables $x_1 \dots x_k$ as independent variables. After this step we generate predicted residuals $(u_1 \dots u_n)$. Then we use these residuals to construct an instrument vector $z_1 \dots z_n$ for each $i \in 1..n$, we estimate $z_i = (\varphi_i - \overline{\varphi_i})u_i$, where $\overline{\varphi_i}$ is the mean of φ_i. Note that this approach is valid in the presence of heteroscedasticity in the first stage, as has been proved by the Breusch-Pagan (1979) test. In the second stage we run two-step IV-GMM by treating time allocation as endogenous and instrument it with the internally generated regressors.

In addition to the internally generated instruments discussed above, we also create a vector of externally selected instruments that are likely to affect time allocation but not performance. The instruments include variables related to management team characteristics and the entrepreneur's household and family, namely the natural logarithm of household expenditure, the natural logarithm of entrepreneur's family size, the share of personal income in total household income, and the natural logarithm of management team size. None of these measures are directly linked with the performance of entrepreneurial ventures, but are likely to affect the time allocation of business owners. For example, larger families and higher household expenditures may increase the motivation of entrepreneurs to work longer hours, whereas if the entrepreneur makes a small contribution to the family budget, this may have a negative effect on hours worked. Increased team size will increase effort because the entrepreneur will have to spend more time monitoring the activities of the team.

The validity of our estimation depends on two important characteristics. First, there should be a zero correlation between the instruments and the error term. To test this assumption we make use of the Sargan/Hansen overidentification test. Second, there should be a strong correlation between the instruments selected and the instrumented variables. We test this proposition by Kleibergen-Paap LM statistic which is also known as underidentification test.

4. Sample and data analysis

Our sample consists of manufacturing firm-level data taken from a nationwide sample survey of privately owned Chinese enterprises. The survey gathers information on a sample

of registered businesses in the private sector and has been conducted every two years from 1991 to 2006 by three major business associations (the All-China Federation of Industry and Commerce (ACFIC), the State Administration for Industry and Commerce (SAIC) and the Chinese Academy of Social Science (SASS).[4] The analysis in this paper is conducted using data pooled over 2004 and 2006. There are 3,837 firms observed in 2006 survey and 3,012 firms in 2004 survey. These two years had consistent sets of questions whereas earlier surveys asked different questions. The dataset represents the largest and most comprehensive source of information on Chinese private enterprises. One of the database's strengths is that the survey has a response rate of around 85%.

The surveys sought information about enterprise owners, the nature of their firms, their management practices and the performance of their businesses. To ensure a focus on owner-managers, we first identify 5,384 non-listed firms where the largest owner is an individual. Then, we restrict the sample to the 3,413 firms in which the manager owns at least 50% of the company. To minimize potential misreporting of the time allocation measures, we only include firms for which the total value for managing, studying and networking hours less than 16. This gives 3,074 observations. We then exclude firms for which the total number of hours spent on all three activities exceeded 24 as well as firms with zero work hours. This restricts our sample to 3,038 observations. Next we ensure that each respondent answered all relevant questions. This gives a final sample of 1,776 observations. The self-reported time allocation patterns of the owner-managers are used to develop a measure of time utilization. Owner-managers are asked to specify the number of hours they spend on average on the following activities per day: management, networking, and studying.

Insert Table 1

Table 1 presents variable definitions and summary statistics based on the estimation sample. On average, each day, entrepreneurs spend, 6.8 hours on management activities, 3.8 hours on networking activities and 1.6 hours to studying. Their total daily hours allocated to work (managing and networking) are 10.6 hours or 53 hours per week. This is slightly higher than worked by the CEOs of Italian companies who average around 48 hours over a 5 day-week (Bandiera et al. 2011). However, it is consistent with Hyytinen and Ruuskanen (2007) who report that the self-employed work more hours than those employed in organisations. The average age of Chinese entrepreneurs is 43 years old. Only 18.1% have university degree. The share of female entrepreneurs is quite low at 12.5%. Figure 1 plots the densities for

management hours (measured as a share of 24 hours) for both male and female entrepreneurs. It reveals similar distributions of the management hours variable by gender.

Insert Figure 1

The mean firm age is 5.6 years. Average ownership share is 81.2%. 56.5% are defined as single decision-makers and 29% have previous management experience. Finally, private firms in our sample are profitable with an average 32.7% return on assets. Fung et al. (2007) use the same survey data in their study. They report that in wave 2000 and 2002, entrepreneurs' average age is 44 years old; 90 percent of them are male and more than a third have college degrees or higher. The average sales revenue in their sample is 21.6 million RMB (2.6 million USD) in 2002 and 18.7 million RMB (2.3 million USD) in 2000. The average firm age was six years in 2000 and seven years in 2002. The descriptive statistics in our sample are consistent with previous studies using the same survey data.

Insert Table 2

Table 2 presents correlation matrix for the firm-level variables employed in our analysis. The coefficients indicate no strong correlation among explanatory variables. The variance inflation factor (VIF) statistics are employed to test multicollinearity and suggest no evidence of multicollinearity in our empirical models.

Insert Table 3

Table 3 summarizes management, networking and study hours by ownership, management experience, gender, and size. As Panel A shows, we observe that managing and studying hours are not statistically different for firms with high (equal to or less than 75%) and those with a very high level (above 75%) of managerial ownership. However, lower stake owners are likely to spend more hours networking than higher stake owners. Panel B reports that, small business owners without management experience spend more (less) time on managing (networking) activities compared to their counterparts with management experience. Panel C shows that, relative to male entrepreneurs, on average female entrepreneurs spent significantly more hours on management activities but significantly fewer hours per day on networking. There are no differences between female and male entrepreneurs in relation to time spent on study. Finally, Panel D suggests that entrepreneurs managing larger firms spend more time on both networking and study hours than their counterparties running small businesses however

there is no difference in the hours allocated to management activities.

5. Results

5.1 Whole sample

Insert Table 4

Table 4 presents results using the Lewbel (2012) estimator with both internal and external instruments. Hours are measured as a share of 24 hours. We report the underidentification (Kleibergen-Paap LM) and overidentification (Hansen J) test results. For all three equations, the underidentification tests rejects the hypothesis that instruments are weak and that asymptotic theory provides a poor guide to actual finite-sample distributions. The overidentification tests do not reject the null hypothesis that all instruments are valid. We also perform the Variance Inflation Factor (VIF) test for the regressions and find no evidence of multicollinearity. F-tests reported in Table 4 reject the null hypothesis that the coefficients are equal to zero.

The results in Table 4 show support for Hypothesis 1. We find, as hypothesised, a statistically significant inverted U-shaped relationship between management hours and performance. Thus, up to a maximum of 6.8 hours, increasing the number of hours allocated for management hours increases profitability. However additional time, above 6.8 hours per day, spent on these activities reduces profitability. The 95% confidence interval ranges from 5.2 to 8.4. There are two possible reasons behind the inverted U-shaped link. First, the labour-leisure model assumes diminishing marginal productivity of entrepreneurs. Second, motivation and aspiration could also be reduced with time spent on managing which in its turn increases opportunity costs. Despite these two facts, we find that 23.6% of owner managers spent in excess of 8.4 hours per day on management activities. The reallocation of time may have a positive effect on firm performance.

The estimates for networking hours also reveal statistically significant inverted U-shaped relationship between time spent on increasing social capital and the return on assets of Chinese entrepreneurs. The finding supports Hypothesis 2 and is in line with Bosma et al. (2004) and Lee and Tsang (2001) who also argue that not only initial social capital, but also investment in social capital affects performance. However, the link between social capital and the return on assets is not monotonic. The maximum allocation is estimated to be 4.9 hours

per day but beyond that, additional hours spent on networking harm performance. The 95% confidence interval ranges from 3.4 to 6.3 hours per day. Our data reveal that 60.4% of entrepreneurs spend time on networking outside this interval. Our results therefore suggest that the reallocation of time between activities will have a beneficial effect on performance.

In relation to Hypothesis 3, we find no evidence to support the hypothesis that there is an inverted U-shaped relationship between time spent studying and firm performance. This result is in line with Unger et al. (2011) who find that the outcomes of human capital investment (e.g. skills) are more important than human capital investment itself (e.g. time spent on study). More educated entrepreneurs may also be more risk averse which could affect decisions to invest or expand businesses (Davidsson and Honig, 2003). A further reason for the insignificant result is that the benefits of studying will take time to feed through to improved firm performance. Finally, some managers might misreport studying time as personal time or vice versa. Therefore, lack of statistical significance might simply reflect measurement error.[5]

Among the control variables, both Log(Sales) and the dummy of single decision-making are statistically significant at 1% level. We find that performance is positively related to size which may be explained by economies of scale obtained by larger firms (Serrasqueiro and Nunes, 2008). In addition, larger size also allows for the possibility of a greater diversification of activities, enabling companies to cope more successfully with market changes, as well as with high-risk situations (Goddard et al. 2005). We find that previous management experience is not significant. The negative sign of the single decision-making dummy suggests that Chinese entrepreneurs, making decisions entirely by themselves, might make mistakes in the decision-making process that will have adverse effects on firm performance. Ownership is found to be positively related to performance, a finding consistent with the agency model discussed below.

As set out in hypothesis H4, we develop the analysis by looking at a subsample that highlights potential agency issues and examine the effect of ownership stakes on the hours–performance relationship. We test the agency hypothesis that higher managerial ownership improves performance by splitting the sample into two groups, one consisting of firms in which the manager owner has between 50% and 75% of the shares and the other in which the manager owner has more than 75%. This allows us to distinguish between high and very high levels of ownership concentration and to evaluate the impact of ownership on the

hours-worked-performance relationship.

Insert Table 5

As reported in Panel A of Table 5, we find no relationship between any of the hours variables and performance for the 50-75% grouping. However, for the high ownership concentration group, ownership in excess of 75%, we find statistically significant inverted U-shaped relationships for management hours. The initial part of this result is consistent with Bitler et al. (2005) who find a positive relationship between entrepreneurs' effort and firm performance when the level of managerial ownership is very high. However, the inverted-U-shaped nature of the result indicates that beyond a certain number of hours, 7.7 for the subsample with ownership in excess of 75%, performance suffers. This implies that even at high levels of ownership, there are limits to effectiveness of additional hours spent on work activities. Consistent with the agency theory, the results offer some support for Hypothesis 4 and indicate that up to a point, for firms with very high managerial ownership, increasing management effort benefits firm performance.[6]

The second sub-sample analyses the impact of managerial experience on the hours-performance relationship. We divide the sample into two groups, those that had previous managerial experience and those that did not. Entrepreneurs with different work experience are likely to develop different patterns of time allocation for different activities.

As Panel B of Table 5 reports, we find a significant inverted U-shaped relationship between management hours and performance for firms run by managers with previous managerial experience, with the optimal hours being 5.9. However, we find an insignificant relationship for networking and study hours. Our data also reveal an insignificant relationship between management hours and performance for firms run by managers without managerial experience. These results offer support for Hypothesis 5 given that the effort-performance relationship is present in the group that had previous managerial experience. This finding suggests that previously accumulated human and social capital complements managerial effort. We also observe that networking hours is significant for those without previous management experience. This may be because managers with no previous experience may have limited access to social networks and will therefore have to commit extra effort to build them up. However, too many hours allocated to networking can eventually adversely affect performance.

Additional analysis and robustness checks

Table 6 presents the results for two further subsamples. First, in relation to gender, it has been shown that in transition economies, women entrepreneurs have been found to be disadvantaged in their access to male-dominated industry networks and in using the opportunities these networks present for business development and growth (Manolova 2005). In addition, legislation inherited in transitional economies may have harmed women's future entrepreneurial success because the legislation reduced their chances of obtaining managerial experience (Bliss and Garratt 2001). Support for this comes from the fact that, as Table 1 shows, women entrepreneurs account for only 12.5 percent of the sample. McKendrick and Carroll (2001) argue that the membership of business associations is an important networking forum for entrepreneurs. We find that significantly fewer Chinese women entrepreneurs have previous management experience or are members of business associations.

Panel A in Table 6 shows a significant inverted U-shaped relationship between management hours and performance and between networking and firm performance is found for male entrepreneurs. However, even though the density functions, (Figure 1), show similar distributions of managerial effort, no such significant relationship is found for female entrepreneurs. One reason for this may be that firms with female entrepreneurs are less likely to grow than firms with male entrepreneurs and this may therefore partly explain the finding on management hours. In addition, there may be some cultural characteristics that could explain the insignificant network hours finding; for example it may be more difficult for women to establish formal network channels than males, even if they commit effort to informal networking. The results imply that the effort made by women entrepreneurs is not directly rewarded with better firm performance. No relationship between time spent studying and firm performance is found for either male or female entrepreneurs.

Second, different patterns of time allocation by firm size were also reported in Table 3. Baker and Hall (2002) develop a model that allows CEO productivity differs for firms of different sizes and find that CEOs do a range of activities, the marginal product of which changes with size in varying degrees. In Table 6 Panel B, we split the sample by firm size and observe significant inverted U-shaped relationship between management hours and performance in smaller sized firms. This may be due to that small firms have distinct advantages in judging

and estimating workers', as well as managers' performance (Zenger 1994). In contrast, the effort-performance relationship is insignificant for larger firms. It may be that, in smaller firms, the owners' effort is more obvious to employees, and thus there is a collective effort to help the firm to perform better. In contrast, in larger enterprises the manager/owner's effort may not be obvious to employees and supervisors. As a result, it may be more difficult to measure the direct link between owner-managers' effort and firm performance as firm size increases.

Insert Table 6

We have also undertaken four additional analyses to check the validity of our main results.[7] First, we employ different measures of performance as dependent variables, including return to sales (ROS) calculated by the ratio of net income to total sales; production efficiency calculated by output per worker; and innovation measured by the ratio of R&D to equity plus debt. Overall, the estimates are in line with those reported in Table 4. Positive impacts on firm performance and diminishing marginal effects are found on both management and networking hours when firm performance is measured by ROS. The statistically significant inverted U-shaped relationship between management hours and firm performance is also found with output per worker used as dependent variable. However, we find no significant effects when innovation is used as the dependent variable. This may be due to the effects of time lags, which we are unable to address due to data availability.

Secondly, we add additional explanatory variables in the regressions, including a financial constraint (Bank loans/Assets); an innovation dummy (equals to 1, if the firm has patent); and a foreign investment dummy (equals to 1, if the firm makes investment overseas) (Du and Girma 2012; Liu 2012). The findings remain consistent with the results reported in Table 4.

The third robustness check is related to the functional form of the time allocation and performance relationship. Bandiera et al. (2011), report a logarithmic relationship between hours and performance. We adapt our econometric specification (1) by replacing *Hours* and $Hours^2$ with the natural logarithm of *Hours*. To control for potential endogeneity we employ the Lewbel (2012) estimator with both internal and external instruments, as used in the main analysis. The results show a positive and statistically significant relationship for management hours but insignificant result for networking. Study hours are also insignificant. Thus, the quadratic relationship seems to be more appropriate than the logarithmic alternative.

Fourth, the entrepreneurs who allocate more time in studying may indicate stronger commitment to achieve high performance of their businesses. We therefore we did a robustness check by treating education as an endogenous variable and found that this did not affect the results. In addition, we split the sample into entrepreneurs with or without university education. Again we found that study hours remained insignificant.[8]

Conclusions

This study examines the effect of time allocation on performance for 1,776 Chinese owner-manager firms in 2004 and 2006. We investigate a question which is fundamental to the success of small business owners, namely: what is the best way to allocate the scarce resource of time? We answer this question by analyzing how financial performance is affected by the allocation of time between different activities. As hypothesised, we find a statistically significant inverted U-shaped relationship between management hours and firm performance and between networking hours and firm performance. However, we report no relationship between study hours and firm performance. The optimal time allocation for management activities is 6.8 hours per day and the optimal networking time allocation is 4.9 hours per day.

We also analyse the time allocation-performance relationship in relation to agency issues, to previous management experience, firm size and to gender. We find no relationship between management hours and performance for firms with 50%-75% management ownership but a significant quadratic relationship for higher ownership stakes is observed. This indicates that there are agency issues in private companies and that the agency conflict is reduced as ownership increases. We also find that management experience produces an inverted U-shaped relationship for those firms whose managers had previous managerial experience. Similar results are found for small firm subsample. In addition, we examine different effects of men and women entrepreneurs' time allocation on firm performance. Significant inverted U-shaped relationship between management hours and performance and between networking and firm performance are found for men entrepreneurs; but not for women entrepreneurs.

The analysis has presented new insights into the effects of time allocation of owner-managers on the financial performance of firms in China, an economy that is in the process of adopting a more market-oriented economic system. A number of policy implications can be derived from our results. First, although a work ethic is important, the results offer little justification for working long hours because it does not necessarily improve the financial performance of

companies. This result is particularly interesting given that 23.6% of business owners in our data spend more than 8.4 hours per day on management activities. An awareness of the importance of time allocation is important for those starting their own business and policy makers should try to ensure that entrepreneurs know this. Second, while networking hours are important, our results suggest that there are limits to the effectiveness of time spent on this activity. The optimal level of networking is estimated to be 4.9 hours per day but 26.2% of business owners network more than five hours and 26% less than three hours. These figures suggest that firms will improve performance if managers reallocate their time more effectively. Third, the failure rate of entrepreneurial firms is high and thus policy makers should provide information and assistance in relation to the most efficient use of time. Our results show that working long hours does not necessarily improve performance, a finding which is important for entrepreneurs.

We find evidence that the allocation of time across different activities significantly affects performance. The results offer support for the increasing opportunity cost model which argues that performance and effort will be positively related up to a certain number of hours and that beyond that point, the relationship will become negative. Investment in social capital also positively affects performance but too many hours spend on that activity will produce negative returns. However, our analysis of the impact of human capital factors produced insignificant results. This may be explained by the fact that the data did not enable an inter-temporal analysis to be undertaken and that increases in human capital has no short run impact on performance.

The analysis does have a number of limitations. First, the use of survey data which relies on self-reporting of hours raises the problem of accuracy and recall bias. Therefore further in-depth analysis of case studies may offer additional insights. Second, the structure of the survey does not permit the use of panel data techniques, which would provide a richer analysis of the effort-performance relationship. Third, while providing rich source for research exploration, a number of important variables for example ownership concentration or industry-specific human capital are not present in our data which could indicate omitted variables bias.

The study offers a number of directions for further research. First, further studies could be undertaken to construct a database of the relationship over time. This would enable the analysis to address issues such as the reaction of activity hours to poor, or good performance.

Lagged effects could also be analysed. Furthermore, the effect of studying hours on performance might only be observed in the long run. Second, an interesting extension of our work could involve exploring the effectiveness of the way in which time is allocated. It might be a case, that working less but more efficiently has much greater effect on performance than working more hours but being less efficient. This would offer potential insights into the need for an effective work-life balance. Third, the analysis relates to China and it would be instructive to see how far the relationships extend to other emerging economies. Fourth, an assessment of entrepreneurial motivation might offer additional insights into the allocation of time-performance relationship.

Acknowledgements

We thank Subasish Chowdhury and the Royal Economic Society 2013 conference participants for valuable comments and suggestions. We also acknowledge the helpful comments of two anonymous referees.

Endnotes

[1]Glaeser et al. (2002) argue that people who investment in human capital are also likely to invest in social capital.

[2]The results for levels of hours are available on request.

[3]In addition to the logarithm of total sales we have also experimented with the natural logarithm of the number of employees. The results are quantitatively similar to those reported in this work.

[4] See also Fung et al. (2007) for a description of the same dataset.

[5] We would like to thank an anonymous referee for this suggestion.

[6] Ownership concentration could be another important characteristic to control for. Unfortunately, our data source does not report any plausible proxies for this factor.

[7]The estimates are available on request.

[8]The full results are available on request

References

Abernethy, Margaret, Jan Bouwens, and Laurence Van Lent. 2013. The Role of Performance Measures in the Intertemporal Decisions of Business Unit Managers, *Contemporary Accounting Research* 30 (3): 925-961.

Adler, Paul and Seok-Woo Kwon. 2002. Social Capital: Prospects for a New Concept. *Academy of Management Review* 27 (1): 17-40.

Anderson, Alistair, Jin-Hai Li, Richard Harrison, and Paul Robson. 2003. The Increasing Role of Small Business in the Chinese Economy. *Journal of Small Business Management* 41(3): 310-316.

Andres, Christian. 2008. Large Shareholders and Firm Performance - an Empirical Examination of Founding-family Ownership. *Journal of Corporate Finance* 14(4): 431-446.

Ang, James, Rebel Cole, and James Lin. 2000. Agency Costs and Ownership Structure. *Journal of Finance* 55: 81-106.

Baker, George, and Brian Hall. 2004. CEO Incentives and Firm Size. *Journal of Labour Economics* 22(4):767-798.

Bandiera, Oriana, Luigi Guiso, Andrea Prat, and Raffaella Sadun. 2011. *What Do CEOs Do?* Centre for Economic Policy Research Discussion Paper DP8235.

Bandiera, Oriana, Anrea Prat, and Raffaella Sadun. 2013. *Managing the Family Firm: Evidence from CEOs at Work*. Harvard Business School Discussion Paper 14-044.

Becker, Gary. 1965. A Theory of the Allocation of Time. *Economic Journal* 75(299): 493-517.

Becker, Gary. 1975. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. National Bureau of Economic Research, New York, NY.

Beffy, Magali, Richard Blundell, Antoine Bozio, and Guy Laroque. 2014. *Labour Supply and Taxation with Restricted Choices*. IFS Working Paper, W14/04.

Bitler, Marianne, Tobias Moskovitz, and Annette Vissing-Jorgensen. 2005. Testing Agency Theory with Entrepreneur Effort and Wealth. *Journal of Finance* 60(2): 539-576.

Bliss, Richard, and Nocole Garratt. 2001. Supporting Women Entrepreneurs in Transitioning Economies. *Journal of Small Business Management* 39(4): 336–344.

Bosma, Nils, Mirjam van Praag, Roy Thurik, and Gerrit de Wit. 2004. The Value of Human and Social Capital Investments for the Business Performance of Startups. *Small Business Economics* 23(3): 227-36.

Breusch, Trevor, and Adrian Pagan. 1979. A Simple Test for Heteroskedasticity and Random Coefficient variation. *Econometrica* 47 (5): 1287-1294.

Burmeister-Lamp, Katrin, Moren Levesque, and Christian Schade. 2012. Are Entrepreneurs Influenced by Risk Attitude, Regulatory Focus or Both? An Experiment on Entrepreneurs' Time Allocation. *Journal of Business Venturing* 27(4): 456-476.

Cao, Jerry, Yuan Ding, and Hua Zhang. 2014. Social Capital, Informal Governance and Post IPO Firm Performance: A Study of Chinese Entrepreneurial Firms*, Journal of Business Ethics* 134 (4): 1-23.

Cassar, Gavin. 2006. Entrepreneur Opportunity Cost and Intended Venture Growth. *Journal of Business Venturing* 21(6): 610-632.

Chen, Ming-Huei, Yu-Yu Chang, and Chia-Yu Lee. 2015. Creative Entrepreneurs' Guanxi Networks and Success: Information and Resource. *Journal of Business Research* 68(4): 900-905.

Chetty, Raj. 2012. Bounds on Elasticities With Optimization Frictions: A Synthesis of Micro and Macro Evidence on Labor Supply. *Econometrica* 80(3): 969-1018

Davidsson, Per, and Benson Honig. 2003. The Role of Social and Human Capital among Nascent Entrepreneurs. *Journal of Business Venturing* 18(3): 301-331.

Dickson, Pat, George Solomon, and K. Mark Weaver. 2008. Entrepreneurial Selection and Success: Does Education Matter*?" Journal of Small Business and Enterprise Development* 15(2): 239-258.

Du, Jun, and Sourafel Girma. 2012. Firm Size, Source of Finance, and Growth - Evidence from China. *International Journal of the Economics of Business* 19(3): 397-419.

Ehrenberg, Roland and Robert Smith. 2000. *Modern Labor Economics: Theory and Public Policy*. Reading, MA: Addison Wesley.

Fafchamps, Marcel, and Bart Minten. 2002. Returns to Social Network Capital among Traders. *Oxford Economic Papers* 54(2): 173-206.

Fama, Eugene, and Michael Jensen. 1983. Separation of Ownership and Control. *Journal of Law and Economics* 26(2): 301-325.

Florén, Henrik. 2006. Managerial Work in Small Firms: Summarising What We Know and Sketching a Research Agenda. *International Journal of Entrepreneurial Behaviour and Research* 12(5): 272-288.

Florén, Henrik, and Joakim. Tell. 2012. *Managerial Behaviour and Small Firm Performance*, working paper, Centre for Innovation, Entrepreneurship and Learning, Halmstad University.

Florin, Juan, Michael Lubatkin, and William Schulze. 2003. A Social Capital Model of

High-Growth Ventures. *Academy of Management Journal* 46(3): 374-384.

Fung, Hung-Gay, Xiaoqing Xu, and Qi-Zi Zhang. 2007. On the Financial Performance of Private Enterprises in China. *Journal of Developmental Entrepreneurship* 12(4): 399-414.

Ganotakis, Panagiotis. 2012. Founders' Human Capital and the Performance in UK New Technology Based Firms. *Small Business Economics* 39(2): 495-515.

Glaeser, Edward, David Laibson, and Bruce Sacerdote. 2002. The Economic Approach to Social Capital. *Economic Journal* 112(8): F437-F458.

Goddard, John, Manouche Tavakoli, and John Wilson. 2005. Determinants of Profitability in European Manufacturing and Services: Evidence from a Dynamic Panel Data. *Applied Financial Economics* 15(18): 1269-1282.

Ham, John, and Kevin Reilly. 2002. Testing Intertemporal Substitution, Implicit Contracts, and Hours Restriction Models of the Labor Market using Micro Data. *American Economic Review* 92(4): 905-927.

Holmström, Benkt, and Jan Tirole. 1997. Financial Intermediation, Loanable Funds, and the Real Sector. *Quarterly Journal of Economics* 112 (3): 663-692.

Hyytinen, Ari, and Olli-Pekka- Ruuskanen. 2007. Time Use of the Self-employed. *Kyklos* 60(1): 105-122.

Jensen, Michael, and William Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3(4): 305-360.

Lee, Don, and Eric Tsang. 2001. The Effects of Entrepreneurial Personality, Background and Network Activities on Venture Growth." *Journal of Management Studies* 38(4): 583-602.

Levesque, Moren, Dean Shepherd, and Evan Douglas. 2002. Employment or Self-employment: A Dynamic Utility Maximizing Model. *Journal of Business Venturing* 17(3): 189-210.

Lewbel, Arthur. 2012. Using Heteroscedasticity to Identify and Estimate Mismeasured and Endogenous Regressor Models. *Journal of Business and Economic Statistics* 30(1): 67-80.

Liu, Jia. 2012. The Dynamics of Listed SMEs in China. *International Journal of the Economics of Business* 19(3): 421-450.

Lynskey, Michael. 2004. Determinants of innovative activity in Japanese technology-based start-up firms. *International Small Business Journal* 22(2): 159-196.

Malmendier, Ulricke, and Geoffrey Tate. 2009. Superstar CEO's. *Quarterly Journal of Economics* 124(4): 1593-638.

Manolova, Tataina. 2005. Builders and leaders: Six case studies of men and women small proprietors in the Bulgarian construction industry. In C.G. Brush, N.M. Carter, E. Gatewood,

P.G. Greene, and M. Hart (Eds.), *Growth oriented women entrepreneurs and their businesses: A global research perspective* (pp. 232–259). Cheltenham, U.K.: Edward Elgar.

McKendrick, David, and Glen Carroll. 2001. On the Genesis of Organizational Forms: Evidence from the Market for Disk Arrays. *Organization Science*, 12(6): 661–682.

McKnight, Philip J., and Charlie Weir. 2009. Agency Costs, Corporate Governance Mechanisms and Ownership Structure in Large Publicly Quoted Companies: a Panel Data Analysis. *Quarterly Review of Economics and Finance* 49(2): 135-158.

Morris, Michael, and Minet Schindehutte. 2005. Entrepreneurial Values and the Ethnic Enterprise: an Examination of Six Subcultures. *Journal of Small Business Management* 43(4): 453-479.

National Bureau of Statistics of China (NBSC). 2013. *China Statistical Year Book 2013*. China Statistics Press, Beijing.

O'Gorman, Colum, Sarah Bourke, and John Murray. 2005. The Nature of Managerial Work in Small Growth-oriented Small Businesses." *Small Business Economics* 25(1): 1-16.

Robb, Alicia. 2002. Entrepreneurial Performance by Women and Minorities: the Case of New Firms. *Journal of Developmental Entrepreneurship* 7(4): 383–397.

Robb, Alicia and John Watson. 2012. Gender Differences in Firm Performance: Evidence from New Ventures in the United States. *Journal of Business Venturing* 27(5): 544-558.

Rose, Casper. 2005. Managerial Ownership and Firm Performance in Listed Danish Firms: in Search of the Missing link. *European Management Journal* 23(5): 542-553.

Serrasqueiro, Zelia and Paulo Macas Nunes. 2008. Performance and size: empirical evidence from Portuguese SMEs. *Small Business Economics* 31(2): 195-217.

Sheng, Shibin, Kevin Zhou, and Juli Li. 2011. The Effects of Business and Political Ties on Firm Performance: Evidence from China. *Journal of Marketing*, 75(1): 1-15.

Sturman, Michael. 2003. Searching for the Inverted U-Shaped Relationship between Time and Performance: Meta-Analyses of the Experience/Performance, Tenure/Performance, and Age/Performance Relationship. *Journal of Management* 29(5): 609-640.

Talavera, Oleksandr, Lin Xiong, and Xing Xiong. 2012. Social Capital and Access to Bank Financing: The Case of Chinese Entrepreneurs. *Emerging Markets Finance and Trade* 48(1): 55-69.

Unger, Jens, Andreas Rauch, Michael Frese, and Nina Rosenbusch. 2011. Human Capital and Entrepreneurial Success: a Meta-Analytical Review. *Journal of Business Venturing* 26(3): 341-358.

Verheul, Ingrid, Martin Carree, and Roy Thurik. 2009. Allocation of productivity and time in new ventures of female and male entrepreneurs. *Small Business Economics* 33(3): 273-291.

Von Lilienfeld-Toal, Ulf and Stefan Ruenzi. 2014. CEO Ownership, Stock Market Performance, and Managerial Discretion. *Journal of Finance* 69(3): 1013-1050.

Volery Thierry, Susan Muller, Frtiz Oser, Catherine Naepflin, and Nuria del Rey. 2013. The Impact of Entrepreneurship Education on Human Capital at Upper-Secondary Level. *Journal of Small Business Management* 51(3): 429-446.

Zenger, Tos. 1994. Explaining Organizational Diseconomies of Scale in R&D: Agency Problems and the Allocation of Engineering Talent, Ideas, and Effort by Firm Size. *Management Science* 40(6): 708-729.

Table 1: Descriptive statistics for estimation sample.

	Mean	s.d.	Median
	(1)	(2)	(3)
Main Variables			
Return on assets	0.327	0.514	0.165
Management hours per day	6.816	2.365	7.000
Management hours per day divided by 24	0.284	0.099	0.292
Networking hours per day	3.847	1.928	4.000
Networking hours per day divided by 24	0.160	0.080	0.167
Study hours per day	1.559	0.900	1.000
Study hours per day divided by 24	0.065	0.038	0.042
Log(Age)	3.769	0.176	3.761
Log(Firm Age)	1.735	0.713	1.792
Log(Sales)	6.272	1.952	6.234
Management Experience	0.290	0. 454	0.000
Single-decision making	0.565	0. 496	1.000
Education	0.181	0.385	0.000
Female	0.125	0.331	0.000
Share of ownership	0.812	0.170	0.800
Instrumental Variables			
Log(Household expenditure)	1.833	0.819	1.792
Log(Management team size)	1.919	1.193	1.792
Log(Number of family members)	1.229	0.440	1.099
Personal income divided by household income	0.720	0.221	0.714

Figure 1: Kernel density management hour (share) by gender

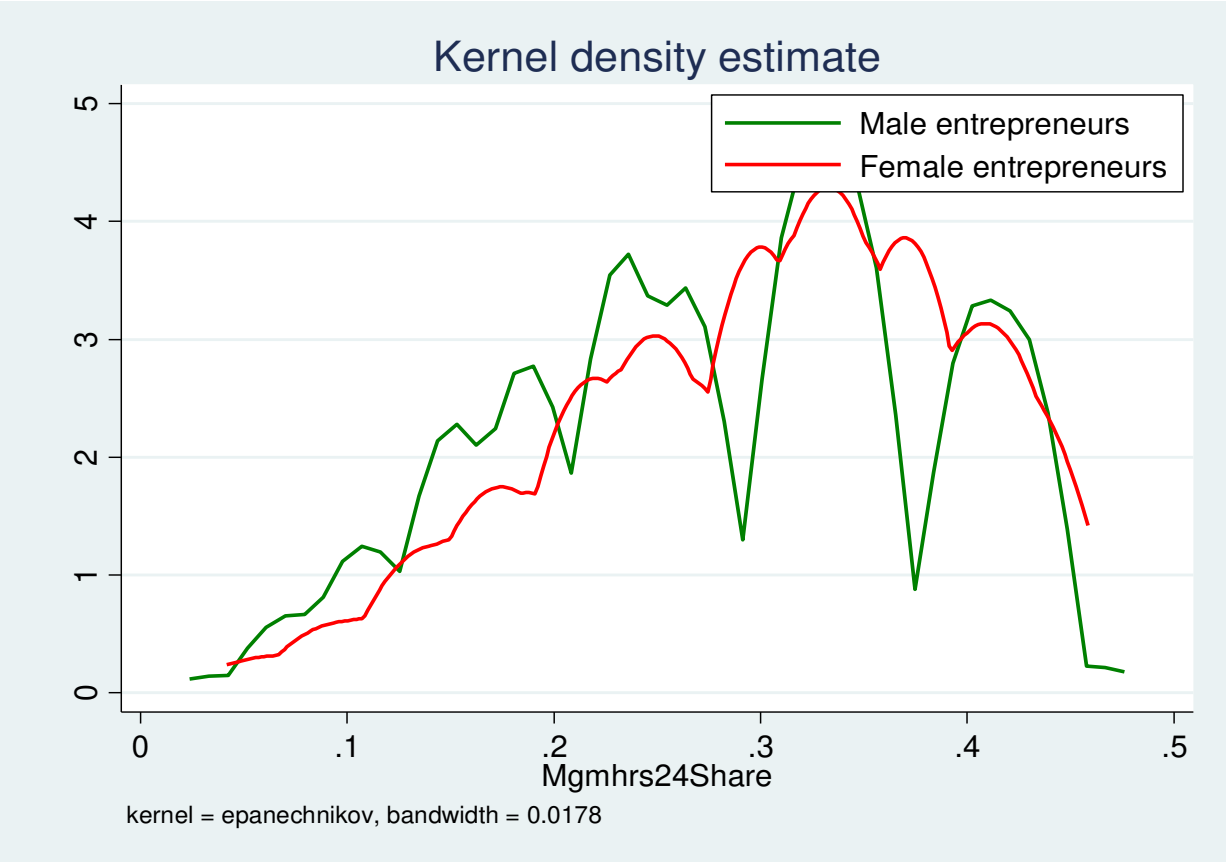

Table 2: Correlation matrix.

		1	2	3	4	5	6	7	8	9	10	11	12
ROA	1	1											
Management hours	2	0.002	1										
Networking hours	3	-0.063***	-0.438***	1									
Study hours	4	0.001	-0.099***	-0.017	1								
Log(Age)	5	0.026	0.132***	-0.059***	0.037*	1							
Log(FirmAge)	6	0.018	0.056***	-0.013	0.065***	0.257***	1						
Log(Sales)	7	0.066***	-0.002	0.113***	0.101***	0.125***	0.281***	1					
Management Experience	8	-0.001	-0.039**	0.071***	0.054***	0.171***	0.021	0.128***	1				
Single-decision making	9	-0.062***	-0.062***	0.097***	0.13***	-0.039*	0.007	0.29***	0.05**	1			
Education	10	-0.052**	-0.064***	0.067***	0.113***	-0.088***	-0.036*	0.135***	0.058***	0.174***	1		
Female	11	0.017	0.061***	-0.099***	-0.014	-0.072***	-0.077***	-0.135***	-0.063***	-0.015	-0.001	1	
Ownership	12	0.066***	0.038*	-0.058***	-0.003	0.016	0.098***	-0.169***	-0.047**	-0.299***	-0.092	0.07***	1

Note: ***, ** and * indicate significant at 1%, 5% and 10% level, respectively.

Table 3: Descriptive Statistics of Hour Variables by Ownership, Management Experience, Gender and Size.

Panel A: By ownership

	50% <ownership ≤ 75%			75% < ownership			
	mean	s.d.	N	mean	s.d.	N	Mean Difference
Management hours	6.726	0.076	977	6.871	0.059	1,608	-0.145
Networking hours	3.978	0.067	885	3.767	0.049	1,456	0.211**
Study hours	1.578	0.025	977	1.614	0.021	1,608	-0.036

Panel B: By management experience

	With management experience			Without management experience			
	mean	s.d.	N	mean	s.d.	N	Mean Difference
Management hours	6.672	0.087	750	6.875	0.055	1,835	-0.203**
Networking hours	4.058	0.073	692	3.758	0 .047	1,649	0.3***
Study hours	1.619	0.029	750	1.593	0.019	1,835	0.025

Panel C: By gender

	Male Entrepreneurs			Female Entrepreneurs			
	mean	s.d.	N	mean	s.d.	N	Mean Difference
Management hours	6.834	0.06	1,570	7.168	0.153	211	-0.334**
Networking hours	3.951	0.051	1,306	3.332	0.138	170	0.619***
Study hours	1.524	0.022	1,413	1.57	0.07	211	-0.046

Panel D: By size

	Log(Sales) above median			Log(Sales) below median			
	mean	s.d.	N	mean	s.d.	N	Mean Difference
Management hours	6.877	0.076	890	6.87	0.081	886	0.007
Networking hours	4.055	0.067	853	3.686	0.069	774	0.369***
Study hours	1.626	0.029	862	1.428	0.03	815	0.198***

Note: ***, ** and * indicate t-test significant at 1%, 5% and 10% level, respectively.

Table 4: Results for instrumental variables regressions for firm performance and activity hours.

	Management	Networking	Study
	(1)	(2)	(3)
Hours (share)	3.689*	1.911*	0.278
	(2.056)	(1.009)	(2.015)
$Hours^2$ (share)	-6.508*	-4.723**	-1.292
	(3.768)	(2.175)	(7.145)
Log(Age)	-0.02	-0.029	-0.027
	(0.077)	(0.078)	(0.073)
Log(Firm Age)	-0.034*	-0.03	-0.028
	(0.019)	(0.02)	(0.02)
Log(Sales)	0.026***	0.027***	0.026***
	(0.007)	(0.007)	(0.007)
Management Experience	-0.013	-0.007	-0.01
	(0.028)	(0.026)	(0.027)
Single-decision making	-0.072***	-0.078***	-0.085***
	(0.024)	(0.026)	(0.029)
Ownership	0.174**	0.1	0.131*
	(0.071)	(0.072)	(0.072)
Education	-0.079***	-0.087***	-0.062**
	(0.027)	(0.026)	(0.03)
Female	0.07**	0.079**	0.05
	(0.036)	(0.037)	(0.035)
N. Obs.	1,776	1,627	1,677
R2	0.01	0.01	0.02
Under-identification test	63.159***	87.079***	53.892***
Over-identification test	25.899	28.693	25.992
Optimal Hours	6.802	4.856	2.584
Optimal Hours 95% CI	[5.218, 8.385]	[3.371, 6.341]	[-9.683, 14.851]
Mean VIF	5.57	3.1	2.26
F-test	4.17***	4.16***	3.55***

Note: ***, ** and * indicate significant at 1%, 5% and 10% level, respectively. Dependent variable is ROA. Numbers in parentheses are robust standard errors. Industry, region and time dummies are included in all specifications but not reported. Instrument set includes internally generated instruments and external instruments (the logarithm of household expenditure, the natural logarithm of entrepreneur's family size, and the share of personal income in total household income.) Optimal Hours is the level of activity hours that maximizes performance. Optimal Hours 95% CI is the 95% confidence interval for optimal activity hours.

Table 5: Results for instrumental variables regressions for firm performance and activity hours for subsamples.

Panel A: By ownership

Subsample	50% <ownership ≤ 75%			ownership > 75%		
	Management (1)	Networking (2)	Study (3)	Management (1)	Networking (2)	Study (3)
Hours (share)	0.423	-1.004	0.787	5.563**	1.357	-0.628
	(3.227)	(1.14)	(2.713)	(2.742)	(1.101)	(1.907)
$Hours^2$(share)	-2.623	0.939	-4.12	-8.684*	-3.811	0.994
	(5.583)	(2.322)	(8.656)	(4.874)	(2.645)	(6.367)
N. Obs.	863	783	780	1,103	1,012	1,035
R2	0.02	0.02	0.03	0.05	0.05	0.05

Panel B: By management experience

Subsample	With management experience			Without management experience		
	Management (1)	Networking (2)	Study (3)	Management (1)	Networking (2)	Study (3)
Hours (share)	6.784**	0.475	-2.086	0.869	2.635*	0.467
	(2.836)	(1.932)	(2.619)	(2.554)	(1.235)	(3.723)
$Hours^2$(share)	-13.896**	-2.336	6.557	-0.17	-5.693*	-1.101
	(5.759)	(4.124)	(8.406)	(4.855)	(2.584)	(14.442)
N. Obs.	529	492	512	1,116	1,024	1,043
R2	0.08	0.01	0.01	0.02	0.01	0.02

Note: ***, ** and * indicate significant at 1%, 5% and 10% level, respectively. Dependent variable is ROA. Numbers in parentheses are robust standard errors. Industry, region and time dummies are included in all specifications but not reported. Instrument set includes internally generated instruments and external instruments (the logarithm of household expenditure, the natural logarithm of entrepreneur's family size, the natural logarithm of firm's management team size and the share of personal income in total household income.)

Table 6: Additional analyses for firm performance and activity hours

Panel A: By gender

Subsample	Male Entrepreneurs			Female Entrepreneurs		
	Management (1)	Networking (2)	Study (3)	Management (1)	Networking (2)	Study (3)
Hours (share)	4.147**	3.166***	3.907	1.024	0.276	-5.587
	(2.044)	(1.049)	(4.589)	(2.79)	(1.635)	(4.209)
$Hours^2$(share)	-8.22**	-7.722***	-24.973	7.655	-1.107	37.285
	(3.948)	(2.281)	(33.679)	(7.627)	(4.214)	(34.577)
N. Obs.	1,570	1,306	1,413	186	170	211
R2	0.01	0.02	0.01	0.19	0.04	0.01

Panel B: By size

Subsample	Log(Sales) below median			Log(Sales) above median		
	Management (1)	Networking (2)	Study (3)	Management (1)	Networking (2)	Study (3)
Hours (share)	4.879**	0.31	0.783	2.054	0.696	4.158
	(2.268)	(1.164)	(3.11)	(3.556)	(1.329)	(5.596)
$Hours^2$(share)	-8.686**	-0.497	-19.794	-5.757	-2.516	-34.941
	(3.931)	(2.801)	(25.391)	(6.948)	(2.646)	(38.85)
N. Obs.	739	777	890	917	874	917
R2	0.03	0.01	0.01	0.04	0.01	0.01

Note: ***, ** and * indicate significant at 1%, 5% and 10% level, respectively. Dependent variable is ROA. Numbers in parentheses are robust standard errors. Industry, region and time dummies are included in all specifications but not reported. Instrument set includes internally generated instruments and external instruments (the logarithm of household expenditure, the natural logarithm of entrepreneur's family size, the natural logarithm of firm's management team size and the share of personal income in total household income.)