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Does Money Make the Entrepreneurial World Go Round?

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Abstract

Lack of capital is one of the oldest explanations advanced to explain lack of firm entry, performance, and survival. In this paper, we model each of these business steps in a causal chain by testing the liquidity constraints theory. We probe the relationships between capital and firm entry, size, and survival by computing an exogenous measure of liquidity, calculating measures of human capital, and developing instruments to capture business quality. We use a database that traces the mobility of the founders across firms and matches founders with their ventures' characteristics. Our results indicate that money is important in the entrepreneurial world, but not so much as previous work has argued. We find only weak support that individuals with more earnings are more likely to attempt entrepreneurship, except in the professional industries. Founder earnings influence start-ups financial capital. Financial capital affects positively the start-up size, but the effect on survival rate is questionable. Overall, lack of earnings inhibits individuals from raising the desired amount of financial capital and establishing firms with the desired scale. After excluding alternative theories, we find support for the liquidity constraints hypothesis only in the funding decisions and not in entry or size decisions.

Jelcodes:M13,L29

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Abstract

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Keywords: Liquidity constraints, Survival, Business Quality, Financial Capital

JEL-codes: J24, L26, M13

1 Introduction

Is lack of money an important deterrent of entrepreneurial activity? Anecdotal evidence and public opinion provide an affirmative answer. Different studies find that entrepreneurs report the difficulty of raising financial capital as one of their main problems (Watson et al., 1998; Blanchflower and Oswald, 1998). Additionally, other works test the idea behind the liquidity constraints theory and argue that opportunities in entrepreneurship are biased toward those who are wealthy. However, the study of the theory underlying the liquidity constraints idea presents enormous challenges, which have not properly been addressed by previous literature.

Where does the truth about liquidity constraints lie? Our intent is to present new evidence for a service-based economy. What drives some individuals to attempt entrepreneurship? Does lack of personal wealth deter entrepreneurship or does it only affect the initial operations of a business? Why are some starts-ups able to raise more capital than others? Do liquidity constraints affect the amount of capital raised? What factors affect firm performance and survival? Are performance and survival constrained by access to credit after controlling for the quality of the business idea? This paper attempts to answer these questions by using three unique Portuguese databases and by restricting the sample to service based firms.¹ We have detailed information about individual work histories, education, and founding experiences, and are able to match founders with their ventures' characteristics. For each firm, we gather information about two-year survival and year-end data on financial capital and size for the first year. None of the previous studies was able to exploit such comprehensive data, and this inability might explain some of the prior findings.²

¹ The sample resulted from merging three datasets: the matched employee-employer dataset - Quadros de Pessoal (SISED dataset) - and two financial surveys: Simplified Corporate Information (IES) and Central Balance-Sheet Database (CBSD).

² The samples of previous studies have different shortcomings. Some of them lack information about the firm performance (The National Longitudinal Survey of Young Men, Panel Study of Income Dynamics, National Child Survey) and others lack data on the founder's specific human capital (The National Longitudinal Survey of Young Men) and earnings (Characteristics of Business

The paper presents an integrated framework that mirrors the theory underlying liquidity constraints idea. We examine how historical earnings affect the propensity of becoming an entrepreneur; how historical earnings affect internal capital (initial capital provided by the founder); how internal capital determines external capital (initial leases and commercial loans); and how financial capital influences survival and size. These relationships are probed by including business quality variables, developing instruments to cope with difficulties of measuring quality of the idea, and computing a new measure for individual liquidity, total historical earnings (sum of working and entrepreneurial earnings during individuals' entire career history). With this latter measure, we eliminate one element of endogeneity of wealth.

Our results indicate that to some extent money is important in the entrepreneurial world, but not so much as previous work has argued. We find only weak support that individuals with more earnings are more likely to attempt entrepreneurship, except in the professional industries. However, founder earnings affect the venture's financial capital. Entrepreneurs contribute more of their own capital when they accumulate larger earnings, which enable them to obtain larger funds from external institutions. Start-up size is positively determined by financial capital, but whether the latter affects the survival rate is questionable. Overall, lack of earnings inhibits individuals from raising the desired amount of financial capital and establishing firms with the desired scale. After excluding alternative theories, we find support for the liquidity constraints hypothesis (capital market imperfections) only in the funding decisions and not in entry or size decisions.

The remainder of the paper is structured as follows. In section 2, we briefly review the literature on liquidity constraints theory and identify their major challenges.

Owners, National Federation of Independent Businesses). Moreover, the samples suffer from different biases: survivorship bias (Colombo and Grilli 2005) and misrepresentation bias (Chandler and Hanks 1998, Cressy 1996).

Next, we develop a framework for evaluating the importance of financial capital on entrepreneurship. Section 4 presents the data and describes some features of the Portuguese institutional environment. Section 5 describes the main variables and the methodological approaches used in this study. Section 6 presents the empirical analysis.. Finally, section 7 discusses the results and their implications.

2 Literature Review

The majority of the literature analyzes the liquidity constraints theory by exploring the role of founder wealth on the propensity to become an entrepreneur. They show that financially advantaged individuals have a higher probability of becoming entrepreneurs,³ and these entrepreneurs have better performing and surviving firms.⁴ Previous research also devotes considerable effort to test whether the amount of capital raised influences performance and survival. Financial capital is found to positively determine firm size (Brüderl et al., 1992), growth (Cooper et al., 1994; Colombo and Grilli, 2005), and survival.⁵ Less effort has been devoted to analyze whether wealth influences capital raised (Astebro and Bernhardt, 2005). However, does previous empirical evidence prove that entrepreneurs are liquidity constrained?

The study of the theory underlying the liquidity constraints idea presents serious challenges. Firstly, it requires an accurate measure of liquidity. Previous studies use assets and wealth or similar measures (county level indicators of household wealth and household net worth) as proxies for liquidity.⁶ However, these variables are potentially

³ Evans and Leighton (1989); Evans and Jovanovic (1989); Holtz-Eakin et al. (1994a); Blanchflower and Oswald (1998); Lindh and Ohlsson (1996); Dunn and Holtz-Eakin (2000); Burke et al. (2000); Fairlie and Krashinsky (2006); Nykvist (2008); Chen (2009). Nevertheless, some authors cast doubt on the importance of wealth as a determinant of entrepreneurial participation. For instance, Kim et al. (2006) find that business formation depends on founder human capital but not on wealth. They also find an insignificant association between household net worth and whether entrepreneurs pursue bank loans. Additionally, Hurst and Lusardi (2004) find that the relationship between personal wealth and entrepreneurial participation is insignificant for all individuals except those at the top quintile of the wealth distribution. But if Hurst and Lusardi's sample is divided into job losers and non-job losers, both samples show evidence of a positive relationship between entry rates and founder wealth (Fairlie and Krashinsky, 2006).

⁴ Burke et al. (2000); Holtz-Eakin et al. (1994a,1994b).

⁵ Bates (1990); Brüderl et al. (1992); Cooper et al. (1994); Astebro and Bernhardt (2003); Headd (2003); Hvide and Moen (2008).

⁶ Evans and Leighton (1989); Evans and Jovanovic (1989); Astebro and Bernhardt (2005); Kim et al. (2006); Cressy (1996).

endogenous because entrepreneurs can accumulate wealth before starting a new venture (Holtz-Eakin et al., 1994a; Xu, 1998). To address this concern, other studies use instruments for unanticipated changes in wealth: inheritance,⁷ lottery winnings (Lindh and Ohlsson, 1996), and housing capital gains.⁸ Nevertheless, these instruments have inadequacies. For instance, inheritances are not completely random events.⁹ Instead, they are more likely to be associated with wealthier individuals and may reflect the transference of businesses to heirs upon death (Hurst and Lusardi, 2004). Lottery winnings are likely to be associated with individuals with low earnings and low skills. If education and earnings are not properly measured, lottery winnings will also be an invalid instrument.

Secondly, previous literature interprets the positive correlations between wealth and business formation as evidence of credit market imperfections. Alternative explanations include individual characteristics – tolerance for risk,¹⁰ preference for self-finance (Cressy, 1996) and over-optimism (De Meza and Webb, 1999) - and the propensity of individuals in professional occupations to become business owners (Hurst and Lusardi, 2004). For example, Cressy (1996) argues that greater wealth makes individuals more prone to take risks and switch to entrepreneurship. Alternatively, Hurst and Lusardi (2004) argue that individuals with professional activities (medical, law, accounting, and consultancy practices) are more prone to start new ventures and such individuals tend to be wealthier. Some studies even go further by arguing that new start-ups do not require large amounts of initial capital, making entrepreneurship within the reach of most individuals (Stouter and Kirchoff, 2004; Reynolds, 2005; Kim et al., 2006).

⁷ Holtz-Eakin et al. (1994a,1994b); Blanchflower and Oswald (1998); Dunn and Holtz-Eakin (2000).

⁸ Hurst and Lusardi (2004); Fairlie and Krashinsky (2006); Nykvist, (2008).

⁹ Lindh and Ohlsson (1996) try to overcome the endogeneity problem by using parental death as an instrument for inheritances. They argue that parental death should not affect the decision to become an entrepreneur. However, this approach does not solve the problem because inheritances can be anticipated and reflect the transference of businesses to heirs.

¹⁰ Knight (1921), Kihlstrom and Laffont (1979), Cressy (1996, 2000), Hurst and Lusardi (2004).

Thirdly, a positive correlation between financial capital and survival possibly captures the quality of the idea instead of funding deficiencies. Defending the irrelevance of financial capital, Cressy (1996) argues that the main predictor of survival is human capital. Human capital allows founders to detect and identify better opportunities, have greater knowledge of how to start a successful business, more effectively select and manage resources, and attract financial capital (Brüderl et al., 1992; Bates, 1990; Astebro and Bernhardt, 2003). Despite being related, quality of the idea is different from human capital. Following Becker (1975), human capital can be divided into general and specific. General human capital includes broad knowledge acquired by individuals through both education and work experience, whereas specific human capital consists of abilities more directly applied to entrepreneurship (i.e. industry, managerial, and entrepreneurial experience).

Finally, studies that focus on whether wealth determines financial capital neglect the impact of financial capital on performance. Moreover, studies that analyze the impact of financial capital on performance use limited measures for capital,¹³ and they do not distinguish human capital from wealth on capital raised. Each of the previous studies examines different pieces of the puzzle; therefore, we need an integrated framework addressing the impact of capital and liquidity constraints on business formation, performance, and survival.

¹³ Financial capital is evaluated through dummy variables that identify whether ventures were able to raise loans from banks, friends, and families (Astebro and Bernhardt 2005, Cressy 1996) and financing from venture capital (Cressy 1996; Colombo et al., 2004).

3 Liquidity constraints and Business Quality: Theory

Consider that a continuum of individuals endowed with different amounts of historical earnings (HE) and with heterogeneous specific human capital¹⁴ is confronted with two decisions. They have to choose between earning their income either from profits, accrued by becoming an entrepreneur (entrepreneurship), or wages, obtained by engaging in the labor market. We expect the decision of moving to entrepreneurship and subsequent performance to be a function of two drivers: quality of the business idea (I), and financial capital (FC). Business ideas enable entrants to gain competitive advantage against established firms, whereas financial capital allows individuals to form their ideas into practice. The entrepreneurial projects require capital to cover the initial fixed costs and subsequent capital investments. The initial capital desired is an increasing function of the quality of the idea, and it can be financed by the founders (internal capital [IC]) and/or external entities (external capital [EC]).

The liquidity constraints theory suggests that capital markets do not provide sufficient funds to profitable ventures because of the problem of information asymmetry.¹⁵ Entrepreneurs have private information about the firm's return stream and investment opportunities; however, their ability to objectively convey the merit of their ventures is limited. Additionally, new firms have a limited operating history, low collateral available to pledge (Cassar 2004), and face high uncertainty in demand and resource supply (Block and MacMillan 1985). Consequently, as lenders cannot distinguish the quality of the loan applications, they will be reluctant to lend money to new ventures. Nevertheless, high-income individuals can bypass credit markets and

¹⁴ According to Schumpeter (1934), entrepreneurial knowledge and ability are unequally distributed in the population.

¹⁵ A substantial theoretical literature has emerged based on imperfect information and capital market constraint. Two influential theoretical models deserve mentioning: Stiglitz and Weiss (1981) and De Meza and Webb (1987). These two models assume that banks offer a pooled loan contract; however, the studies differ in their assumption about the nature of the heterogeneity of entrepreneurs (the first assumed heterogeneous risk and the second heterogeneous expected returns), the possibility of credit rationing, and the possibility of under-investment.

become more willing to attempt entrepreneurship. The liquidity constraints theory suggests:

H1: The probability of becoming an entrepreneur is an increasing function of wealth.

On the other hand, high-income entrepreneurs can use their own funds to finance their ventures (De Meza and Southey, 1996). Their choice of the amount invested can signal information about the business quality to outside investors. Entrepreneurs of higher quality will usually invest more of their own money (Leland and Pyle, 1977). Moreover, ventures with larger internal capital and established by wealthier founders will have larger resources that can be used as collateral to secure external funding (Berger and Udell, 1998). Some studies have highlighted the lack of separation between business and personal risks (Avery et al., 1998). Therefore, firms with higher internal capital and with better ideas will be more likely to obtain additional funding from external sources. The liquidity constraints theory implies:

H2a: The initial amount of internal capital is larger for wealthier entrepreneurs.

H2b: The initial amount of external capital is larger for firms with higher initial internal capital.

The theory so far shows that possession of wealth leads to larger amounts of financial capital. Nevertheless, for businesses with the same quality, the total capital raised conditions a start-up's size and survival. Financial capital is critical in any business but even more so in the case of new ventures as they often struggle to survive with no profits in the first years. Thus, ventures with greater financial resources can overcome temporary hardships or managerial mistakes more easily. Financial capital allows firms to increase their legitimacy among stockholders, acquire better resources and technology, and start operation at a larger scale by reaching or surpassing the

minimum efficient scale. If the initial costs are high and firms are not able to raise the desired capital, entrepreneurs will establish smaller firms than desired. Therefore, if wealthier individuals obtain larger funds, significant differences will exist in firm size and survival prospects according to their level of capital. Therefore, the arguments suggest:

H3: Performance and survival are positively affected by the capital raised.

However, in a world of no capital restrictions (perfect world), performance and survival will only be functions of the quality of the business idea.

4 Data

This paper relies on three Portuguese databases: matched employer–employee dataset (*Quadros de Pessoal* or SISED - *Sistema de Informação de Salários, Emprego e Duração do Trabalho*), Simplified Corporate Information (IES), and Central Balance-Sheet Database (CBSD). The matched employer–employee dataset is a mandatory survey submitted annually to the Portuguese Ministry of Employment by firms with at least one employee. Although the database is available since 1982, we only obtained information for the period from 1986 to 2008.

This database is a good source for three reasons. First, the dataset collects information on an average of 207,000 firms and two million individuals per year, covering virtually all employees and firms in the Portuguese private sector. Second, as individuals and firms are cross referenced by a unique identifier, the database makes it possible to trace the mobility of entrepreneurs across firms and match founders with their ventures' characteristics. Finally, the database has comprehensive information at the individual and firm level. For each firm, the following data are available: year of

creation, location, size, industry, number of establishments, initial capital, and ownership structure. At the individual level, the database contains information on gender, age, date of hire, education, occupation, working hours, earnings—base wage, bonus (regular and irregular), and other regular wage components.

The main drawback of the database is its lack of financial information. To overcome this limitation, we use two economic and financial databases: the IES (Simplified Corporate Information)¹⁸ and Central Balance-Sheet Database (CBSD).¹⁹ Both surveys collect year-end data on approximately 655 accounting variables, with detailed information on the performance and capital structure of new firms and entrepreneurial rents. Whereas the IES is a mandatory survey that assures the reporting obligations of firms to different entities (Ministry of Justice, Ministry of Finance, Statistics Portugal, and Portugal Central Bank), the CBSD is a smaller, non-mandatory survey conducted by the Portuguese Central Bank. We were able to obtain a sample of approximately 50,000 firms per year from the IES for the period from 2005 to 2006, and a sample of 21,000 firms per year from the CBSD for the period 1992 and 2004.

After matching the IES and matched employer–employee databases and deleting all individuals with multiple observations in one year,²⁰ we identify 5,715 new firms established in 2005 corresponding to 7,837 founders. Then we restrict the sample by selecting firms with a single “business owner”²¹ with age between 19 and 60 and excluding all types of non-profit organizations, and state-owned companies. We have to

¹⁸ Although IES was only officially established in 2007 by the “Decree-Law n °8/2007 of 17th January”, we were able to obtain combined data of the INE (Statistics of Portugal) and Central Portuguese Bank surveys.

¹⁹ The CBSD database was discontinued in 2007 and substituted by IES database.

²⁰ Those entrepreneurs represent a minority in the total sample. Two reasons can explain the large number of observations for the same entrepreneur in one year: their identification numbers is not inserted or is inserted incorrectly.

²¹ Our study defines entrepreneurs as those owning and managing a business. The founder was identified as the employer in the first year. As the database only reports employers that worked in the firm, we also identify as founders employers that appear in the database in the second year.

delete firms established by teams, because we cannot determine the initial amount of capital each member of the team invested.²²

Additionally, we select from the matched employer–employee dataset a random sample of approximately 200,000 individuals who were wage workers in 2005 within the same age range as the “business owners” (between 19 and 60 years old) and who have never had any entrepreneurial experience.

For the entrepreneurs and wage worker subsamples, we also exclude the individuals for whom we cannot follow at least 50 percent of their career history after they first appeared in the database. Ultimately, the final sample is comprised of 161,137 individuals, of which 1,729 (1.7 percent) started a business in 2005.

In order to better frame the paper’s results, we will briefly describe the main features of the Portuguese economy and labor market. Portugal is a service-based economy with 10.6 million inhabitants.²³ In 2005, the Gross Domestic Product (GDP) per capita in purchasing power parity (PPP) was approximately \$17,600, which was below the average European income (approximately 75 percent of the 25 Member-States of European Union) and US income (\$41,700).²⁴ The Portuguese economic performance is concentrated in two regions: Lisbon and northern Portugal. These regions account for more than 60 percent of the total GDP and employment. Between 1996 and 2000, the economy experienced a period of growth, reaching an average annual rate of approximately four percent; but from 2001 to 2005, growth decelerated (one percent), and a recession occurred in 2003. Competition from lower-cost producers in Central Europe and Asia, lack of employee skill,²⁵ parallel informal economy,²⁶ and

²² This procedure can cause self-selection problems. According to Astebro and Serrano (2008), entrepreneurs seek partners to obtain financing because individually they are more likely to be financially constrained. Thus, each entrepreneur of the team is more likely to be liquidity constrained than a solo entrepreneur.

²³ In 2005, the services industry accounted for 72% of the Portuguese GDP. See *INE Statistical Yearbook of Portugal* (2006) for the year 2005.

²⁴ See The World Bank *Global Purchasing Power Parities and Real Expenditures* (2008) for the year 2005.

²⁵ In 2005, only 26.5 percent of the Portuguese population between 25 and 64 years of age had at least 12 years of education (upper secondary education). See *INE Statistical Yearbook of Portugal* (2006) for the year 2005.

red tape are usually implicated as the main obstacles for greater growth and productivity. Related to economic performance, the unemployment rate decreased steadily from 4.5 percent in 1998 to 3.9 percent in 2000. However, a sharp rise in the unemployment rate occurred after 2000 reaching 7.6 percent in 2005. Although the United States and Portugal had similar unemployment rates by the end of the 20th century, their labor markets were completely different (Blanchard and Portugal, 2001). Compared with the United States, Portugal had lower job flows and higher unemployment durations. Portugal has one of the most protective employment environments.²⁷ Although some changes have been made in temporary and permanent employment regulation, Portuguese legislation on firing and layoffs makes firing long-term employees difficult. Although Portugal presents specific economic and labor features, its entrepreneurial activity is comparable with that of the United States and other countries around the world. For instance, according to Global Entrepreneurship Monitor (GEM), the percentage of the Portuguese population engaged in establishing and running their own businesses is very close to that of the United States.²⁸ On the other hand, the initial capital structure is not much different for Portugal and American start-ups. Typically, start-ups of both countries fund their first years through founder savings and commercial loans.²⁹

²⁶ According to the International Monetary Fund, in 2002 the “gray economy” accounted for 22.6 percent of GDP. See IMF *Portugal: Selected Issues* (2007). However, Cabral (2007) argues that after correcting for Gross National Income (GNI) per capita, Portugal is not particularly different from other countries.

²⁷ The OECD has consistently ranked Portugal as the country with the greatest employment protection, whereas the United States has always appeared in the bottom. See OECD *Employment* (2004).

²⁸ The GEM has ranked Portugal near the United States in terms of the percentage of the adult population between 18 and 64 years engaged in early entrepreneurial activity. See *Adult Population Survey* (2007).

²⁹ Reynolds and White (1997), Kim et al. (2006), Bates (1990), Cassar, (2004), Berger and Udell, (1998). According to IAPMEI, 63.9 percent of the Portuguese firms finance their activities with founders capital and 24.2 percent with commercial loans (see Observatório de Criação de Empresas, Relatório 2007).

5 Methodological Approach and Variables

In order to proceed further, we must address some of the challenges of testing the liquidity constraints theory. First, we begin by defining the three key concepts: founder liquidity, financial capital, and quality of the business idea. Then we present the methodological specification. We discuss these in turn.

Founder liquidity is measured by historical earnings (HE). This variable includes worker earnings and entrepreneurial rents, both of them accumulated from when an individual was 18 years old until 2004, the year prior to the establishment of the start-up.³⁰ Worker earnings are the annualized value of the monthly regular wage, subsidies, and bonuses, whereas entrepreneurial rents are the amount of dividends, as suggested by Hamilton (2000). The total historical earnings are defined as

$$HE = \sum_{i=18}^{age\ in\ 2004} earnings_i = \sum_{i=18}^{age\ in\ 2004} (worker\ earnings + entrepreneurial\ rents)_i \quad (1)$$

Compared with previous measures, this measure eliminates one element of endogeneity. It does not depend on unobservable factors that determine the decision to establish firms (i.e., savings). Nevertheless, our data have a limited number of years of earnings for individuals aged 38 or older in 2005; thus we compute the variable as

$$HE = \begin{cases} \sum_{i=18}^{age\ in\ 2004} earnings_i, & \text{if } age \leq 38 \\ \sum_{i=age\ in\ 2004-18}^{age\ in\ 2004} earnings_i, & \text{if } age > 38 \end{cases} \quad (2)$$

If we assume the fraction of missing earnings is proportional to total past earnings ($\lambda_{age\ in\ 2004-38}$), then

³⁰ The majority of the studies evaluate founder liquidity using measures of wealth, such as inheritances, assets and changes in household income. Others studies use liquidity measures at the firm level (e.g., cash-flow ratios) (Fagiolo and Luzzi 2006, Kaplan and Zingales 1997).

$$HE = \begin{cases} \sum_{i=18}^{age\ in\ 2004} earnings_i, & \text{if } age \leq 38 \\ \sum_{i=18}^{age\ in\ 2004} earnings_i = (1 + \lambda_{age\ in\ 2004-38}) \sum_{i=age\ in\ 2004-18}^{age\ in\ 2004} earnings_i, & \text{if } age > 38 \end{cases} \quad (3)$$

On the other hand, some individuals are absent from the database in some specific years either because they become unemployed or they move to the public sector. We reduce this problem by controlling for the percentage of years that an individual is missing from the database, restricting our sample to individuals who have observations for at least half of the prior (up to 18) years, and computing alternative measures of liquidity (average annual earnings).

The second concept is financial capital (*FC*), and is defined as the amount of internal and external capital a startup was able to raise at the end of its first year.³¹ As the name suggests, internal capital is the initial amount of funds the founders provide and includes share capital, share premiums, supplementary capital,³³ and shareholder loan. External capital is the initial funds provided by financial institutions and includes commercial loans and leasing.

An important challenge of our study is determining proxies for quality of the business idea (*I*). Recent studies have suggested that new entrants are diverse and have different pre-entry capabilities that will affect their performance (Klepper 2002, Helfat and Lieberman 2002). Although different factors affect the quality of the business idea, we expect that specific human capital to be fundamental. Individuals with previous industry and entrepreneurial experience, particularly successful entrepreneurial spells, will accumulate the necessary knowledge and skills that allow them to identify better business opportunities and mobilize the desired resources. We assume the process of

³¹ We opt to choose the internal and external capital framework because we consider it to be more acceptable than the equity and debt framework. In the context of new ventures, the categorization of debt and equity is blurred. For instance, equity from external sources has similar characteristics to a debt contract.

³³ Supplementary capital is similar to a shareholder loan; however, it does not generate interest and is only claimed when a firm is dissolved.

discovering opportunities is related to an individual's prior knowledge and information (Venkatarmann 1997, Shane 2000). To sum up, we use two types of specific human capital: industry and entrepreneurial experience. Industry and entrepreneurial experience are measured with dummy variables equaling 1 for entrepreneurs with experience in the same industry (four-digit level), and equaling 1 for entrepreneurs who established new firms before 2005, respectively.

Our analysis includes two sets of control variables: individual and firm control variables. We include age, gender, years of education, and year of education square to control for founder general human capital. At the firm level, we control for geographic location, industry, and period of activity. Geographic location helps account for differential macro-economic conditions and levels of competition at the regional level. Typically, entrepreneurs located in developed regions (i.e., Lisbon and north of Portugal) are wealthier and have easier access to financial capital. Industry (two-digit code) variables are included to control for different levels of initial capital requirements and different survival prospects. Period of activity denotes the number of months the firm operates in 2005 and accounts for the fact that financial capital and performance variables are evaluated at the end of the period (December 2005).

Next, we discuss the specification of the econometric model. We define the specification for the decision to become an entrepreneur as function of age and life-time earnings:

$$Enter_i = f(age_i + life - time earnings_i) \quad (4)$$

We include age to control for different attitudes toward risk³⁴ and life-time earnings to test the impact of capital on business entry. Since our observed measure of earnings has limited information for individuals aged 38 and older, we include 42 interactions terms between historical earnings and age. If we assume that the fraction of missing earnings

³⁴ Individuals with higher tolerance for risk should be more likely to become business owners.

is proportional to life-time earnings, the sign of coefficients associated with interaction terms will allow us to infer about the importance of capital. We also include 41 age dummies. Thus, the specification includes different constant and earnings slope for each age:

$$Enter_i = \alpha_0 + \alpha_1 \log HE_{ia} + \dots + \alpha_{42} \log HE_{ia} + \lambda'Y_i + \epsilon_i \quad (5)$$

The dependent variable $Enter_i$ is a dummy variable equaling 1 if an individual is an entrepreneur in 2005 and 0 if a paid worker. The variables HE_{ia} , $a = 19, \dots, 60$, are the total historical earnings (up to 18 years) of individuals of ages 19 to 60 in 2005. The vector of variables Y_i is a set of control variables, which includes regional and age dummies, number of work experiences, and individual demographic characteristics (gender, education, and education square). This specification is regressed on a sample of individuals (non-entrepreneurs and nascent entrepreneurs) with no previous entrepreneurial experience.

Next, we specify the equation for internal capital:

$$\log IC_i = \theta_0 + \theta_1 \log HE_{ia} + \dots + \theta_{42} \log HE_{ia} + \theta_{43} I_i + \gamma'X_i + \xi_i \quad (6)$$

The dependent variable IC_i is the initial internal capital. The variables HE_{ia} , $a = 19, \dots, 60$, are the total historical earnings (up to 18 years) of individuals of ages 19 to 60 in 2005, and I_i is the quality of the idea. The vector of variables X_i is a set of control variables, which includes regional and industry dummies, the period of activity, and the demographic characteristics (gender, education, and education square) for the founders.

The equation for external capital is

$$\log EC_i = \omega_0 + \omega_1 \log IC_i + \omega_2 I_i + \gamma'X_i + \eta_i \quad (7)$$

The dependent variable EC_i is the initial external capital (commercial loans and leasing). The independent variables are IC_i , the initial internal capital, and I_i , the quality of the idea. The vector of variables X_i is a set of control variables, which

includes regional and industry dummies, the period of activity, and the demographic characteristics (gender, education, and education square) for the founders.

In equation (7), internal capital is an endogenous regressor. The source of bias is related to the measurement error on the business quality variable. As internal and external capital are both correlated with quality of the business idea, and this latter variable is not properly measured, the error term of equation (7) will be correlated with internal capital. To overcome this problem, we use total historical earnings as an instrument for internal capital. For instrument to be valid, two conditions have to be satisfied: founder earnings have to be correlated with internal capital and uncorrelated with some of the variables that are not properly measured (business quality). We will see that the former condition is satisfied. The last condition will be assumed, and we will evaluate its adequacy later.

As argued in section 2, financial capital and quality of business idea are expected to determine size and survival. Therefore, the regression specifications for size and survival are:

$$\log Size_i = \beta_0 + \beta_1 \log FC_i + \beta_2 I_i + \gamma' X_i + \mu_i \quad (8)$$

The dependent variable $Size_i$ is the initial number of employees. The independent variables are as follows: FC_i , the initial financial capital, which includes initial internal and external capital ($FC_i = IC_i + EC_i$); I_i , quality of the idea; and X_i , a set of control variables, which includes dummies for the industry and region, the period of activity, and the demographic characteristics (gender, education, and education square) for the founder:

$$Survival_i = \delta_0 + \delta_1 \log FC_i + \delta_2 I_i + \gamma' X_i + v_i \quad (9)$$

The dependent variable $Survival_i$, is a dummy variable equaling 1 if a startup does not stop operating in 2006 and 0 otherwise. The independent variables are as follows: FC_i ,

the initial financial capital, which includes initial internal and external capital ($FC_i = IC_i + EC_i$); I_i , quality of the idea; and X_i , a set of control variables, which includes dummies for the industry and region, the period of activity, and the demographic characteristics (gender, education, and education square) for the founder.

A legitimate estimation concern in equations (8) and (9) is the possible endogeneity problem in determining the coefficient associated with financial capital ($\delta_1; \beta_1$). Similar to the procedure used in equation (7), we will use total historical earnings as an instrument for financial capital.

The predicted signs of the coefficients are summarized in Figure 1. We are interested in the coefficients associated with historical earnings ($\alpha_1 \dots \alpha_{42}; \theta_1 \dots \theta_{42}$), internal capital (ω_1), and financial capital ($\beta_1; \delta_1$). According to the liquidity constraints theory, all of those coefficients should be positive and significant. Possession of wealth is expected to positively influence the decision to become an entrepreneur and internal capital. On the other hand, internal capital is expected to positively affect external capital. Hence, wealth should positively affect financial capital, which in turn should affect size and working capital. Both or either of the latter variables should affect survival. Nevertheless, after excluding alternative theories, we can only infer the presence of liquidity constraints from external capital regression, equation (7).³⁵ The coefficients associated with quality of the business idea should be positive and significant in all equations. Outside investors are expected to supply larger external funds to entrepreneurs with better ideas. Size and survival should be positively influenced by specific human capital (Bates, 1985; Headd, 2003; Brüdel et al., 1992; Cressy, 1996; Klepper, 1992). Since period of activity reflects the age of start-ups, we expect a positive relationship between period of activity, and financial capital and size.

³⁵ For example, the coefficients associated with historical earnings in equation (4) might reflect the risk propensity of individuals and in equation (6) reflect entrepreneurs' preference for self-finance.

As firms become established in the market, their size increases and entrepreneurs have more time to raise the desired level of financial capital. However, after controlling for financial capital, the period of activity should not influence the risk of failure.

Figure 1

6 Results

6.1 Descriptive Statistics

Tables 1 and 2 provide the descriptive statistics and definitions of the variables. Table 1 presents the characteristics of the individuals in our sample separately for wage workers and entrepreneurs. Individuals in our sample are mostly men (56 percent), are 37 years old on average, and have eight years of education. However, the subsample of entrepreneurs is slightly more educated (ten years) and has a higher percentage of males (72 percent). On average, entrepreneurs accumulate a larger amount of historical earnings. For individuals below age 38, the gap of earnings between entrepreneurs and wage workers is approximately 1,900€ For those older than 38, the gap is approximately 19,000€ Nevertheless, wage earners worked more years than the entrepreneurs (eight years compared with six years).

Table 1

Considering only the subsample of entrepreneurs, we see that the majority (48 percent) of them (831 entrepreneurs) have industry experience and only 26 percent of them (447 entrepreneurs) have entrepreneurial experience. Combining the experience of the entrepreneur and his previous startup's performance we find that approximately 39

percent of entrepreneurs with entrepreneurial experience (ten percent of total number of entrepreneurs) have previous surviving spells and only 14 percent of entrepreneurs with industry experience (three percent of total number of entrepreneurs) have firms that were still operating in 2006.

Table 2

Table 2 presents the characteristics of new firms in our sample. They are similar to those reported in previous studies using U.S. data.³⁷ Start-ups are small and employ on average three employees. After the first two years, 268 entrepreneurs/firms fail, corresponding to a mortality rate of 15.5 percent. The first-year failure rate is approximately 6 percent,³⁹ which is slightly lower than the value obtained in previous studies. Typically, start-ups begin with approximately 65,000€ in financial capital (internal and external), with the median being considerably lower, approximately 24,500€. Internal capital represents approximately 71 percent of the initial capital structure. New firms raise on average 33,500€ from founders and 31,500€ from financial institutions, mainly through commercial loans. However, the median values are significantly lower for external capital because a large proportion of firms (approximately 46 percent) did not obtain commercial loans or leasing. The median internal and external capital are 10,310€ and 1,233€ respectively.

³⁷According to Stouder and Kirchoff (2004), a typical American start-up required \$20,000 (measured in 1998 U.S. dollars), whereas Reynolds (2005) found that typical start-up needed \$15,000.

³⁹ Although the failure rate in the first year is small, we have to consider that most firms operate on average only eight months. Moreover, if we consider only matched employer–employee database, 15 percent of the firms fail in the first year. After matching with IES database and before excluding firms founded by teams and non-profit organizations, the failure rate is approximately 10 percent.

6.2 Regression Results

6.2.1 Transition to Entrepreneurship

In Table 3, we present the marginal effects of probit estimation for the probability of transitioning from wage earnings to entrepreneurship. The first column reports the estimates with total historical earnings as the only explanatory variable, and column (2) shows the results after including individual characteristics. To exclude the professional industry explanation (Hurst and Lusardi 2004), we present in column (3) the estimation results after dropping professional firms.

Table 3

Column (2) shows that historical earnings are a significant positive predictor of the decision of entering entrepreneurship for individuals older than age 38. However, between ages 28 and 38, most of the coefficients are insignificant. If we exclude the professional firms (column [3]), the coefficients decrease in magnitude and become mostly not significant (see Figures 2 and 3). Although these results provide little support to hypothesis 1, which predicted that entry was affected by founder earnings, the test of joint significance of the coefficients associated earnings is not rejected.⁴³

Figure 2 and 3

The decision to become an entrepreneur is more related to some individual characteristics. The probability of transition to entrepreneurship is higher for men than

⁴³ The Chi-squared test statistic is 59.89 (column [3]) and the p-value is 2.85 percent.

women, rises non-monotonically with education, decreases with the number of years in the labor market, and increases with age until 35, at which point it decreases and becomes not significant. These results suggest that as individuals become older and more engaged in the labor market, they become less likely to move to riskier activities.

6.2.2 Financial Capital

We now turn to the financial decisions whose predictions addressed in hypotheses 2a and 2b. To test these hypotheses, we restrict our analysis to the subsample of entrepreneurs and estimate equations (6) and (7).

Internal Capital

The least-squares estimates for internal capital regressions are reported in Table 4. The first column shows the estimates for total historical earnings and the second column combines the earnings and business quality's effects. As mentioned in section 4, we use industry and entrepreneurial experience as a proxy for business quality.

Table 4

The coefficient estimates associated with total historical earnings are positive and significant, suggesting that wealthier entrepreneurs invest more of their own funds. Controlling for business quality (column [2]) causes these coefficients to increase in magnitude. A 10 percent increase in total historical earnings leads to an increase between 0.7 percent and 1.8 percent in internal capital. Moreover, a test for the joint hypothesis that all coefficients associated with earnings are zero leads to its rejection at the 1 percent level. To quantify the effect of founder earnings on internal capital, we

graph the estimates and the confidence intervals in Figure 4. The amount of internal capital invested increases with age, particularly for entrepreneurs older than 37.

Figure 4

We find that entrepreneurs with entrepreneurial experience invest 0.24 percent more of their own capital but, contrary to what might be expected, industry experience has a negative effect. One possible interpretation for this phenomenon might be that high-quality projects are financed with external sources. In all the regressions, period of activity positively affects the amount of capital invested by the founders, suggesting that the first months of operation are crucial for raising internal capital.

To sum up, historical earnings influence the amount of internal capital supporting hypothesis 2a; however, we cannot claim that is due to the liquidity constraints theory.

External Capital

Table 5 presents the coefficient estimates for external capital regression. Column (1) presents the effect of internal capital, column (2) reports the impact of the business idea, and columns (3) and (4) display both effects using ordinary least squares (OLS) and instrumental variable estimation (IV), respectively. We use IV to cope with difficulties of measuring business quality.

Table 5

In all the regressions, the coefficient estimates associated with internal capital are positive and statistically significant at the 1 percent level, supporting hypothesis 2b.

After controlling for business quality (columns [3] and [4]), we find that a 1 percent increase in internal capital leads to an increase of 0.6 percent and 2.1 percent in external capital when using OLS and IV regression, respectively. In the IV approach, we use total historical earnings as instruments for internal capital, and we find support for a positive correlation between those variables. The coefficients associated with historical earnings are individually and jointly significant at the 5 percent level.

Our results also show a positive and significant relationship between external capital and quality of the business idea. Entrepreneurs with entrepreneurial and industry experience raise in expected terms 63 percent and 68 percent more external funds. Financial institutions give more loans to highly educated entrepreneurs. These results support Cressy (1996) and Bates's (1990) findings that differ from Astebro and Bernhardt (2003) and Cassar's (2004) results. Similar to internal capital, we find a positive correlation between period of activity and external capital, suggesting that firms established in the beginning of the year have more time to search for external funding.

6.2.3 Size

We now turn to the effect of financial capital on size. The estimation results are presented in Table 6. Similar to the previous analysis, column (1) presents the results for financial capital, column (2) for business quality, and columns (3) and (4) combine both effects using OLS and IV regression respectively.

Table 6

As expected, the estimated effect of financial capital is positive and highly significant. A 10 percent increase in financial capital implies that the entrepreneur will

recruit 1.6 percent and 2.2 percent more employees (columns [3] and [4]). Our result is consistent with Burke, FitzRoy, and Nolan's (2000) finding, which uses inheritances as proxy for wealth. As seen on previous analyses, the coefficient estimates of earnings are positively and significantly correlated with financial capital.

Initial size is also affected by quality of the business idea and period of activity. Entrepreneurs with industry experience will establish slightly larger firms. However, we find no significant effect for entrepreneurial experience and personal characteristics of entrepreneurs (gender and education).

Overall, these results provide strong support for hypothesis 3, suggesting financial capital and quality of business idea influence initial firm size.

6.2.4 Survival

We present the coefficient estimates for two-year survival in Table 7. Column (1) presents the effect of financial capital solely, column (2) reports the impact of business idea, and columns (3) and (4) display both effects using logit and IV regressions respectively. In columns (5) and (6), we introduce the minimum efficient scale (MES) as a predictor of firm survival. In industries where MES is large, entrants are obliged to start at a larger scale. Consequently, they have more difficulties raising the desired level of capital and lower survival prospects. Therefore, we expect a negative relationship between MES and survival. As suggested by Lyons (1980), MES is computed as the logarithm of the average size (fixed assets) of firms with sales higher than the median at the industry level (four-digit code).

Table 7

Financial capital estimates are positive and significant in columns (1), (3), (5) and (6). However, in the IV approach, the variable loses statistical significance. Considering that financial capital constrains a firm's initial size, the IV result leads us to question the importance of capital on survival. Similar to previous analyses, the coefficient estimates of earnings are positively and significantly correlated with financial capital. Our results do not change when we consider one-year survival.

Nevertheless, survival prospects increase for high-quality businesses. Entrepreneurs with previous industry experience increase their probability of survival by approximately 9 percent. However, neither MES nor personal characteristics of the entrepreneurs (gender and education) are significant predictors of survival.

Overall, we do not find support in the IV approach for hypothesis 3, and thus we question the importance of capital on survival. The results indicate that entrepreneurs are constrained from borrowing and establishing firms with the optimal size, but such constraints do not seem to affect survival for the majority of the firms.

We test a number of variations on the basic specifications to assess the robustness of our results. To minimize possible bias from our sample selection procedure or from our measures of historical earnings and business quality, we re-estimate previous regressions using alternative measures and considering different samples. Generally, our results are still valid. Other issues arise from the fact that some of the dependent variables (internal capital, external capital, and size) do not include negative values and/or are highly skewed (size and external capital). We re-estimated the previous regressions using tobit and median regressions. We also estimate a duration model to evaluate a start-up's survival prospects. The main results are unchanged under these alternative model estimations.

7 Conclusion

Contrary to common belief, we find that money does not seem to be a major barrier to firm entry and survival. We find that past earnings influence the probability of becoming an entrepreneur but mostly in the professional industries. Although we find a significant effect of financial capital on survival, this effect loses statistical significance in the instrumental variable approach. A possible explanation for this result is that the instruments are flawed due to the possible positive correlation between a founder's historical earnings and business quality. However, this explanation is implausible because of the insignificant correlation between survival and financial capital, and the positive correlation between firm size and financial capital. This study also provides support for the liquidity constraints theory, but only through the external capital regression. Outside investors will lend more money to firms with larger amounts of internal capital, which suggests evidence of market imperfections. To sum up, financial factors play no crucial role in entrepreneurial activity, except for limiting the initial scale and quality of resources acquired.

Since liquidity does not seem to constrain individuals from setting up viable businesses, the only force that restrains them from performing better is their ability to develop an innovative idea. In the estimated regressions, we find a positive relationship between specific human capital and external capital, size and survival. The critical trait that affects the future of the firms is the quality of the business idea.

Our findings raise a number of additional questions, particularly about the ability to cope with limited resources. If financial capital is irrelevant to firm entry, performance, and survival, what are the mechanisms that constrained entrepreneurs will use to overcome their disadvantageous positions? Will those mechanisms enable them

to close the gap, or are constrained entrepreneurs doomed to failure in the long run?

These are some of the issues worth addressing in future research.

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Figures

Figure 1- Predictions to access the impact of founder liquidity

Equations Variables	Enter (4)	Internal Capital (5)	External Capital (6)	Size (7)	Survival (8)
Historical Earnings	+ (H1)	+ (H2a)			
Internal Capital			+ (H2b)		
Financial Capital				+ (H3)	+ (H3)
Quality of Idea		+	+	+	+
Period of Activity		+	+	+	0
Age	+ / 0				
Work experience	-				

Figure 2 – Change in the probability of becoming an entrepreneur as function of total historical earnings by age (marginal effects of the probit regression), showing 95 percent confidence intervals

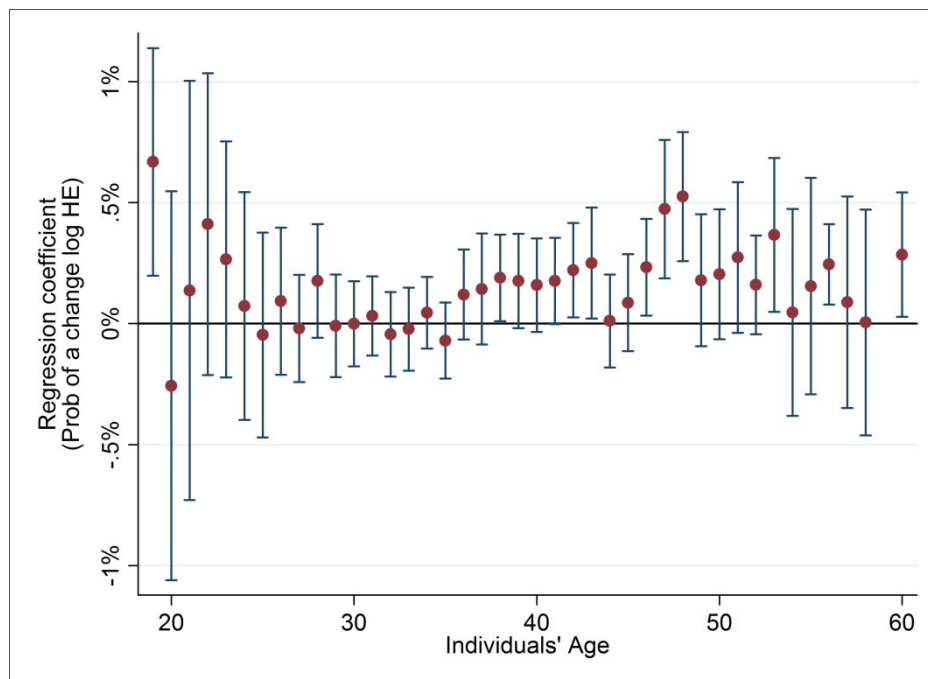


Figure 3 – Change in the probability of becoming an entrepreneur as function of total historical earnings by age (marginal effects of the probit regression), showing 95 percent confidence intervals and excluding professional industries (industry code 74)

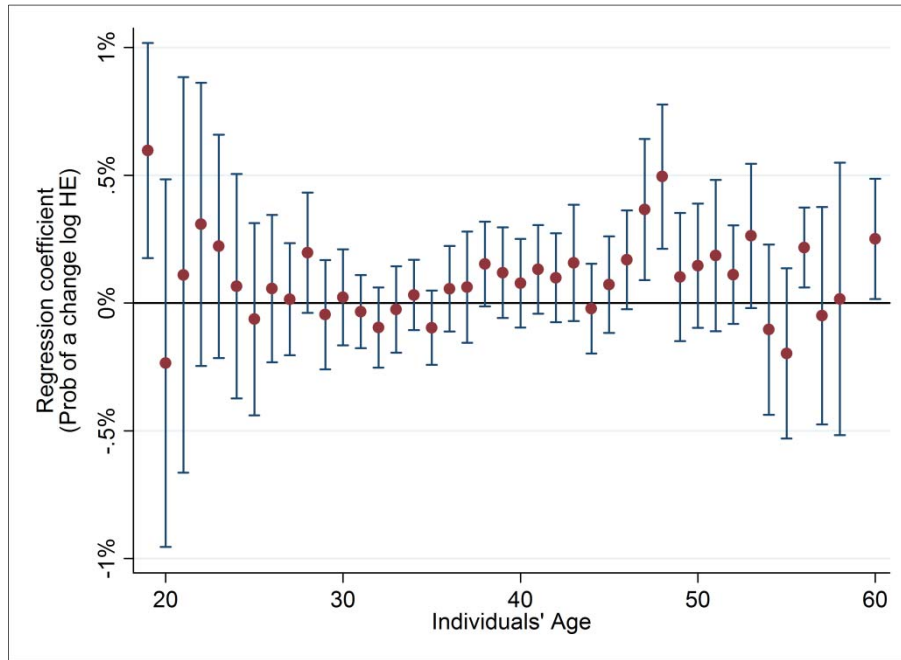
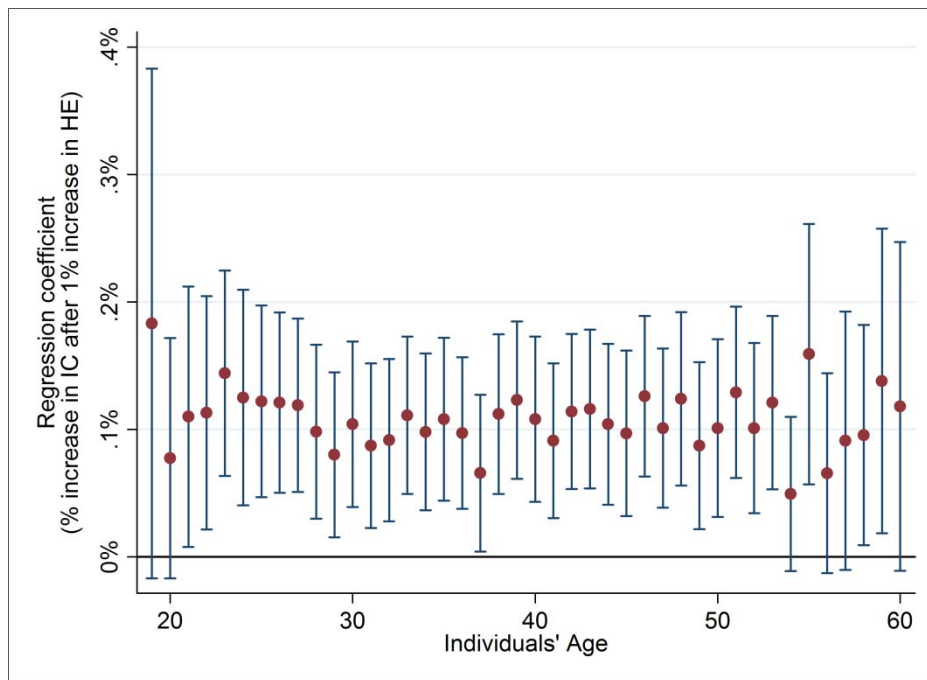


Figure 4 – Percentage increase in internal capital as function of total historical earnings by age, showing 95 percent confidence intervals



Tables

Table 1 – Descriptive statistics of the individuals

Variable	Definitions	All Sample			Wage workers			Entrepreneurs		
		Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Enter	Dummy variable equaling 1 if an individual is an entrepreneur in 2005 and 0 if a paid worker.	161,137	0.01	0.10						
Gender (Male)	Dummy variable equaling 1 for male and 0 for female individuals.	161,137	0.56	0.50	159,408	0.55	0.50	1,729	0.72	0.45
Age	Age of the individual in 2005.	161,137	37.26	10.08	159,408	37.26	10.09	1,729	37.03	8.45
Education	Years of education.	161,137	8.27	4.07	159,408	8.25	4.06	1,729	10.23	4.38
Total historical earnings (age<38) ^a	Accumulated earnings (worker earnings and dividends) for individuals with less than 38 years of age in 2005.	88,614	55.63	59.6	87,716	55.61	59.63	898	57.48	54.82
Total historical earnings (age>=38) ^b	Accumulated earnings (worker earnings and dividends) for individuals aged 38 or older in 2005.	72,318	135.01	130	71,692	134.84	129.49	626	153.83	211.26
Work experience	Years of wage experience accumulated from when an individual was 18 years of age to 2004 (or from 1986 to 2005 if the individual was 38 or older).	161,137	7.55	4.75	159,408	7.57	4.75	1,729	5.52	4.19
Industry experience	Dummy variable equaling 1 for entrepreneurs with experience in the same industry (four-digits-level) and 0 otherwise.							1,729	0.48	0.50
Entrepreneurial experience	Dummy variable equaling 1 for entrepreneurs who founded new firms before 2005 and 0 otherwise.							1,729	0.26	0.44
Entex*Survival	Entrepreneurial experience* Average survival rate (in 2006) of entrepreneurs previous' start-ups.							1,729	0.10	0.29
Index*Survival	Industry experience* Average survival rate (in 2006) of entrepreneurs previous' start-ups.							1,729	0.03	0.24
Nuts 1	Dummy variable equaling 1 for firms located on the north region and 0 otherwise.	161,137	0.34	0.47	159,408	0.34	0.47	1,729	0.36	0.48
Nuts 2	Dummy variable equaling 1 for firms located on the Algarve region and 0 otherwise.	161,137	0.03	0.18	159,408	0.03	0.18	1,729	0.06	0.23
Nuts 3	Dummy variable equaling 1 for firms located on the center region and 0 otherwise.	161,137	0.19	0.39	159,408	0.18	0.39	1,729	0.22	0.41
Nuts 4	Dummy variable equaling 1 for firms located on the Lisbon region and 0 otherwise.	161,137	0.36	0.48	159,408	0.36	0.48	1,729	0.28	0.45
Nuts 5	Dummy variable equaling 1 for firms located on the Alentejo region and 0 otherwise.	161,137	0.05	0.21	159,408	0.05	0.21	1,729	0.06	0.23
Nuts 6	Dummy variable equaling 1 for firms located on the Açores island and 0 otherwise.	161,137	0.02	0.12	159,408	0.02	0.12	1,729	0.01	0.10
Nuts 7	Dummy variable equaling 1 for firms located on the Madeira island and 0 otherwise.	161,137	0.02	0.15	159,408	0.02	0.15	1,729	0.03	0.16

Note: ^a For individuals with less than 38 years of age in 2005, we computed the total historical earnings (worker earnings and dividends) according to the following formula: $HE = (\sum_{i=18}^{age\ in\ 2004} earnings_i)$.

^b For individuals aged 38 or older in 2005, we computed the total historical earnings (worker earnings and dividends) according to the following formula: $HE = (\sum_{i=age\ in\ 2004-18}^{age\ in\ 2004} earnings_i)$.

Table 2 – Descriptive statistics of the new firms

Variable	Definitions	Obs	Mean	Std. Dev.	Min	Max
Survival	Dummy variable: 1 for start-ups that did not stop operation in 2007.	1729	0.845	0.36	0	1
Size	Number of employees in the first year of the start-ups.	1727	3.31	4.65	1	76
Period of activity	Number of months in the first year of the start-ups.	1726	7.6	3.0	3	12
Financial capital	Total amount of capital in the first year of the start-up (in Euros).	1729	64,981	274,380	5,155	9,279,000
Internal capital	Total amount of internal capital (initial equity and shareholder loans) in the first year of the start-up (in Euros).	1729	33,530	239,563	5,155	9,279,000
Initial equity	Amount of initial capital in the first year of the start-up (in Euros).	1729	19,564	234,873	5155	9,279,000
Shareholder loans	Amount of loans provided by the founder in the first year of the start-up (in Euros).	1729	13,966	40,036	0	1,065,242
External capital	Total amount of financial institution credits (commercial loans and leasing) in the first year of the start-up (in Euros).	1729	31,451	113,758	0	2,243,117
Leasing	Amount of leasing credits in the first year of the start-up (in Euros).	1729	14,908	61,856	0	1,334,155
Commercial loans	Amount of bank loans in the first year of the start-up (in Euros).	1729	16,543	93,585	0	2,243,117
% Internal capital	Proportion of internal capital in total financial capital in the first year of the start-up (in percentage).	1729	71.0%	34.5%	0.4%	100.0%
% External capital	Proportion of external capital in total financial capital in the first year of the start-up (in percentage).	1729	29.0%	34.5%	0.0%	99.6%

Table 3 – Becoming an Entrepreneur

	Individuals with no entrepreneurial experience					
	(1)		(2)		(3)	
	Marginal Effects	Standard Errors	Marginal Effects	Standard Errors	Marginal Effects	Standard Errors
Total historical earnings if age=19	0.00916***	(0.00285)	0.00668***	(0.00240)	0.00597***	(0.00215)
Total historical earnings if age=20	-0.00305	(0.00459)	-0.00257	(0.00410)	-0.00235	(0.00367)
Total historical earnings if age=21	0.000721	(0.00510)	0.00137	(0.00442)	0.00110	(0.00395)
Total historical earnings if age=22	0.00445	(0.00388)	0.00411	(0.00318)	0.00308	(0.00283)
Total historical earnings if age=23	0.00235	(0.00300)	0.00265	(0.00249)	0.00222	(0.00223)
Total historical earnings if age=24	-6.47e-05	(0.00271)	0.000725	(0.00240)	0.000656	(0.00224)
Total historical earnings if age=25	-0.00158	(0.00250)	-0.000469	(0.00216)	-0.000629	(0.00192)
Total historical earnings if age=26	-9.50e-05	(0.00176)	0.000927	(0.00155)	0.000564	(0.00147)
Total historical earnings if age=27	-0.00138	(0.00130)	-0.000201	(0.00113)	0.000149	(0.00112)
Total historical earnings if age=28	0.000959	(0.00146)	0.00176	(0.00120)	0.00197*	(0.00120)
Total historical earnings if age=29	-0.00109	(0.00124)	-9.52e-05	(0.00108)	-0.000453	(0.00109)
Total historical earnings if age=30	-0.00101	(0.00108)	-9.28e-06	(0.000895)	0.000221	(0.000960)
Total historical earnings if age=31	-0.000412	(0.000992)	0.000316	(0.000834)	-0.000337	(0.000730)
Total historical earnings if age=32	-0.00155	(0.00110)	-0.000442	(0.000891)	-0.000960	(0.000800)
Total historical earnings if age=33	-0.00116	(0.00109)	-0.000230	(0.000874)	-0.000253	(0.000864)
Total historical earnings if age=34	-0.000114	(0.000924)	0.000444	(0.000756)	0.000317	(0.000703)
Total historical earnings if age=35	-0.00159	(0.000970)	-0.000701	(0.000799)	-0.000966	(0.000740)
Total historical earnings if age=36	0.000869	(0.00121)	0.00120	(0.000948)	0.000560	(0.000854)
Total historical earnings if age=37	0.00128	(0.00151)	0.00143	(0.00117)	0.000624	(0.00111)
Total historical earnings if age=38	0.00195	(0.00124)	0.00189**	(0.000911)	0.00153*	(0.000846)
Total historical earnings if age=39	0.00175	(0.00136)	0.00176*	(0.000994)	0.00119	(0.000905)
Total historical earnings if age=40	0.00144	(0.00139)	0.00159	(0.000985)	0.000776	(0.000883)
Total historical earnings if age=41	0.00145	(0.00121)	0.00176*	(0.000908)	0.00132	(0.000885)
Total historical earnings if age=42	0.00192	(0.00135)	0.00221**	(0.000995)	0.000991	(0.000888)
Total historical earnings if age=43	0.00227	(0.00168)	0.00250**	(0.00117)	0.00157	(0.00116)
Total historical earnings if age=44	-0.00108	(0.00126)	0.000106	(0.000981)	-0.000223	(0.000896)
Total historical earnings if age=45	-0.000193	(0.00127)	0.000863	(0.00102)	0.000724	(0.000965)
Total historical earnings if age=46	0.00194	(0.00145)	0.00233**	(0.00102)	0.00169*	(0.000986)
Total historical earnings if age=47	0.00538**	(0.00217)	0.00473***	(0.00146)	0.00366***	(0.00141)
Total historical earnings if age=48	0.00634***	(0.00208)	0.00525***	(0.00136)	0.00495***	(0.00144)
Total historical earnings if age=49	0.00141	(0.00205)	0.00179	(0.00139)	0.00102	(0.00128)
Total historical earnings if age=50	0.00181	(0.00198)	0.00204	(0.00137)	0.00146	(0.00124)
Total historical earnings if age=51	0.00299	(0.00254)	0.00273*	(0.00159)	0.00186	(0.00151)
Total historical earnings if age=52	0.000866	(0.00142)	0.00160	(0.00104)	0.00111	(0.000984)
Total historical earnings if age=53	0.00391	(0.00261)	0.00366**	(0.00162)	0.00263*	(0.00144)
Total historical earnings if age=54	-0.000702	(0.00300)	0.000464	(0.00218)	-0.00104	(0.00170)
Total historical earnings if age=55	0.000974	(0.00325)	0.00155	(0.00228)	-0.00197	(0.00170)
Total historical earnings if age=56	0.00221*	(0.00118)	0.00245***	(0.000847)	0.00217***	(0.000798)
Total historical earnings if age=57	0.000357	(0.00326)	0.000883	(0.00223)	-0.000496	(0.00217)
Total historical earnings if age=58	-0.000881	(0.00309)	4.92e-05	(0.00238)	0.000163	(0.00272)
Total historical earnings if age=60	0.00253	(0.00174)	0.00285**	(0.00131)	0.00251**	(0.00120)
Work experience			-0.000594***	(8.62e-05)	-0.000472***	(8.17e-05)
Gender (Male)			0.00381***	(0.000362)	0.00342***	(0.000343)
Years of education			0.00142***	(0.000215)	0.00152***	(0.000211)
Square of years of education/1000			-0.0363***	(0.0103)	-0.0520***	(0.0102)
Age dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	159375		159375		159196	
Log likelihood	-7060		-6799		-6027	
Test Chi2	62.34		65.02		59.89	
P_value	0.0174		0.00984		0.0285	

Note: The table reports the results from estimating Equation (4) by dprobit procedure in STATA. This procedure reports the marginal effects of probit regression. Dependent variable is a dummy equal to 1 if an individual is an entrepreneur in 2005 and 0 if a paid worker. The independent variables are logarithm of total historical earnings for each cohort of individuals of ages 19 to 60 in 2005, age of the individuals, number years worked, years of education and its square. Age dummies defined for each year between 20 and 60 years-old. Seven regional dummies included. Robust standard errors are in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 4 – Internal Capital

	(1)		(2)	
	Coef.	St. Error	Coef.	St. Error
Total historical earnings if age=19	0.146	(0.101)	0.183*	(0.102)
Total historical earnings if age=20	0.0514	(0.0460)	0.0774	(0.0481)
Total historical earnings if age=21	0.0819	(0.0521)	0.110**	(0.0521)
Total historical earnings if age=22	0.0849*	(0.0454)	0.113**	(0.0467)
Total historical earnings if age=23	0.118***	(0.0401)	0.144***	(0.0411)
Total historical earnings if age=24	0.100**	(0.0422)	0.125***	(0.0431)
Total historical earnings if age=25	0.0934**	(0.0376)	0.122***	(0.0384)
Total historical earnings if age=26	0.0964***	(0.0351)	0.121***	(0.0361)
Total historical earnings if age=27	0.0940***	(0.0339)	0.119***	(0.0347)
Total historical earnings if age=28	0.0733**	(0.0341)	0.0982***	(0.0348)
Total historical earnings if age=29	0.0570*	(0.0321)	0.0801**	(0.0330)
Total historical earnings if age=30	0.0799**	(0.0322)	0.104***	(0.0331)
Total historical earnings if age=31	0.0645**	(0.0323)	0.0872***	(0.0330)
Total historical earnings if age=32	0.0685**	(0.0317)	0.0915***	(0.0325)
Total historical earnings if age=33	0.0901***	(0.0309)	0.111***	(0.0315)
Total historical earnings if age=34	0.0751**	(0.0308)	0.0980***	(0.0314)
Total historical earnings if age=35	0.0865***	(0.0316)	0.108***	(0.0326)
Total historical earnings if age=36	0.0749**	(0.0292)	0.0971***	(0.0303)
Total historical earnings if age=37	0.0458	(0.0307)	0.0657**	(0.0314)
Total historical earnings if age=38	0.0906***	(0.0311)	0.112***	(0.0320)
Total historical earnings if age=39	0.102***	(0.0310)	0.123***	(0.0315)
Total historical earnings if age=40	0.0863***	(0.0325)	0.108***	(0.0331)
Total historical earnings if age=41	0.0700**	(0.0303)	0.0911***	(0.0310)
Total historical earnings if age=42	0.0949***	(0.0305)	0.114***	(0.0310)
Total historical earnings if age=43	0.0997***	(0.0315)	0.116***	(0.0318)
Total historical earnings if age=44	0.0837***	(0.0315)	0.104***	(0.0322)
Total historical earnings if age=45	0.0768**	(0.0323)	0.0969***	(0.0331)
Total historical earnings if age=46	0.108***	(0.0316)	0.126***	(0.0321)
Total historical earnings if age=47	0.0803***	(0.0310)	0.101***	(0.0318)
Total historical earnings if age=48	0.107***	(0.0343)	0.124***	(0.0347)
Total historical earnings if age=49	0.0673**	(0.0329)	0.0872***	(0.0334)
Total historical earnings if age=50	0.0810**	(0.0352)	0.101***	(0.0356)
Total historical earnings if age=51	0.108***	(0.0330)	0.129***	(0.0343)
Total historical earnings if age=52	0.0842**	(0.0342)	0.101***	(0.0341)
Total historical earnings if age=53	0.102***	(0.0338)	0.121***	(0.0347)
Total historical earnings if age=54	0.0305	(0.0311)	0.0493	(0.0309)
Total historical earnings if age=55	0.142***	(0.0526)	0.159***	(0.0521)
Total historical earnings if age=56	0.0498	(0.0401)	0.0656	(0.0400)
Total historical earnings if age=57	0.0703	(0.0559)	0.0912*	(0.0517)
Total historical earnings if age=58	0.0760	(0.0468)	0.0955**	(0.0441)
Total historical earnings if age=59	0.133**	(0.0601)	0.138**	(0.0610)
Total historical earnings if age=60	0.0936	(0.0654)	0.118*	(0.0658)
Industry experience			-0.104*	(0.0577)
Entrepreneurial experience			0.217***	(0.0752)
Period of activity	0.0328***	(0.00885)	0.0335***	(0.00885)
Gender (Male)	-0.0554	(0.0638)	-0.0807	(0.0638)
Years of education	0.00343	(0.0317)	0.00382	(0.0317)
Square of years of education	0.00146	(0.00146)	0.00140	(0.00147)
Constant	7.898***	(0.426)	7.678***	(0.436)
Observations	1521		1521	
Industry dummies	Yes		Yes	
Regional dummies	Yes		Yes	
Adjusted R-squared	0.112		0.118	
Test F	2.332		2.022	
P_value	0.000283		0.000140	

Note: The table reports the results from estimating Equation (5) by OLS. Dependent variable is logarithm of initial internal capital. The independent variables are logarithm of total historical earnings for each cohort of individuals of ages 19 to 60 in 2005, dummy variables for industry and entrepreneurial experience, period of activity, gender, years of education and its square. Industry (2-digit code) and regional dummies are included but not reported. Robust standard errors are in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 5 – External Capital

	(1)	(2)	(3)	(4)
Internal Capital	0.588*** (0.122)		0.588*** (0.122)	2.054*** (0.630)
Industry Experience		0.379 (0.262)	0.449* (0.261)	0.682** (0.298)
Entrepreneurial experience		0.580** (0.290)	0.501* (0.286)	0.627* (0.362)
Period of activity	0.114*** (0.0408)	0.131*** (0.0408)	0.114*** (0.0407)	0.0956* (0.0489)
Gender (Male)	0.147 (0.285)	0.0770 (0.288)	0.0935 (0.286)	0.0432 (0.317)
Years of education	0.336** (0.145)	0.360** (0.147)	0.362** (0.145)	0.313* (0.160)
Square of years of education	-0.0128* (0.00675)	-0.0127* (0.00684)	-0.0136** (0.00677)	-0.0139* (0.00753)
Constant	-2.465 (2.164)	2.346 (1.828)	-2.870 (2.164)	-15.24** (6.010)
Observations	1726	1726	1726	1521
Industry Dummies	Yes	Yes	Yes	Yes
Regional Dummies	Yes	Yes	Yes	Yes
Adjusted R-squared	0.034	0.024	0.037	
Estimation Model	OLS	OLS	OLS	IV

Note: The table reports the results from estimating Equation (6). Dependent variable is logarithm of initial external capital. The independent variables are logarithm of initial internal capital, dummy variables for industry and entrepreneurial experience, period of activity, gender, years of education and its square. Industry (2-digit code) and regional dummies are included but not reported. Columns 1 to 3 are estimated by OLS, and column 4 is estimated by Instrumental Variables (IV). The instruments for internal capital are the logarithm of total historical earnings for each cohort of entrepreneurs. Robust standard errors are in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 6 – Size

	(1)	(2)	(3)	(4)
Financial Capital	0.160*** (0.0182)		0.156*** (0.0181)	0.220*** (0.0677)
Industry experience		0.211*** (0.0402)	0.218*** (0.0389)	0.186*** (0.0416)
Entrepreneurial experience		0.142*** (0.0447)	0.101** (0.0439)	0.0448 (0.0556)
Period of activity	0.0316*** (0.00601)	0.0390*** (0.00609)	0.0317*** (0.00594)	0.0311*** (0.00728)
Gender (Male)	-0.00917 (0.0418)	-0.0220 (0.0427)	-0.0204 (0.0413)	-0.0203 (0.0445)
Years of education	-0.0121 (0.0217)	0.00432 (0.0222)	-0.00488 (0.0216)	-0.00931 (0.0234)
Square of years of education	0.000194 (0.000986)	-0.000177 (0.00102)	-1.66e-05 (0.000978)	0.000169 (0.00104)
Constant	-1.208*** (0.279)	0.167 (0.252)	-1.315*** (0.304)	-2.235*** (0.698)
Observations	1724	1724	1724	1520
Industry dummies	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
R-squared				0.234
Adjusted R-squared	0.193	0.162	0.213	
Estimation Model	OLS	OLS	OLS	IV

Note: The table reports the results from estimating Equation (7). Dependent variable is logarithm of initial number of employees. The independent variables are logarithm of financial capital, dummy variables for industry and entrepreneurial experience, period of activity, gender, years of education and its square. Industry (2-digit code) and regional dummies are included but not reported. Columns (1) to (3) are estimated by OLS, and column (4) is estimated by Instrumental Variables (IV). The instruments for financial capital are the logarithm of total historical earnings for each cohort of entrepreneurs. Robust standard errors are in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 7 – Survival

	(1)	(2)	(3)	(4)	(5)	(6)
Financial capital	0.209*** (0.0611)		0.209*** (0.0627)	0.0476 (0.0349)	0.195*** (0.0593)	0.0622* (0.0363)
Industry experience		0.704*** (0.150)	0.717*** (0.151)	0.0897*** (0.0194)	0.672*** (0.147)	0.0875*** (0.0195)
Entrepreneurial experience		0.290 (0.179)	0.247 (0.181)	0.0244 (0.0260)	0.230 (0.175)	0.0147 (0.0265)
MES					-0.0502 (0.0403)	-0.00830 (0.00565)
Period of activity	-0.0320 (0.0239)	-0.0244 (0.0239)	-0.0333 (0.0242)	-0.00486 (0.00384)	-0.0256 (0.0236)	-0.00478 (0.00389)
Gender (Male)	0.394** (0.154)	0.359** (0.155)	0.368** (0.155)	0.0546** (0.0238)	0.485*** (0.145)	0.0732*** (0.0231)
Years of education	-0.161* (0.0838)	-0.134 (0.0847)	-0.139* (0.0845)	-0.0161 (0.0111)	-0.129 (0.0833)	-0.0158 (0.0111)
Square of years of education	0.00765** (0.00390)	0.00693* (0.00393)	0.00689* (0.00393)	0.000746 (0.000507)	0.00687* (0.00386)	0.000809 (0.000504)
Constant	0.562 (1.096)	2.841** (1.207)	0.845 (1.299)	0.373 (0.357)	0.469 (1.130)	0.494 (0.337)
Industry dummies		Yes	Yes	Yes	No	No
Regional dummies		Yes	Yes	Yes	Yes	Yes
Observations	1690	1690	1690	1521	1723	1519
R-squared				0.059		0.013
Log likelihood	-702.0	-694.4	-688.6		-711.5	
Estimation model	Logit	Logit	Logit	IV	Logit	IV

Note: The table reports the results from estimating Equation (8). Dependent variable is survival rate, dummy variable equaling 1 if a start-up does not stop operating in 2007 and 0 otherwise. The independent variables are logarithm of financial capital, dummy variables for industry and entrepreneurial experience, minimum efficient scale (MES), period of activity, gender, years of education and its square. MES is measured by a variables similar to the one suggested by Lyons (1980). MES is computed as the logarithm of the average size (fixed assets) of firms with sales higher than the median at the industry level (four digit code). Industry (2-digit code) and regional dummies are included but not reported. Columns (1), (2), (3) and (5) are estimated by Logit regression, and column (4) and (6) are estimated by Instrumental Variables (IV). The instruments for financial capital are the logarithm of total historical earnings for each cohort of entrepreneurs. Robust standard errors are in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.