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Determinants of Novice, Portfolio and Serial Entrepreneurship: An Occupational Choice Approach*

By

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Abstract

In this paper we present an occupational choice model for entrepreneurs, in which, based on their individual skills and on the quality of their business, entrepreneurs can keep their original business, open a new business in the same or another sector along the current business (portfolio entrepreneur), shut it down to either start a new one (serial entrepreneur) or to turn to dependent employment. We test our theory using a 10-year panel dataset (2001 to 2010) of more than 4,000 Vietnamese manufacturing firms. We estimate an occupational choice model and a survival model and find that: (i) a greater endowment of human capital is associated with a higher likelihood to become a serial or a portfolio entrepreneur; (ii) A higher quality of the new business is associated to a higher likelihood of being habitual entrepreneurs. Particularly, high entrepreneurial skills together with a high-quality business positively influence the likelihood to be serial or portfolio; (iii) novice entrepreneurs with high entrepreneurial skill and a high-quality business are more likely to keep their business.

Keywords: Portfolio entrepreneurship, serial entrepreneurship, occupational choice, industrial policy.
JEL codes: F02; L26; L53.

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Managerial Summary

Understanding why some entrepreneurs continue to run their first business whereas others become serial or portfolio is essential to understand the process of firm demographics. We present a model where individuals choose among novice entrepreneurship, habitual (either serial or portfolio) entrepreneurship, and wage employment. We test it empirically using a novel dataset from Vietnam. We find that serial and portfolio entrepreneurs are endowed with stronger human capital and run better quality businesses. They operate in more capital-intensive businesses, supporting the idea that it is easier for them to mobilize human capital and financial resources to re-launch their activity. Low-skilled novice entrepreneurs with low-quality businesses are likely to exit entrepreneurship. Novice entrepreneurs maintain their business if they have high skills and rich technical and managerial resources.

Introduction

Generally, the literature distinguishes between two types of entrepreneurs: *novice*, who run their first business and *habitual*, who run multiple businesses, either sequentially (serial entrepreneurs) or in parallel (portfolio entrepreneurs). This paper investigates, both theoretically and empirically, the occupational choices of novice entrepreneurs, explaining what leads individuals who already own a business to start a new one, becoming either a serial or a portfolio entrepreneur. While the choice between entering entrepreneurship for the first time (i.e., becoming a 'novice' entrepreneur), and engaging in wage employment is largely explored in the literature (cf. among many others, Evans and Leighton, 1989; Parker, 2009; Santarelli et al., 2009), the study of serial and portfolio entrepreneurship is relatively under-developed.[1] Both the theoretical and the empirical literature say little about the determinants of people's choice to remain novice or to become serial and portfolio entrepreneurs (Carter and Ram, 2003; Parker, 2014). Particularly, empirical research on this topic suffers from the lack of suitable data (Parker, 2012; Sarasvathy et al., 2013; Rocha et al., 2015).

A study of the occupational choices between novice, serial and portfolio is much needed. First of all, both serial and portfolio entrepreneurs are quite widespread (Parker, 2014). Moreover, the existing literature on habitual entrepreneurs presents conflicting results on their economic performance (among those finding a superior performance of habitual: Wright et al., 1998; Astebro and Bernhardt, 2003, Chen, 2013, Rocha et al., 2015; among those finding opposite evidence: Rerup, 2005; Gottschalk et at., 2017). It then becomes important to understand what transforms a novice entrepreneur into a habitual one and, more specifically, what makes them choose serial entrepreneurship over portfolio and vice-versa.

[1] Different is the case of habitual entrepreneurship. There are several studies on this type of entrepreneurship, albeit not focusing on the distinction between serial and portforlio explicitly (see Uchasaran et al., 2006).

In this paper, we aim to contribute to this emerging area in two ways: First, we present a theoretical model of occupational choice, where, based on the quality of the current business, their skills and given the size of their initial investment, entrepreneurs can choose to become habitual (either serial or portfolio), to remain novice entrepreneurs, or become wage workers. We extend the Plehn-Dujowich's (2010) occupational choice model by including the additional possibility of portfolio entrepreneurship. Second, we test selected propositions from our model empirically, using a novel dataset from Vietnam. The purpose of the empirical part is to identify to what extent the decision to become either a portfolio or a serial entrepreneur, or even to exit entrepreneurship reflects the skills (defined as the human capital and the organizational and technological capabilities), and the financial circumstances of novice entrepreneurs. As robustness checks, we first take into account the different modes of exiting entrepreneurship, that is selling/transferring the business or bankruptcy. Second, we control for the way in which serial entrepreneurs return to entrepreneurship, i.e., through acquiring an existing business (change of ownership) or setting up a completely new one.

Literature review

There is an extensive literature that analyzes the occupational choice between novice entrepreneurship and paid employment (for reviews, see Parker, 2009; Poschke, 2013). However, far less has been written on the decision a novice entrepreneur may take to become serial or portfolio, or to remain novice or even to shut down his/her business. From a theoretical point of view, Plehn-Dujowich (2010) and Parker (2014) propose sophisticated models of occupational choices. While the former deals with wage employment, novice and serial entrepreneurship, the latter includes also portfolio entrepreneurship. Plehn-Dujowich (2010) finds that, in equilibrium, a highly-skilled entrepreneur shuts down a business of low quality to become a serial entrepreneur whereas a low-skilled entrepreneur shuts down a

business of low quality to enter the labor market. Parker (2014) claims that *i)* higher opportunity-exploitation ability is associated with portfolio entrepreneurship rather than with serial and novice entrepreneurship (see also Parker and van Praag, 2010); *ii)* a sequence of opportunities whose returns covary negatively (diversifying opportunities) promotes portfolio entrepreneurship at the expense of both novice and serial entrepreneurship; *iii)* synergies between successive opportunities promote portfolio entrepreneurship over novice entrepreneurship, unless the initial opportunity is sufficiently valuable; and *iv)* individuals with low (moderate) (high) risk aversion are more likely to be serial (portfolio) (novice) entrepreneurs, respectively (for experimental evidences, see Koudstaal et al., 2016). In our paper, we choose to extend Plehn-Dujowich (2010)'s contribution adding portfolio entrepreneurship because he considers the role of invested capital and the intrinsic quality of the firm explicitly besides entrepreneurial skill, whereas Parker (2014) focuses on entrepreneurial skills only (distinguishing between recognition and exploitation ability). Moreover, Plehn-Dujowich (2010) presents a dynamic model that allows to infer the quality of the new business, a variable we deploy in our empirical analysis

In another theoretical paper aimed at singling out the possible relationship between the typology of entrepreneurship and the likelihood of a venture to be successful or doomed to failure, Sarasvathy et al. (2013) contend that entrepreneurs can amplify their expected success rates by designing their careers as temporal portfolios that exploit the contagion processes embedded in serial entrepreneurship. While the advantages from holding concurrent portfolios that exploit heterogeneity are known within the field of the portfolio diversification literature, the same advantages can be achieved in the serial (entrepreneurship) context through contagion.

One of the main difficulties with empirical studies of portfolio entrepreneurship is that the level of analysis needs to be shifted from the firm to the individual. Sieger et al (2011)

suggest that using the firm as the unit of analysis might lead to underestimating the prevalence of portfolio entrepreneurship, since owning and managing multiple businesses could be considered a normal diversification strategy at the firm level. While the goal of strategic diversification is to maximize managerial efficiency or risk management, reasons for engaging in portfolio entrepreneurship may include growth aspirations, wealth, value maximization, and providing career opportunities for family members (Mulholland, 1997). In other words, portfolio entrepreneurship is a process through which entrepreneurial diversification occurs.

Nevertheless, significant differences among the three types of founders have been identified in the existing empirical literature.

These result from both the entrepreneur's personal background and the firm's organizational level. Regarding personal background, habitual entrepreneurs are found to be younger when they started their first business (Westhead and Wright, 1998), to obtain a higher endowment of human and social capital (Wiklund and Shepherd, 2008; Li et al., 2009; Sieger et al., 2011), to be more experienced (Westhead et al., 2005, Amaral et al. 2011). Focusing on the role of innate ability in serial entrepreneurship, learning by doing is less important than selection on ability in explaining both the formation and the early performance of serial businesses. This result is proven by Chen (2013) for a young cohort of U.S. firms between 1979 and 1994 and by Rocha et al. (2015) for a sample of Portuguese firms between 1997 and 2003. Moreover, Chen (2013) finds that the only exception to this empirical regularity occurs when an entrepreneur creates a new firm in an industry closely related to his past business experience.

As far as the organizational level is concerned, Westhead et al. (2005) observe, for a sample of 354 firms in Scotland, that portfolio entrepreneurs have more resources and organizational capabilities (skills, knowledge, et.) than serial entrepreneurs. Besides, on

average, they seem to offer more attractive growth prospects. Tihula and Huovinen (2010), focusing their analysis to a sample of 245 Finnish firms with 20-49 employees, provide interesting empirical evidence about the presence of managerial teams in small firms. They distinguish *solo* entrepreneurs (i.e. entrepreneurs who themselves run the firm that they own) from entrepreneurs who share responsibility with small groups of managers from different functional areas and other key persons (managerial team). Their findings show that solo entrepreneurship is more common among novice entrepreneurs, and that there are more management teams in firms owned by portfolio entrepreneurs than in firms owned by serial entrepreneurs.

A conspicuous body of research finds that habitual entrepreneurs have superior economic performance (Wright et al., 1998; Westhead and Wright, 1999; Klepper and Simons, 2000; Astebro and Bernhardt, 2003; Agarwal et al., 2004; Hyytinen and Ilmakunnas, 2007; Wiklund and Shepherd, 2008; Chen, 2013). In general, other things being equal, education and human capital have been shown to positively affect the longevity of new firms (cf. Bates, 1990 Brüderl et al., 1992 and Gimeno et al., 1997 among others). More specifically, having been a habitual entrepreneur in the past might facilitate the future creation of a subsequent or concurrent new business. Using a longitudinal matched employer–employee dataset for Portugal over the period 1997-2003, Rocha et al. (2015) evaluate whether entrepreneurial experience acquired in the previous business improves serial entrepreneurs' survival. Their findings for 35,000 serial entrepreneurs show that serial entrepreneurs likely exhibit personal characteristics that lead them to repeat their entrepreneurial experience and reduce their exit rates in their second experience as entrepreneurs.

However, according to Rerup (2005), habitual entrepreneurs may get stuck in a “success trap”. First, generally it seems that people tend frame a problem and search for

solutions from their past experience. It then becomes more difficult for habitual entrepreneurs to recognize industry and technological changes, and thus modify the heuristics that worked in the past. They repeat actions that appeared to have produced the success or experiment with new ideas hoping to find alternatives that will make their next venture successful (Storey, 1982). Moreover, it seems that (successful) habitual entrepreneurs may be subject to "entrepreneurial euphoria" and tend to be overconfident about their understanding of market dynamics (Li et al., 2009). Tracking new firm closures amongst 7,400 new German firms, Gottschalk et al. (2017) find no evidence that habitual entrepreneurs take advantage from their experiential knowledge in developing new firms which are more viable than those started by novice entrepreneurs. In fact, their empirical evidence shows that new firms run by habitual entrepreneurs are just as likely as those started by novice entrepreneurs to go bankrupt. Under certain circumstances, as implied by the theoretical results of Sarasvathy et al. (2013), individuals choose portfolio entrepreneurship as a way to overcome the limits to firm growth encountered by single business ownership. Based on such empirical evidence, Carter and Ram (2003) conclude that, whenever individual firm growth is restricted (for instance by fiscal or sectoral considerations), multiple business ownership may be used as an instrument for achieving growth through the development of a portfolio of entrepreneurial interests[2].

The Theoretical Model

In this section, we set up the theoretical setting that we are going to test empirically in the remainder of the paper. We extend Plehn-Dujowich (2010)'s model to include the possibility of portfolio entrepreneurship.

[Figure 1 about here]

[2]For an enlightening case-study showing how this strategy was pursued in the Italian petrochemical industry, see Zamagni (2007).

Time is infinite and discrete. There is a continuum of entrepreneurs, characterized by an idiosyncratic level of opportunity exploitation ability (or entrepreneurial skill) $s \in [0, \infty)$, which is observable and distributed according to the function G(·).[3] In line with Plehn-Dujowich (2010), we assume that entrepreneurs are subject to credit rationing.[4] This implies that they are unable to acquire more capital after start-up. Let K be the initial investment in physical capital. This startup capital K evolves according to $K_1 = \beta(1-\delta)K$ where $\delta \in (0,1)$ is the rate of capital depreciation or utilization of resources, and $\beta \in (0,1)$ is the time discount factor. Apart from the initial investment K, we assume no further entry costs into entrepreneurship.

Suppose that an individual chooses to be an entrepreneur at time t=0.[5] Then, he/she launches a business characterized by an uncertain quality $q \in [0, \infty)$, distributed according to the cumulate density function $F(\cdot)$ and becomes a novice entrepreneur. Following Plehn-Dujowich (2010), the profits for an entrepreneur with skill *s* running a business with quality q are $\pi(q,s)K$, where $\pi_s > 0$ (higher skills increase profitability) and $\pi_q > 0$ (higher quality businesses are more profitable). Also, $\pi_{qs} > 0$, i.e., entrepreneurial skills and business qualities are complements. A profit function satisfying these assumptions is $\pi(q,s)K = qs^{1+\alpha}K$, with $\alpha > 0$. The sequence of decision is represented in Figure 1.

At t=1, novice entrepreneurs learn the quality of their business. At that point, they have four possibilities: (i) maintain their business in operation; (ii) shut down the business to launch a new venture, thus becoming a serial entrepreneur. Such operation will cost him a proportion $T \in (0,1)$ of his remaining capital, that needs to be reconverted to fulfil the needs

[3] The distinctive traits of an entrepreneur's human capital (education and experience) are typically used as indicators of entrepreneurial skill. We follow this practice in the empirical part of this paper.
[4] We have also developed a version of the model where part of the profits can be reinvested either in the current firm or in another. Results are qualitatively the same.
[5] Intuitively, individuals with low entrepreneurial skill ($s < \underline{s}$) never choose to become novice entrepreneurs but enter the labor market. The value $\underline{s}$ is obtained in Appendix 1. Given that in our dataset we only have entrepreneurs and for most of them we have no information about their initial capital investment and about the characteristics of their first business we do not consider the initial decision between paid employment and novice entrepreneurship but we focus only on the novice entrepreneur's decision.

of the new firm; (iii) set up another business besides the current one to exploit a new opportunity. In this case, he becomes a portfolio entrepreneur. Since he cannot obtain more capital by assumption, he has to invest a proportion $\lambda \in (0,1)$ of his remaining capital in the new venture.[6] In analogy with the serial entrepreneurship case, the cost of such operation is a proportion $T\lambda$ of his remaining capital; (iv) shut down the business to enter the labor market. If an entrepreneur chooses paid employment, he/she loses all his/her remaining capital[7] and obtains lifetime earnings equal to *ws*, where *w* is the exogenous wage.[8]

Since we are interested in studying cases in which both serial and portfolio entrepreneurship are feasible, we assume that the size λ of the investment in a new venture for a portfolio entrepreneur is not too high relative to T, the cost to switch to serial entrepreneurship. Particularly, as shown in Appendix 1, we need that $\lambda < \frac{1-T}{T}$. If the latter inequality is not satisfied, serial entrepreneurship is always preferred to portfolio.

Let $V(q, s, K)$ denote the value function of an entrepreneur with skill *s* who is currently running a business with quality q. The entrepreneur decides whether to maintain the business in operation, shut it down either to enter the labor market or to launch a new venture, or launch a new business besides the current one to maximise expected profits. The Bellman equation is given by

$$V(q, s, K) = qs^{1+\alpha}K +$$

$$\beta max \begin{Bmatrix} V_c(q, s, (1-\delta)K); ws; E[V_s(q', s, (1-T)(1-\delta)K)]; \\ E[V_c(q, s, (1-\delta)(1-\lambda)K) + V_s(q', s, (1-\delta)\lambda K)] \end{Bmatrix} \quad (1)$$

where V_c denotes the continuation value of maintaining the business and V_s denotes the present value of setting up a new venture.

[6] The parameter λ represents the optimal minimum investment size for that type of business.
[7] This assumption is made to simplify analysis and is with no loss of generality.
[8] Notice that the adopted profit function presents an elasticity with respect to skill equal to $1 + \alpha$ and thus greater than the elasticity of labor income with respect to *s* (which is equal to 1, as shown in Appendix 1). This is in line with the empirical literature (see Plehn-Dujowich, 2010 and references therein).

We can thus derive the following Proposition, whose results are illustrated in Figure 2.

Proposition 1. *In equilibrium, at t=1, the occupational choices of a novice entrepreneur depending on the quality of his current business are as follows. There exists quality thresholds* $\hat{\tilde{q}} > \tilde{q}$*, and skill levels* $\tilde{s} > \tilde{\tilde{s}} > \underline{s}$*, such that*

a. *An entrepreneur with skill* $s \in [\underline{s}, \tilde{\tilde{s}})$*, (i.e. low-skilled entrepreneur)*
    i. *If business quality* $q \in [0, \overline{q}(s))$*, he shuts down his current business to enter the labor market.*
    ii. *If business quality* $q \in [\overline{q}(s), \infty)$*, he maintains his current business in operation.*
b. *An entrepreneur with skill* $s \in [\tilde{\tilde{s}}, \tilde{s})$ *(i.e., an entrepreneur with average skills)*
    i. *If business quality* $q \in [0, \tilde{q})$ *(i.e., a bad business), he shuts down his current business to enter the labor market.*
    ii. *If business quality* $q \in [\tilde{q}, \hat{\tilde{q}})$ *(i.e., an average business), he dismantles a portion* $1 - \lambda$ *of his current business, invests a proportion* λ *of his remaining capital in a new venture and becomes a portfolio entrepreneur.*
    iii. *If business quality* $q \in [\hat{\tilde{q}}, \infty)$ *(i.e., a good business), he maintains his current business in operation, remaining a novice entrepreneur.*
c. *An entrepreneur with skill* $s \in [\tilde{s}, \infty)$ *(i.e., a high-skilled entrepreneur)*
    i. *If business quality* $q \in [0, \tilde{q})$ *(i.e., a bad business), he shuts it down to launch a new venture and thus becomes a serial entrepreneur.*
    ii. *If business quality* $q \in [\tilde{q}, \hat{\tilde{q}})$ *(i.e., an average business), he dismantles a portion* $1 - \lambda$ *of his current business, invests a proportion* λ *of his*

remaining capital in a new venture and becomes a portfolio entrepreneur.

iii. *If business quality* $q \in [\hat{\hat{q}}, \infty)$ *(i.e., a good business), he maintains his current business in operation, remaining a novice entrepreneur.*

Proposition 1 shows that low-skilled entrepreneurs are never habitual. Thus, habitual entrepreneurship requires relatively high skills. Serial entrepreneurs are highly skilled individuals who own a low-quality business, whereas portfolio entrepreneurs may be somewhat less skilled than serials and own an average-quality business. Independently of skill, novice with a good business will never become habitual.

In general, for given skill s, the first business of a portfolio entrepreneur has a higher quality than that of a serial entrepreneur, because a novice would want to get rid of a bad business and become serial rather than portfolio. Then, for given business quality, a portfolio can be less skilled than a serial, since the cost of becoming portfolio is lower than the cost of becoming serial ($T\lambda < T$). Combining the two preceding findings yields the results *b.ii* and *c.ii* in Proposition 1.[9]

[Figure 2 about here]

In Appendix 1 we show that the thresholds $\tilde{q}$ and $\hat{\hat{q}}$ are both increasing in q', the quality of the new business that the novice entrepreneur could start, thus becoming either serial or portfolio. The threshold $\hat{\hat{q}}$ increases with q' faster than $\tilde{q}$. From Figure 2, this implies that a larger quality of the new business reduces the likelihood that an entrepreneur chooses

[9] Parker (2014), among other things, shows that portfolio entrepreneurship dominates when the returns of the two businesses are negatively correlated, as investing in the second firm allows risk diversification. In our model, we abstract from risk aversion and diversification considerations. This is because our database does not allow us to ascertain which firms belong to a given "portfolio", so that we cannot compute the correlation among business yieldings. We also lack data about the degree of risk aversion of the entrepreneurs. Including risk aversion and correlated returns would have greatly complicated the model without the possibility to test the results empirically.

to remain novice (i.e., a higher q' is associated to a higher likelihood to become habitual). It also implies a greater likelihood to become portfolio, since the interval $[\tilde{q}, \hat{\tilde{q}})$ widens.

The intuition for this result is as follows. The threshold $\tilde{q}$ is the quality of the current business that renders the novice entrepreneur indifferent between becoming serial and becoming portfolio. When $q > \tilde{q}$ the entrepreneur becomes portfolio. A larger q' implies a greater attractiveness of the new enterprise compared to the current one, thus, for the entrepreneur to be indifferent, the quality of the current business must be larger too, otherwise the entrepreneur would likely rather get rid of it and invest everything in the new venture. Similarly, $\hat{\tilde{q}}$ is the quality of the current business that renders the novice entrepreneur indifferent between remaining novice and investing part of his/her assets in the new venture, becoming portfolio. If $q > \hat{\tilde{q}}$, the entrepreneur remains novice. Again, an increase in q' requires a higher quality of the current business to match the larger attractiveness of the new venture. However, the increase in $\hat{\tilde{q}}$ must be higher than the increase in $\tilde{q}$. Consider $\tilde{q}$ first. Becoming serial implies sacrificing a percentage T of the entire capital K_1, whereas becoming portfolio implies a cost equal to a share $T\lambda$ of a fraction λ of K_1. If q' increases, the improved attractiveness of being serial is counteracted by the smaller cost of being portfolio (which is $T\lambda$, compared to T). Thus, indifference is restored by a small increase in $\tilde{q}$. As far as $\hat{\tilde{q}}$ is concerned, when q' increases, the improved attractiveness of becoming serial has to be compared to the zero cost of remaining novice (becoming serial costs T, whereas there are no investment costs to keep the existing business). Thus, we need a big increase in $\hat{\tilde{q}}$ to restore indifference.

Finally, the complementarity between s and q in the profit function implies that the higher the entrepreneurial skills, the larger the positive impact of an increase in the quality of the new business on the likelihood to be a habitual entrepreneur, since the new business will constitute a particularly attractive investment opportunity.

Hypotheses

We are now able to formulate the hypotheses that we are going to test in the empirical part of the paper. From our theoretical model, we infer that, *ceteris paribus*

1. Entrepreneurs tend to be novice when the quality of their business is high, and this even if they are low – skilled.
2. Habitual entrepreneurs are generally high – skilled individuals.
    a. They become serial when they are highly skilled and the quality of their first business is low.
    b. Medium to highly - skilled entrepreneurs with averagely good businesses become portfolio.
3. A high quality of the new business increases the likelihood that the entrepreneur becomes habitual, and such a positive impact is larger for portfolio entrepreneurs.
4. The higher the entrepreneurial skills, the larger the positive impact of an increase in the quality of the new business on the likelihood to be a habitual entrepreneur.
5. Finally, a low or averagely-skilled novice entrepreneur facing a low-quality business exits entrepreneurship, while remaining in entrepreneurship with a high-quality business.

Based on the results above, we can formulate the following hypotheses, which we are going to test in our empirical analysis.

From results 1. and 2. we get our first hypothesis.

H1: Novice entrepreneurs with high entrepreneurial skills are more likely to become habitual;

Results 3 and 4 yield our second hypothesis.

H2: A higher quality of the new business is associated to a higher likelihood of being habitual entrepreneurs. The impact of the quality of the new business should be higher for portfolios than for serials.

Particularly, the higher the entrepreneurial skills, the larger the positive impact of an increase in the quality of the new business on the likelihood to be a habitual entrepreneur.

Finally, result 5 yields our third and last hypothesis.

H3: Facing a low-quality business, novice entrepreneurs with low entrepreneurial skills are more likely to exit entrepreneurship.

Data description

We use a novel dataset consisting of a 10-year panel of Vietnamese small and medium-sized private manufacturing enterprises covering the period from 2001 to 2010. The dataset is extracted from five waves of the Danish International Development Agency (DANIDA) surveys (carried out in 2002, 2005, 2007, 2009, and 2011) providing highly detailed information on various characteristics of entrepreneurs and their firms. These surveys stem from the collaboration of different institutions: the Central Institute for Economic Management (CIEM) in Hanoi, the Ministry of Labor, Invalids and Social Affairs of Vietnam, the Department of Economics of the University of Copenhagen and the Royal Embassy of Denmark in Vietnam. In addition to formally registered enterprises, the survey includes also a substantial number of non-registered household/family businesses to gain a comprehensive understanding of firm dynamics in Vietnam, where the informal sector is especially relevant.

All the surveys are based on questionnaires sharing the same structure and many of the same features to ascertain that the way they are implemented is as similar as possible

across years. Further, the 2011 study hinges on the sample collected for the 2009 survey, which in turn was a follow-up of the 2007 one, and so on. This allows us to follow the development of the enterprises involved.

Each survey round provides financial information and economic data for the two most recent years. For instance, the 2011 survey provides information for 2009 and 2010; the 2009 survey does it for 2007 and 2008. Overall, this yields an unbalanced 10-year panel.

The surveyed sample was drawn randomly from the complete list of non-state manufacturing enterprises, based on the Establishment Census and the Industrial Survey 2004-2006 from the General Statistics Office of Vietnam (GSO, 2007). A stratified sampling technique was adopted, to ensure that an adequate number of enterprises with different ownership structures was included for each province. We thus have households, private firms, partnerships / cooperatives, limited liability and joint stock companies (for a comprehensive understanding of the surveys, see Rand and Tarp, 2007).

Our sample consists of 18,850 observations, covering 4,508 entrepreneurs. The dataset contains a wide range of variables on the demographic characteristics of entrepreneurs and on their technological and organizational capabilities, as well as the economic performance of their firms. The sample includes 3,156 novice entrepreneurs (70%), 225 portfolio entrepreneurs (5%), and 1,127 serial entrepreneurs (25%). Most entrepreneurs in our sample own small and medium-sized enterprises. Owners of this kind of firm are likely to be more vulnerable to the challenges from the external environment and they are more likely to fail in their initial start-ups, which reduces the chances that they run more than one business at a time. Moreover, they might find it more difficult to access the capital market. This might explain the relatively small proportion of portfolio entrepreneurs in our sample. Appendix 2 presents some descriptive statistics and statistical tests for the differences among novice, serial and portfolio entrepreneurs in the sample. No statistically significant differences were

found among the three groups of entrepreneurs regarding their main industrial activity. In terms of their geographical location, almost all habitual entrepreneurs are in urban cities with an abundance of business opportunities (Hanoi, Hochiminh City), whereas novice entrepreneurs are somewhat evenly distributed across selected provinces. Table 1 documents firms' survival rate in our sample, to link the five surveys.

As mentioned above, the dataset we are using focuses on firms but it provides information about current entrepreneurs and their past occupational choices. Tracing a firm across different survey waves gives us information about its performance and survival. However, when a firm shuts down or changes ownership, we are not able to tell what happened to the leaving entrepreneur (whether he/she moved to wage employment, started another business or retired). Particularly, we know whether a firm is led by a habitual (i.e., somebody who owned another firm before the current one or owns more than one firm at the same time) or by a novice entrepreneur and assess his/her performance given his/her previous occupational decision. An entrepreneur is marked as 'dead' when he declared in the survey that either the business had been shut down or there had been a change of ownership through a sales or transfer transaction.[10]

[Table 1 about here]

Our data allow us to assess how successful entrepreneurs are in their current business given their past occupational choices: we can tell whether a habitual entrepreneur has a more profitable business than a novice, whether he/she is skilled and whether he runs a business with more technological resources. We are also able to assess how the presence of an habitual entrepreneur affects the likelihood that a firm remains active (i.e., its survival probability).

[10] The surveys were designed in the way that all firms are surely traced over time. Firms exit the surveys for a definite reported reason. This keeps the number of enterprises being lost during the sampling to the minimal. Indeed, given an average annual exit rate of around 10% across the five surveys, only about 20% of these exited firms are reported as 'no specific reason', i.e. the enterprise could not be found or the owner declined to answer the questionnaire.

Econometric Strategy

In this Section, we are going to test the hypotheses laid down in Section 4 empirically. We use two distinct models.

The first model is a multinomial logit studying the determinants of an entrepreneur's choice between habitual and novice entrepreneurship and, given habitual entrepreneurship, what affects the likelihood that an entrepreneur chooses to be either serial or portfolio (the *occupational choice equation*). By means of this first equation, we test hypotheses H1 and H2, that is, we investigate what leads the entrepreneur to become a serial or a portfolio entrepreneur given his entrepreneurial skills (education and experience), the quality of the business (proxied by its technological and organizational capabilities) and its financial conditions. To analyze the interplay of skill and quality we include interaction terms in the model.

The second model is a survival equation. By means of the second equation we investigate what leads a novice entrepreneur to close his business, i.e. to exit entrepreneurship, given his entrepreneurial skills, the quality and the financial conditions of his current business. This equation addresses hypothesis H3 directly. Particularly, looking at the interaction term between entrepreneurial skills and current business quality, we can determine whether a low or averagely-skilled entrepreneur facing a low-quality business exits entrepreneurship, while remaining in entrepreneurship with a high-quality business.

The need to separate the analysis of the choices available to the entrepreneur at time t=1 and therefore to test hypothesis H3 separately stems from the characteristics of our dataset, which traces firms and not entrepreneurs, as explained above. Looking at the questionnaire, we can see whether a firm is run by somebody who owns only that firm and has never owned any other firm before (a novice entrepreneur), whether he previously owned a different firm that he sold or closed before founding or buying the current one (a serial

entrepreneur) or whether he is the current owner of more than one firm (a portfolio entrepreneur). We can also see whether a firm has been dropped from the survey, in which case we mark the entrepreneur that was running it as "dead". In this case, we don't know what has been of that "dead" entrepreneur: whether he/she started a new business or went into paid employment. However, when an entrepreneur leaves entrepreneurship, we know whether he was novice, portfolio or serial before shutting down his/her firm. Similarly, if a business changes ownership between two survey periods, we know which type of entrepreneur (novice, etc.) owned it in both periods. Therefore, the two models we estimate test all the possible occupational decisions for a novice entrepreneur at time t=1 (see Figure 1), covering all our hypotheses.

Methodology

Testing H1 and H2: the occupational choice equation of novice entrepreneurs who remain entrepreneurs

Given that we look at the choice of leaving entrepreneurship with the survival equation, here the occupational outcome y_i for a novice entrepreneur *i*, is one of *three* occupational alternatives (continue to be a novice entrepreneur, become a serial entrepreneur, or become a portfolio entrepreneur). We set $y_i = j$ if the outcome is the *j*th alternative, *j=1, 2,…,3*. The probability that the outcome for entrepreneur *i* is alternative *j*, conditional on his entrepreneurial skills (s_i), on the business quality (q_i) and the initial capital investment (K_i) of his current business is

$$p_{ij} = \Pr(y_i = j) = F_j(s_i\ q_i\ K_i, \theta), \quad j = 1, \dots, 3; i = 1, \dots, N \qquad (2)$$

where different functional forms of $F_j(.)$ correspond to different multinomial models. In line with a great deal of papers addressing similar issues, we apply the multinomial logit model.

Testing H3: the survival equation

We define a variable *time*, measuring the time from the first year in which the entrepreneur is surveyed until "death" (i.e., when entrepreneurs exit entrepreneurship, closing down the business or transferring the ownership to another entrepreneur). Obviously, our 10 - year study is not a time span long enough to observe the death of all the entrepreneurs in the sample; and thus, our data are right censored. The variable *exit* is an indicator of whether *time* refers to business close-down or ownership change (value 1) or end of study (value 0). The survival time *T* may be regarded as a random variable with a probability function *U(t)* and probability density function *u(t)*. The survival function or survival curve *S(t)* is given by:

$$S(t) = P(T \geq t) = 1 - U(t) \quad (3)$$

A further fuction of interest for survival data is the hazard function. This represents the instantaneous failure rate, the probability that an entrepreneur experiences the event of interest (*exit*) at a point of time given that the event has not yet occurred. The hazard function is given by $h(t) = \frac{f(t)}{S(t)}$. Combining it with (3), we have $-\frac{dlog(S(t))}{dt} = h(t)$, so that $S(t) = \exp(-H(t))$, where *H(t)* is the integrated hazard function, or cumulative hazard function.

We deploy three different estimation models:[11] the nonparametric Kaplan-Meier estimator, the semi-parametric Cox proportional hazards regression, and the parametric Weibull model.[12] We use observations on all the 4,508 entrepreneurs in the sample, singling out novice entrepreneurs by means of the dummy variable *Novice* (taking value 1 when the entrepreneur is a novice and 0 otherwise).

[11] Appendix 3 contains a formal description of the three models employed and of their differences.

[12] Given that our duration data are right censored, we cannot analyze them by means of conventional methods such as a linear regression. Survival times tend to have a positively skewed distribution, which violates the normal distribution assumption of the conventional linear regression.

Variables

Independent variables:

Categories of entrepreneurs: A categorical variable presenting different, mutually exclusive occupational choices for an entrepreneur. The variable attains value 0 if the entrepreneur is a novice, 1 if he is a serial entrepreneur and 2 if he is a portfolio. Serial entrepreneurs are those who answered 'yes' to the question "before establishing the present enterprise, did you own any other enterprise?". Portfolio entrepreneurs are those who answered 'yes' to the question "does the owner currently have more than one enterprise?"[13]

Serial entrepreneur / Portfolio entrepreneur: Dummy variables respectively attaining value 1 if the individual is either a serial or a portfolio entrepreneur, and 0 otherwise.

The following two variables enable us to set data as survival time.

The event variable is *exit*, which is a dummy variable that attains value 1 if the entrepreneur leaves entrepreneurship, and 0 otherwise. The entrepreneur exits entrepreneurship in two scenarios: (i) he himself closes his business (for instance, because of bankruptcy) or (ii) he sells his business, so a change of ownership is reported. The duration variable is *time*, presenting the duration in years from the starting year of the sample, 2000, (if the entrepreneur started up or obtained this current business before 2000) or the year that the entrepreneur was surveyed for the first time (if he/she entered the current business after 2000) until he/she closed it down or transferred ownership (if that is the case during our observation period).

Explanatory variables:

Based on the model presented above, we introduce three groups of explanatory variables: (1) entrepreneurial skills s_{it}, proxied by human capital characteristics (education, experience as an employee, experience as a manager, industry experience); (2) the quality of

[13] These multiple enterprises could be either in the same or different industries. Thus, portfolio entrepreneurs are those running at least two different businesses at the same time, whatever their sector.

the firm q_{it}, proxied by its technological and organizational capabilities (innovation intensity, the share of technical employees, and the share of employees with managerial knowledge and expertise over total labor); (3) total initial capital K_{it} in each year, proxied by the logarithm of the total assets of the firm.

Group 1: Human capital is here proxied by education and by three types of experience of the entrepreneur. The variable *education* is measured by the number of schooling years for each entrepreneur. *Industry experience* is a dummy taking value 1 if the entrepreneurs have pre-existing knowledge of buyers and suppliers. *Managerial experience* and *labor force experience* (i.e., having previously worked as an employee) are two dummies attaining value 1 if the entrepreneur holds the corresponding experience.

Human capital is assumed to be one of the main drivers of successful entrepreneurship, increasing the owners' capacity to pursue generic entrepreneurial tasks and to discover and exploit business opportunities (Shane and Venkataraman, 2000). Start-up entrepreneurs with a greater endowment of human capital should be more efficient in running their business than those with less human capital (Santarelli and Tran, 2013). Thus, human capital is a proxy for entrepreneurial skills. Among human capital components, education, as prior knowledge, increases a person's stock of information and skills useful for the pursuit of an entrepreneurial opportunity, improves entrepreneurial judgement (Shane, 2000), enhances entrepreneurial alertness (Westhead et al., 2005), and boosts up entrepreneurial performance (Van der Sluis et al., 2003). Industry experience has been found to have a strong effect: entrepreneurs are more likely to be successful if they have pre-existing knowledge of buyers and suppliers, and understand operational issues in their industry (Bosma et al., 2004). Since entrepreneurship plays a core organizing function, managerial experience can be transformed into entrepreneurial skills to improve entrepreneurial performance (Van Praag, 2005). Finally, we also consider labor force experience.

Group 2: Technological and organizational capabilities enable firms to develop new products and processes and to absorb knowledge from outside more effectively (Cohen and Levinthal, 1990). They are proxied by three variables. First, *innovation intensity*, measured as the ratio of the investment on innovation activities and the total annual revenue of the firm. We allow for a non-linear relationship by including its squared value in the regression. Second, the *share of technical employees in the total labor force* of the firm, which reflects the internal technological capacity and the skills endowment that help firms to absorb incoming spillovers and protect their knowledge from various appropriation mechanisms (Garcia-Quevedo et al., 2014). Third, the *share of managerial employees who possess managerial knowledge and expertise that facilitates organizational change*, thus allowing the firm to respond to dynamic and competitive challenges.

Group 3: The initial financial situation of the entrepreneur determines the likelihood to face capital constraints, and thus shape his subsequent entrepreneurial performance (Dawson et al., 2014).[14] Three variables will be adopted to reflect the initial capital investment of the entrepreneur: (i) *firm size* is the economic size of the firm, i.e. the logarithm of the total assets of the firm. A quadratic term is also added to establish a non-linear relationship between financial investment and entrepreneurial performance; (ii) the *debt ratio* of the firm (ratio of total debts to total assets), to isolate the effect of a firm's leverage capacity on its performance;[15] (iii) *land ownership:* a dummy taking value 1 if the entrepreneur owns the land housing the firm's main production facility.

In the survival equation, we also use the dummies *habitual entrepreneurs*, taking value 1 when the entrepreneur is either serial or portfolio, and *novice*, taking value 1 when the entrepreneur is a novice.

[14] An entrepreneur with personal saving covering total investment does not need to acquire external loans that may put his business at sustainability risk.

[15] While Opler and Titman (1994) find that highly leveraged firms lose a substantial market value and impose greater risks to owners and creditors than their more conservatively financed competitors. Teece (1982) finds that debts reduce the chances of bankruptcy through flexible asset deployment.

Control variables:

Besides *age*, *gender* and *tenure*[16] of the entrepreneur, we include *firm age*, the age of the current firm. We then isolate the ownership type of the current firm, creating dummies *private firms, partnership/cooperatives, limited liability* (all taking value 1 when the firm takes the corresponding ownership type and 0 otherwise). Finally, a dummy is added to take any divergence or mismatch arising from different surveys into account. Appendix 3 presents the descriptive summary statistics and pair-wise correlation matrix of all the adopted variables.

Estimation results

The occupational choice equation

Table 2 presents the results of the maximum likelihood estimation of the multinomial occupational choice model when remaining a novice entrepreneur is used as the base category. Regressors are jointly statistically significant at the 0.01 level across the two models we estimate. Particularly, the second model (presented in the last two columns) includes the interaction term between managerial experience and the share of managerial employees, and that between industry experience and the share of technical employees in the firm labor force.

In general, entrepreneurial skills have a significant effect on the propensity to engage in habitual entrepreneurship. Education, industry experience, and managerial experience all increase the propensity of an occupational transition to habitual entrepreneurship and this effect is consistent for both serial and portfolio entrepreneurs, who are endowed with stronger human capital than their novice counterparts. They are more likely to spend longer years in education, possess richer experience from the industry and have previously worked as

[16] Duration, in terms of number of years, of the period that an individual stays in the current business or in entrepreneurship.

managers.[17] For example, if the entrepreneur were to increase his schooling years by one year, the multinomial log-odds for serial entrepreneurs relative to novice would increase by 0.052 units, while holding all other variables in the model constant, whereas those for portfolio relative to novice would increase by 0.084 units.[18] This pool of formal and tacit knowledge enables them to seize business opportunities timely and efficiently through either re-establishing a new venture after temporarily exiting entrepreneurship (serial) or diversifying into a new (possibly related) business (portfolio) (Stam et al., 2006; Spulber, 2012; Santarelli and Tran, 2013; Santarelli and Tran, 2016). This supports hypothesis H1, according to which n*ovice entrepreneurs with high entrepreneurial skills are more likely to become habitual*. However, labor force experience from previously working as an employee has a negative impact on the entrepreneurs' motivation to take further entrepreneurial risks rebuilding a failed business or expanding their current one. For them, the opportunity cost of restarting or expanding their business is significantly higher than staying still or returning to paid employment; and thus employee experience may stimulate entrepreneurs to shut down their business to enter the labor market if the quality of their business is not up to their expectation (Hyytinen and Ilmakunnas, 2007).

With respect to the effect of organizational quality on the likelihood of engaging in habitual entrepreneurship, the impact of innovation intensity is not statistically significant. Technological resources (proxied by the share of technical employees in the total firm labor force) play an essential role for both serial and portfolio entrepreneurs. A possible explanation is that technical employees increase the firm's external absorptive capacity as well as its internal knowledge base, which is crucial for portfolio entrepreneurs to better adapt to changing conditions and to absorb knowledge spillovers in old or new industries /

[17] The two-tailed t-test for the comparison of mean 'education', mean 'industry experience', and mean 'managerial experience' between novice and habitual entrepreneurs significantly rejects the equality and supports the superiority of these characteristics for habitual entrepreneurs. Results are reported in Appendix 2.
[18] These findings are consistent with those by Parker and van Praag (2012).

businesses. Similarly, technological resources are crucial also for serial entrepreneurs, to sustain and expand their current business. Moreover, technical knowledge and expertise are crucial for both serial and portfolio entrepreneurs to propel technological and organizational changes resulting in either resolving the current business to launch a new venture or expanding a new business. The share of managerial employees exerts opposite influences on serial and portfolio entrepreneurship: an increase in managerial employees has a positive impact on portfolio entrepreneurship and a negative impact on serial entrepreneurship. This supports the conclusions of our model, that predicts that an increase in the quality of the new business impacts the likelihood of being a portfolio entrepreneur more than the likelihood of becoming a serial. Three out of three proxies for entrepreneurial skill exert a positive impact on the likelihood to be portfolio, whereas only two exert a positive impact and one a negative impact on the likelihood to be serial. Thus, the first part of hypothesis H2, stating that *a higher quality of the new business is associated to a higher likelihood of being habitual, with a stronger effect on portfolios*, is verified.

The interaction between entrepreneurial skills and business quality tells us some interesting results. First, although the share of managerial employees seems to have a negative impact on the likelihood to become a serial entrepreneur, the significant and positive interaction of managerial experience and share of managerial employees in the third column indicates that the impact of previous managerial experience is higher the larger the share of managerial employees for serial entrepreneurs. This interaction is insignificantly associated with portfolio entrepreneurship. Thus, possessing own managerial skills and rich managerial resources strengthen novice entrepreneurs' motivation to relaunch their business. Second, the interaction between industry experience and the share of technical employees is positive and statistically significant for both serial and portfolio entrepreneurship. Thus, entrepreneurial motivation to either reboot or expand business will be enhanced by a relevant combination of

industry experience of the entrepreneur combined with industry-specific technological resources of the firm. These two findings support the second part of hypothesis H2, proposing that *high entrepreneurial skills and high business quality are positively associated with the likelihood of being a habitual entrepreneur.*

Regarding the impact of investment capital *K*, we consistently find a positive but almost zero effect on the probability to be habitual. Land ownership has a negative effect on the likelihood of being serial and a positive effect on the likelihood of being portfolio. Owning the land housing the main production facility would deter the motivation to re-launch a new venture to reap short-term profit opportunities, since owners can rent out the land they own to substitute for their entrepreneurial income. However, land ownership is favourable to business expansion for portfolio entrepreneurs. They can easily exploit different entrepreneurial opportunities on the land they own without any concerns for the rent or leasing-related risks. The statistically significant parameters of the debt ratio in the portfolio equations indicate that indebted entrepreneurs are more likely to become portfolio since they can use their leverage conditions to undertake other profitable but risky investments.

With respect to the control variables, while the current firm of serial entrepreneurs is larger in terms of the size of firm labor force than the one of novice counterparts, portfolio entrepreneurs have relatively smaller-sized firms, possibly because they own and run multiple businesses. The effect of firm size is however non-linear. There is a consistent finding that younger firms and younger entrepreneurs are less likely to be habitual (but the effect is insignificant for serial entrepreneurs). Male entrepreneurs are more likely to take risks in expanding the current business (and thus become portfolio entrepreneurs), whereas female are more flexible and adaptive in learning from past failures to relaunch a new business (and thus become serial entrepreneurs). As expected, serial entrepreneurs tend to have shorter tenure and portfolio ones have longer tenure in running their current business. Finally,

businesses of serial entrepreneurs are more likely to take the form of private or limited liability ownership type, portfolio ones seem not favour any specific ownership type.

[Table 2 about here]

The survival equation

Figure 3 presents different graphs for the nonparametric estimation of the survival of the entrepreneurs in the sample. Figure 3.a: as time goes by, entrepreneurs are more likely to exit entrepreneurship. The exit rate of entrepreneurs increases sharply for the first 4 years in business, then it is steadily flat around 4 years before falling sharply after 4 years. In other words, after 4 years remaining in their business, entrepreneurs are significantly less likely to close down their business. The Nelson-Aalen estimator serves to obtain the cumulative hazard function by summing up the values of the hazard functions over time (Figure 3.b). The Kaplan-Meier survival curve (Figure 3.c) presents the survival duration of the sample. It starts from 1 because we have full sample of entrepreneurs at the beginning. Over time they gradually exit entrepreneurship, and thus the curve is moving downwards. There are around 75% entrepreneurs who are still in business after 2.5 years. After 6 years of observation, the figure reduces to only 25%. Figure 3.d presents survival curves for novice, serial and portfolio entrepreneurs separately. Test of equality of survival functions among the 3 groups of entrepreneurs rejects the null hypothesis of equality at 1% significant level[19]. The survival estimates of novice and serial entrepreneurs are quite similar over time, slightly longer for serial ones; but portfolio entrepreneurs remain in business much longer than their counterparts. Nearly 75% portfolio entrepreneurs still survive after 6 years in observation.

Table 3 presents the semiparametric Cox and parametric Weibull estimation results of the survival equation in two specifications: survival duration and hazard rate. Results, in general are quite consistent across the estimation models.

[19] chi2(2) = 165.14; Pr>chi2 = 0.0000

[Figure 3 about here]

First, *ceteris paribus* habitual entrepreneurs remain in business longer than novice ones. Regarding entrepreneurial skills, while the length of education is significantly and negatively associated with the entrepreneur's propensity to exit entrepreneurship, which is consistent with previous empirical findings (see Santarelli and Tran, 2013), industry experience and management experience are surprisingly found to stimulate entrepreneurs to exit entrepreneurship sooner than their unexperienced peers. Particularly, from the Weibull model, entrepreneurs who have industry experience will be about 60% higher in hazard rate, or those with managerial experience will have 28% higher hazard rate.

To test hypothesis H3, we consider the two three-way interactions among entrepreneurial skills (industry or managerial experience), firm-level business quality (technological or managerial resources) and the likelihood of being novice entrepreneurs. The statistically significant and negative parameters of both interactions indicate that, *ceteris paribus*, novice entrepreneurs have a stronger motivation to remain in their business if they have both high entrepreneurial skills (managerial or industry experience) and high business quality (larger technological or managerial resources). Their exit rate is around 45% lower. Therefore, although industry and managerial experience enable novice entrepreneurs to be more alert to other business opportunities, they will not abandon their current businesses if they are possessing high quality resources. In other words, *facing a low-quality business, novice entrepreneurs having low entrepreneurial skills are more likely to exit entrepreneurship*, which is exactly our hypothesis H3.

There are other interesting results that we can derive from our survival analysis. The technological quality of the firm, proxied by innovation intensity and by the share of technical employees, plays a negative role in sustaining its survival. The hazard rate increases about 15% for those entrepreneurs having larger technological resources (Weibull model).

Although these capabilities enable entrepreneurs to be responsive to dynamic changes in the market and thus transform their entrepreneurial efforts into observable material outcomes, they are quite costly and challenging to develop and manage, especially for inexperienced novice entrepreneurs. Santarelli and Tran (2016) find out that young, innovative firms are less profitable and even more vulnerable to bankruptcy than mature innovative firms if they invest too heavily in innovation activities. Thus, at the earlier stage of firm start-up process and entrepreneurial learning curve, increasing technical resources fails to stimulate the survival of novice entrepreneurs' businesses. Nevertheless, managerial resources do help entrepreneurs lengthen their survival duration.

Other noteworthy findings include a consistent, negative and nonlinear effect of capital investment on firm exit (although not economically strong). Other things kept constant, more initial investment capital leads to higher survival propensity; but once an optimal level of investment capital is reached, a further increase in investment does not lead to the proportional increase in entrepreneurial survival.

[Table 3 about here]

Second, heavily indebted entrepreneurs have a lower propensity of survival. And finally, smaller and younger firms are found to be more vulnerable to bankruptcy; and older entrepreneurs can survive longer.[20]

[20] We have also performed two robustness checks: one for the occupational choice equation and one for the survival equation. In the first one we have tried to separate the effects of different skills: education and managerial experience. We have distinguished serial entrepreneurs between those who launched a new business after closing their previous one and those who acquired an existing one. Literature (Parker and Van Praag, 2010) claimed that the first ones require education, whereas the second require managerial experience. We have then excluded those who acquired an existing enterprise and rerun the multinomial logit regression. In the second robustness check, we sort entrepreneurs according to their exit modality: some went bankrupt and some others sold their enterprise. While bankruptcy is typically attributed to skill and financial resources (or lack thereof), ownership transfer may not. We exclude those who sold their firm from the sample and rerun the survival analysis. The results of the two robustness checks (available upon request), are consistent with our main results in section 7.

Conclusions

In this paper, we studied why some people become serial or portfolio while others remain novice entrepreneurs, or even exit entrepreneurship to return to the labor market. We propose a model wherein a novice entrepreneur faces the possibility to keep his/her current business, to shut it down to return to the labor market, to launch a new venture and even to carry the option to manage multiple businesses simultaneously. In equilibrium, an entrepreneur maintains his/her business if it is sufficiently profitable, and this even if he/she is low – skilled. High – skilled individuals tend to become habitual entrepreneurs, unless their first business is very profitable. They become serial when they are highly skilled and the quality of their first business is low, whereas medium to highly - skilled entrepreneurs with averagely good businesses become portfolio. We have also analyzed the link between skill and the quality of the new business of a habitual entrepreneur. We prove that a high quality of the new business increases the likelihood that the entrepreneur becomes habitual, and that such a positive impact is larger for portfolio entrepreneurs. Moreover, due to the complementarity between skills and firm quality in the profit function, the higher the entrepreneurial skills are, the larger is the positive impact of an increase in the quality of the new business on the likelihood to be a habitual entrepreneur. Finally, a low or averagely-skilled novice entrepreneur facing a low-quality business closes down his/her business to enter the labor market.

We test the relevance of the model using a rich dataset from Vietnam, obtaining some noteworthy findings that support our model propositions. First, there is a significant effect of entrepreneurial skill, proxied by education, industry experience, and managerial experience in increasing the propensity of occupational transition to habitual entrepreneurship. In addition, both serial and portfolio entrepreneurs are endowed with stronger human capital than their novice counterparts. We also find that an increase in the

quality of the new business increases the likelihood that it is a habitual entrepreneur that runs them, with a stronger incidence on portfolio entrepreneurs.

Second, the interaction between entrepreneurial skills and business quality supports our theory that high skills and business quality are generally associated to a habitual entrepreneur. Third, low-skilled novice entrepreneurs having a low-quality business will likely exit entrepreneurship to find other employment opportunities. Conversely, novice entrepreneurs have a stronger motivation to remain in their business if they have both high entrepreneurial skills and rich technical and managerial resources.

Our empirical analysis unveils other interesting results. While the businesses of both serial and portfolio entrepreneurs are endowed with significant technological resources, only portfolio entrepreneurs are more motivated to invest heavily in managerial resources for greater adaptability and to absorb knowledge spillovers in new industries / businesses. Furthermore, regarding the impact of investment capital, we consistently find that habitual entrepreneurs are more likely to reside in more capital-intensive businesses. Land ownership and leveraging debts are favourable to business expansion activities of portfolio entrepreneurs only. Other factors, like human capital, experience and technology, significantly affect entrepreneurial performance in a manner consistent with previous empirical findings for Vietnam (see Santarelli and Tran, 2013).

Serial entrepreneurship entails entrepreneurs bouncing back from business failure. Vietnam is characterized by a dynamic market economy with numerous entrepreneurial opportunities; and thus, ‘failed entrepreneurs’ always have chances to return and try their luck. We have not separated serial entrepreneurship with different restart-up motivations in our model: learning from failure, experimenting with luck, or truly exploiting a newly-recognized opportunity. This will be a promising field for future research.

Moreover, the availability of Vietnamese data allows us to extend the study of entrepreneurship and occupational choices. Vietnam can be considered as a post-transition country since it abandoned central planning in 1986, joined the Association of Southeast Asian Nations in 1995, liberalized trade with the United States in 2001 and became a member of the World Trade Organization in 2007. In the country's transformation from a planned into a capitalist economy, a class of young and dynamic business owners in the private sector with strong entrepreneurial spirit started to play an important role in boosting economic growth. The analysis of a Vietnamese dataset therefore may shed light on both the occupational choices of such a varied and changing group of entrepreneurs and on the entrepreneurial strategies adopted in transition and post-transition economies. In fact, despite the prevalence of habitual entrepreneurship as an engine for fast-growing companies and 'therefore of key economic importance' (Storey, 1994: 112), the factors determining behaviors and roles of habitual entrepreneurs in developing and transition countries which have been considered a fertile repository of entrepreneurial activities (cf. Santarelli and Tran, 2013) are still little understood and explored.

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Appendix 1: Proof of Proposition 1

Decision at time t=1:

We start from the conjecture that an individual with very low entrepreneurial skill will never choose to become an entrepreneur at time t=0 and will enter the labor market. We define a threshold $\underline{s}$, such that only individuals with $s > \underline{s}$ choose to become entrepreneurs and reach t=1 in our decision tree in Figure 1.

The following analysis is conducted assuming that all novice entrepreneurs at time t=1 have skill $s > \underline{s}$. The threshold $\underline{s}$ will be derived below, when the decision at time t=0 is examined.

We now examine the novice entrepreneur's decision at t=1.

Assume first that an entrepreneur never shuts down his business to enter the labor market. Then, the entrepreneur has three options: (i) keep his current business; (ii) shut down his business to become a serial entrepreneur; (iii) open a new venture besides his current one, becoming a portfolio entrepreneur.

If the entrepreneur decides to keep his original business in operation, the present value of doing so is $V_c(q, s, K)$. This can be rewritten as follows, recalling the definition of profits in Section 3 above:

$$V_c(q, s, K) = qs^{1+\alpha}K + \beta V_c[q, s, (1-\delta)K] = qs^{1+\alpha}K + \beta(1-\delta)V_c(q, s, K) \qquad \text{(A1)}$$

The second equality in expression (1) derives from the recursive nature of $V_c(q, s, K)$, so that $V_c(q, s, (1-\delta)K) = (1-\delta)V_c(q, s, K)$ Thus we have

$$V_c(q, s, K) = \frac{qs^{1+\alpha}K}{1-\beta(1-\delta)} \qquad \text{(A2)}$$

which is strictly increasing in *q*, *s* and *K*.

Let $V_s(q, s, K)$ denote the present value of shutting down the business to set up a new venture (being a serial entrepreneur):

$$\begin{aligned} V_s(q', s, K) &= qs^{1+\alpha}K + \beta E[V(q', s, (1-T)(1-\delta)K)] \\ &= qs^{1+\alpha}K + \beta(1-T)(1-\delta)E[V(q', s, K)] \qquad \text{(A3)} \end{aligned}$$

Let $V_p(q,s,K)$ denote the present value of maintaining (part of) the current business and launching also a new venture (being a portfolio entrepreneur):

$$V_p(q',s,K) = qs^{1+\alpha}K + \beta E[V_c(q,s,\lambda(1-\delta)K) + V_s(q',s,(1-\lambda)(1-\delta)(1-T\lambda)K)] =$$

$$= qs^{1+\alpha}K + \beta\lambda(1-\delta)E[V_c(q,s,K)] + \beta(1-\lambda)(1-\delta)(1-T\lambda)E[V_s(q',s,K)] \quad \text{(A4)}$$

We know from Plehn-Dujowich (2010) that an entrepreneur with skill *s* is indifferent between maintaining the business in operation versus shutting down the business to set up a new venture if $q = \hat{q}$, where $\hat{q}$ is unique and is defined as follows:

$$(1-\delta)V_c(\hat{q},s,K) \equiv E[V_s(q',s,(1-T)(1-\delta)K)] \qquad \text{(A5)}$$

so that, using (A2)

$$\hat{q} = \frac{[1-\beta(1-\delta)](1-T)E[V_s(q',s,K)]}{s^{1+\alpha}K} \qquad \text{(A6)}$$

Similarly, an individual is indifferent between maintaining his business and investing part of his capital in a new venture, thus becoming a portfolio entrepreneur if

$$(1-\delta)V_c(\hat{\hat{q}},s,K) \equiv (1-\lambda)(1-\delta)E[V_c(\hat{\hat{q}},s,K)] + \lambda(1-\delta)(1-T\lambda)E[V_s(q',s,K)] \qquad \text{(A7)}$$

Using (A2),

$$\hat{\hat{q}} = \frac{[1-\beta(1-\delta)](1-T\lambda)E[V_s(q',s,K)]}{s^{1+\alpha}K} \qquad \text{(A8)}$$

Given that $\lambda \in (0,1)$, it is immediate to check that $\hat{\hat{q}} > \hat{q}$.

The thresholds above were obtained comparing the various opportunities for the entrepreneur with the payoff from keeping his current business. However, a relevant threshold is the quality level *q* that renders the entrepreneur indifferent between becoming serial and portfolio. By definition, this occurs when, upon learning *q*,

$$(1-T)(1-\delta)E[V_s(q',s,K)]$$

$$\equiv (1-\lambda)(1-\delta)E[V_c(\tilde{q},s,K)] + \lambda(1-\delta)(1-T\lambda)E[V_s(q',s,K)] \qquad \text{(A9)}$$

which can be rewritten as

$$[1 - T(1 + \lambda)]E[V_s(q', s, K)] = E[V_c(\tilde{q}, s, K)] \qquad \text{(A10)}$$

Notice that, when $\lambda > \frac{1-T}{T}$, then $1 - T(1 + \lambda) < 0$, which implies that it is always preferable for an entrepreneur to become serial. That is because the size λ of the investment in the new business is too large relative to the startup cost *T* and the entrepreneur always chooses to be serial, for every $q \in (0, \hat{\hat{q}})$. Given that we are interested in a case where both portfolio and serial entrepreneurship are viable options, we assume that $\lambda < \frac{1-T}{T}$.

Then, from (A10), portfolio and serial yield the same expected profit if

$$E[V_c(\tilde{q}, s, K)] = mE[V_s(q', s, K)] \qquad \text{(A11)}$$

where $m = 1 - T(1 + \lambda)$. Then, again using (A2), we obtain

$$\tilde{q} \equiv \frac{[1-\beta(1-\delta)]mE[V_s(q', s, K)]}{s^{1+\alpha_K}} \qquad \text{(A12)}$$

It can be checked immediately that $\tilde{q} < \hat{q}$, since *m < 1 – T*. Thus, for given skill *s*, if $q \in (0, \tilde{q})$, upon learning the quality of his business, the entrepreneur becomes serial; if $q \in [\tilde{q}, \hat{\hat{q}})$, the entrepreneur becomes portfolio; if $q \in [\hat{\hat{q}}, \infty)$, the entrepreneur keeps his current business.

It can also be checked that both $\hat{\hat{q}}$ and $\tilde{q}$ are increasing in q', the quality of the new prospective business. In fact, $\frac{\partial \hat{\hat{q}}}{\partial q'} = \frac{[1-\beta(1-\delta)](1-T\lambda)}{s^{1+\alpha_K}} E[\frac{\partial}{\partial q'} V_s(q', s, K)]$ and $\frac{\partial \tilde{q}}{\partial q'} \equiv \frac{[1-\beta(1-\delta)]m}{s^{1+\alpha_K}} E[\frac{\partial}{\partial q'} V_s(q', s, K)]$. Moreover, $\frac{\partial \hat{\hat{q}}}{\partial q'} > \frac{\partial \tilde{q}}{\partial q'}$, since $1 - T\lambda > m$. Then, an increase in q' increases the likelihood that the entrepreneur chooses to become either portfolio or serial, since the increase in $\hat{\hat{q}}$ reduces the range of possible values of *q*, the quality of the current business, that induce the entrepreneur to remain novice. Furthermore, the fact that $\tilde{q}$ increases less than $\hat{\hat{q}}$ implies that the range of the values of q that lead to portfolio entrepreneurship becomes bigger, making portfolio entrepreneurship more likely. Thus, an increase in q'

increases the probability that the novice becomes portfolio more than that the novice becomes serial.

We are now able to compute the expected value of the entrepreneur. Given the thresholds above, ex-ante, such expected value is

$$E[V(q',s,K)] = \int_0^{\tilde{q}} V_s(q',s,K)dF(q) + \int_{\tilde{q}}^{\hat{\hat{q}}} V_p(q',s,K)dF(q) + \int_{\hat{\hat{q}}}^{\infty} V_c(q,s,K)dF(q) \quad \text{(A13)}$$

Combining (A3), (A4) to compute $E[V(q',s,K)]$ in (A13) and using (A2) we obtain the thresholds $\tilde{q}$ and $\hat{\hat{q}}$, implicitly solving the following system of two equations in two unknowns:

$$\begin{cases} \dfrac{\tilde{q}}{m} = E(q) - \beta(1-\delta)\displaystyle\int_0^{\hat{\hat{q}}} qdF(q) + \beta(1-\delta)\frac{1-T}{1-\lambda T}\int_0^{\tilde{q}} \hat{\hat{q}}dF(q) + \beta(1-\delta)\int_{\tilde{q}}^{\hat{\hat{q}}} \hat{\hat{q}}dF(q) \\ \dfrac{\hat{\hat{q}}}{1-\lambda T} = E(q) - \beta(1-\delta)\displaystyle\int_0^{\hat{\hat{q}}} qdF(q) + \beta(1-\delta)\frac{1-T}{1-\lambda T}\int_0^{\tilde{q}} \hat{\hat{q}}dF(q) + \beta(1-\delta)\int_{\tilde{q}}^{\hat{\hat{q}}} \hat{\hat{q}}dF(q) \end{cases} \quad \text{(A14)}$$

Neither $\tilde{q}$ nor $\hat{\hat{q}}$ depend on *s*.

So far, we assumed that the entrepreneur never shuts down the firm to enter the labor market. For this to be optimal, it must be that the payoff from not shutting down upon learning *q* is higher than the earnings in the labor market.

If an individual chooses paid employment, his/her lifetime earnings are equal to *ws*, where *w* is the exogenous wage. Then, the elasticity of lifetime earning with respect to skill *s* is equal to 1, which is lower than the elasticity of profits with respect to *s*, equal to $1 + \alpha$.

After the first period, if the entrepreneur does not leave to enter the labor market, he can shut down his current business to become serial, he can open a new firm besides his existing one, becoming portfolio, or he can keep his business. To study under which conditions entering the labor market is not optimal we need to consider the three cases separately.

The value from becoming a serial entrepreneur after one period, upon learning the quality of the current business, is $(1-\delta)(1-T)E[V(q',s,K)]$. From the definition of the threshold $\tilde{q}$, which does not depend on skill *s*, we know that

$$E[V(q',s,K)] = \frac{\tilde{q}s^{1+\alpha}K}{(1-\beta(1-\delta))m} \qquad \text{(A15)}$$

which is increasing in *s* and grows faster than *ws*, since $\alpha > 0$.[21] Hence, there is a unique value $\tilde{s}$, such that $(1-\delta)(1-T)E[V(q',s,K)] \geq ws$ when $s \geq \tilde{s}$. The threshold $\tilde{s}$ can be obtained from (A15) and is equal to

$$\tilde{s} = \left[\frac{(1-\beta(1-\delta))mw}{(1-\delta)(1-T)\tilde{q}K}\right]^{\frac{1}{\alpha}} \qquad \text{(A16)}$$

Similarly, the value from becoming a portfolio entrepreneur after one period is $(1-\delta)(1-T\lambda)E[V(q',s,K)]$, which is greater than *ws* for $s \geq \tilde{\tilde{s}}$, where $\tilde{\tilde{s}}$ is equal to

$$\tilde{\tilde{s}} = \left[\frac{(1-\beta(1-\delta))mw}{(1-\delta)(1-T\lambda)\tilde{q}K}\right]^{\frac{1}{\alpha}} \qquad \text{(A17)}$$

It is immediate to see that $\tilde{\tilde{s}} < \tilde{s}$. Thus, entrepreneurs with $s > \tilde{s}$ are highly skilled: upon learning the quality of their current enterprise they become serial entrepreneurs if the quality of the business is below $\tilde{q}$, they become portfolio entrepreneurs if $q \in [\tilde{q}, \hat{\tilde{q}}]$ and keep their current business if $q > \hat{\tilde{q}}$. Entrepreneurs with $s > \tilde{\tilde{s}}$ do not have enough skill to become serial entrepreneurs, leaving their current business to start from scratch all over again. However, they may be able to start a new firm besides their current one. Such operation is less costly than starting a completely new business ($T\lambda$ as compared to *T*) and therefore less skill *s* is required to make it profitable enough to outperform the labor market.

Finally, if $s \in [\underline{s}, \tilde{\tilde{s}})$, the individual is not sufficiently skilled to become either serial or portfolio but has enough skill to become an entrepreneur. Thus, he chooses between keeping the current business or shutting down to enter the labor market. If, upon learning the quality

[21] Notice that it is indifferent to obtain $E[V(q',s,K)]$ from (A12) or from (A8). In fact, from (A14), $\frac{\tilde{q}}{m} = \frac{\hat{\tilde{q}}}{1-\lambda T}$.

q, he decides to keep his business, his expected value is $V_C(q, s, (1-\delta)K)$. Then, he continues if $V_C(q, s, (1-\delta)K) \geq ws$, that is if $q \geq \bar{q}(s) = \frac{[1-\beta(1-\delta)]w}{(1-\delta)s^{\alpha}K}$, which is decreasing in s and, at $\tilde{\tilde{s}}$, $\bar{q}(\tilde{\tilde{s}}) = \hat{\hat{q}}$. In this case, if the quality of his current business turns out to be low ($q < \bar{q}(s)$), the entrepreneur shuts down his current business to enter the labor market.

Decision to become an entrepreneur at t=0:

Consider now an individual who must decide whether to enter the labor market or to become a novice entrepreneur, launching his first business. While his expected value on the labor market is ws, his expected value as entrepreneur is $E[V(q', s, K)]$, as given in (A13). Given the assumption of no initial (fixed) entry costs, the individual optimally decides to become an entrepreneur if $E[V(q', s, K)] \geq ws$, that is, using (A15), if $s \geq \underline{s} = \left[\frac{[1-\beta(1-\delta)]mw}{\tilde{q}K}\right]^{\frac{1}{\alpha}}$, where $\underline{s} < \tilde{\tilde{s}}$. Thus, if $s \in [0, \underline{s})$, the individual enters the labor market directly, never investing in a business.

Appendix 2: One-way ANOVA test and tabulation for the differences between the three types of entrepreneurs: novice, serial and portfolio.

[Table A2.a about here]

[Table A2.b about here]

[Table A2.c about here]

[Table A2.d about here]

From Table A2.d, the mean of age, firm age and ROS differs significantly among the three types of entrepreneurs. However, we do not know if the difference is between only two or all three types. Novice entrepreneurs are generally younger, running younger firms and are less

profitable than their serial and portfolio counterparts, while portfolio entrepreneurs have the most mature and profitable business. Male entrepreneurs approximately account for 70% of all serial and portfolio entrepreneurs, whereas the proportion of male novice entrepreneurs is up to 75%.

[Table A3.e about here]

Regarding the legal ownership types among different types of entrepreneurs, Table A3.e shows that household ownership type accounts for nearly three quarters of all types. Compared to novice and portfolio counterparts, serial entrepreneurs adopt more the private and limited liability type. Joint stock type is more common for portfolio entrepreneurs given its benefits in product-market diversification activities. Finally, partnership type is preferable to novice entrepreneurs.

Appendix 3: The survival equation. A formal analysis

In this paper, we use three different estimation models: the nonparametric Kaplan-Meier estimator, the semi-parametric Cox proportional hazards regression, and the parametric Weibull model.

The *Kaplan-Meier estimator* is a nonparametric estimator of the survival function *S(t)*. If all the failure times are ordered and labeled $t_{(j)}$ such that $t_{(1)} \leq t_{(2)} \ldots \leq t_{(n)}$, the estimator is given by $\hat{S}(t) = \prod_{j|t_{(j)} \leq t}(1 - \frac{d_j}{n_j})$, where d_j is the number of entrepreneurs who exit at time $t_{(j)}$, and $n_j$is the number of entrepreneurs who are still in the business at the time and are therefore still "at risk" of experiencing *exit*.

The *Cox hazard function* for entrepreneur *i* is $h_i(t) = h_0(t)\exp(s_i\ q_i\ K_i, \theta)$, where $h_0(t)$ is the baseline hazard function when all covariates are zero. The parameters θ are estimated by maximizing the partial log likelihood given by $\sum_f \log(\frac{\exp(s_i\ q_i\ K_i, \theta)}{\sum_{i \in r(f)} \exp(s_i\ q_i\ K_i, \theta)})$,

where the first summation is over all failures exit *f*, and the second summation is over all entrepreneurs *r(f)* who are still at risk at the time of failure.

The *Weibull model* assumes the Weibull distribution for *T* with parameters λ and *p*, denoted $T \sim W(\lambda, p)$, if $T^p \sim E(\lambda)$. The cumulative hazard is $H(t) = (\lambda t)^p$, the survivor function $S(t) = \exp(-(\lambda t)^p)$, and the hazard is $\lambda(t) = \lambda^p p t^{p-1}$. Both semi-parametric and parametric survival model are estimated by maximum likelihood estimation technique.

Appendix 4: **Summary statistics and matrix of correlation**

[Table A4 about here]

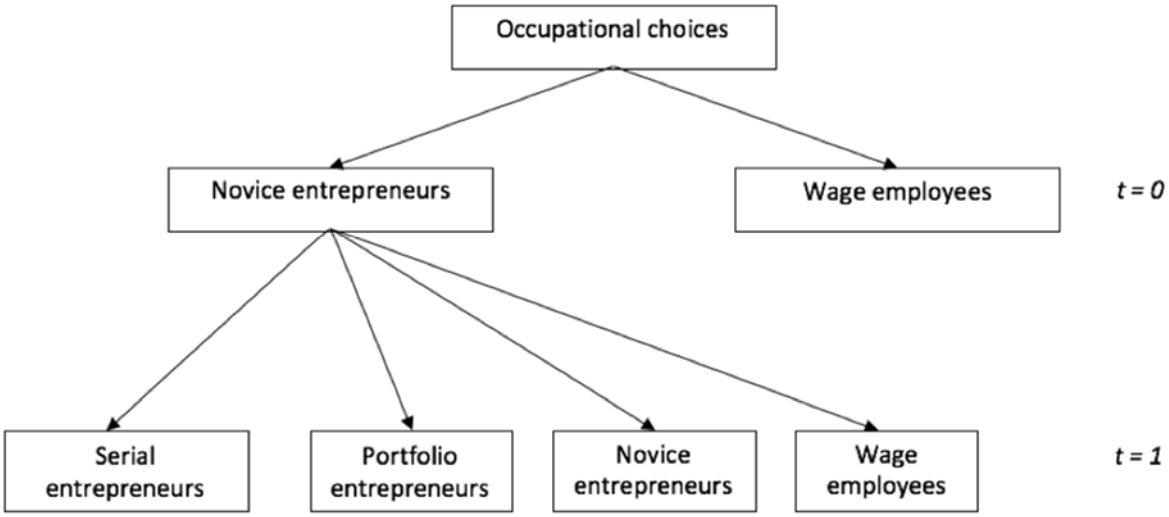


Figure 1: The decision tree

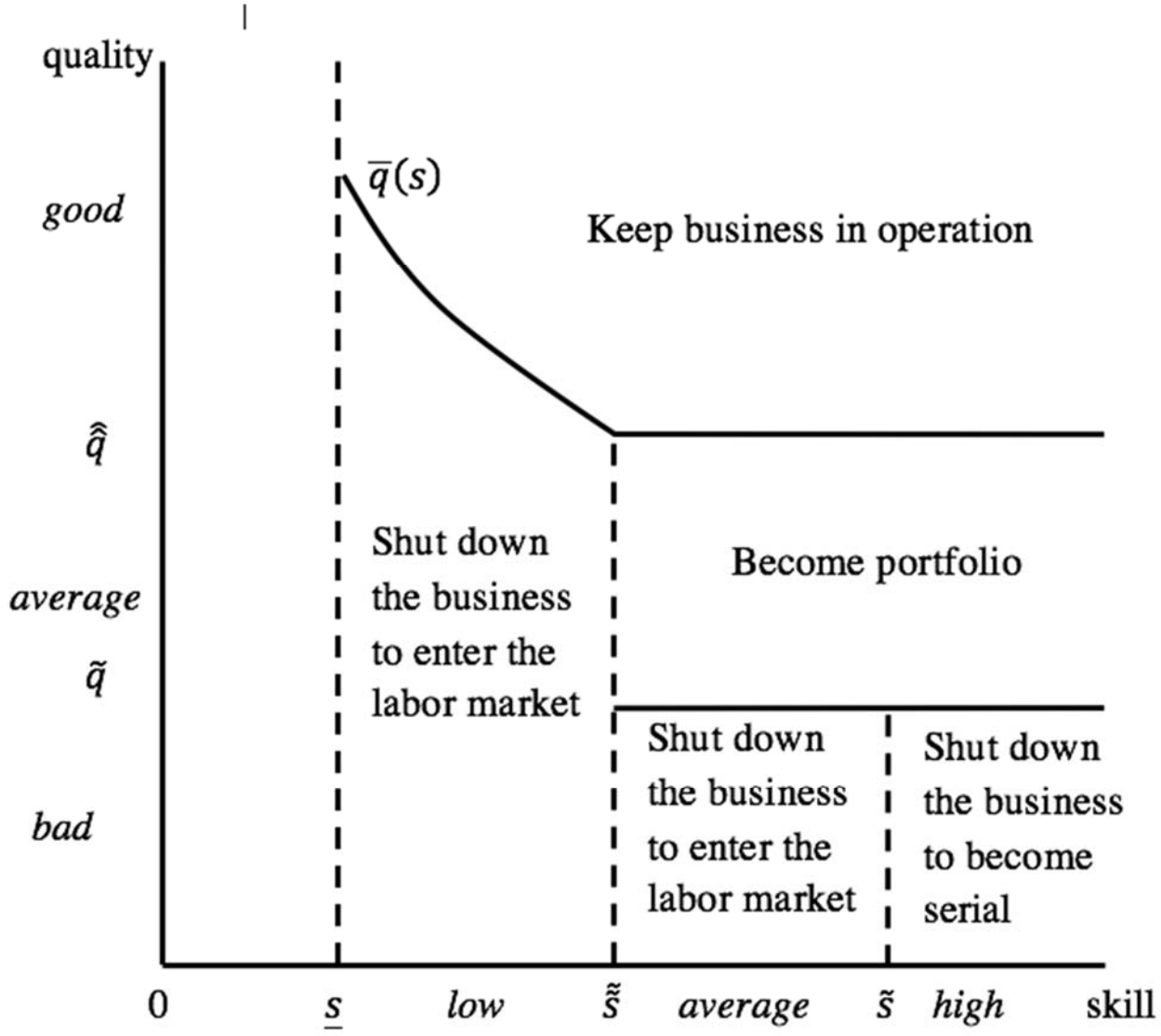
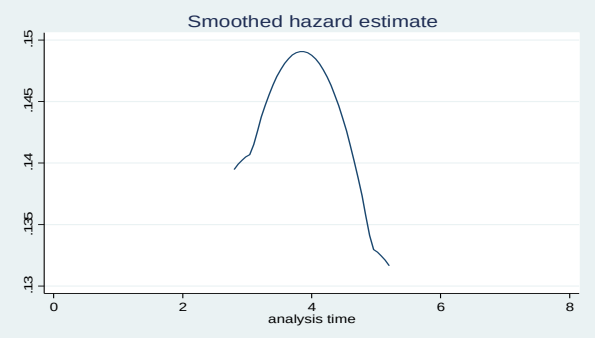
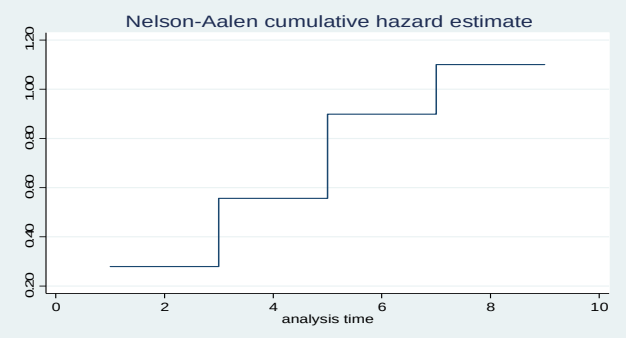


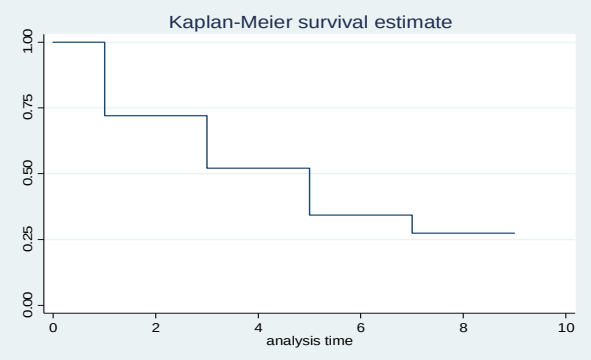
Figure 2: Individual Occupational Choices



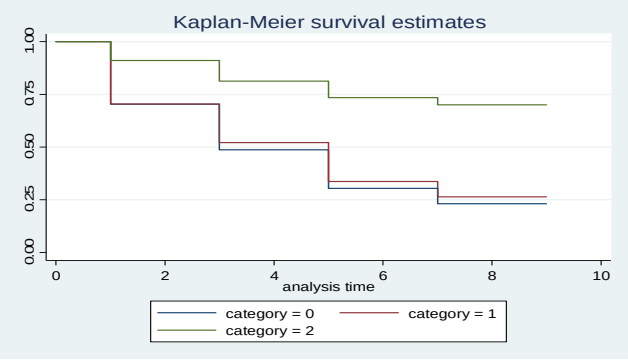
a. Graph of hazard ratio



b. Nelson-Aalen cumulative hazard curve



c. Kaplan-Meier survival curve



d. Kaplan-Meier survival curve for novice (category=0), serial (category=1), portfolio (category=2)

Figure 3: Survival analysis

Table 1: Survival Overview

Survey		2002	2005	2007	2009	2011
Categories	Surveyed firms in 2002	1050				
of surveyed	Survivors from 2002		644			
firms	New entrants[22] in 2005		1706			
	Survivors from 2005			1663		
	New entrants in 2007			526		
	Survivors from 2007				1476	
	New entrants from 2009				534	
	Survivors from 2009					1097
	New entrants in 2011					729
Total analyzed firms		1050	2350	2189	2010	1826

[22] New entrants mean new firms entering the survey for the first time regardless of their type as novice, serial or portfolio.

Table 2: Occupational choice for novice entrepreneurs

Variables	Multinomial logit model			
	Serial	Portfolio	Serial	Portfolio
Schooling years	0.052** (0.007)	0.084** (0.013)	0.052** (0.007)	0.079** (0.013)
Industry experience	0.401** (0.055)	0.805** (0.084)	0.643** (0.061)	0.569** (0.096)
Labor market experience	-6.229** (0.189)	-1.305** (0.086)	-6.491** (0.204)	-1.226** (0.086)
Managerial experience	0.591** (0.118)	0.223* (0.094)	0.318* (0.173)	0.298* (0.102)
Innovation intensity	0.036 (0.091)	0.187 (0.141)	0.031 (0.091)	0.177 (0.144)
Innovation intensity squared	-0.0103 (0.018)	-0.037 (0.029)	-0.010 (0.018)	-0.036 (0.029)
Share of technical employees	5.064** (0.571)	9.239** (0.585)	10.52** (0.824)	5.765** (0.975)
Share of managerial employees	-0.486** (0.157)	1.188** (0.199)	-0.408** (0.158)	1.079** (0.203)
Managerial exp x share of managerial employees			1.858* (0.857)	0.281 (0.754)
Industry exp x share of technical employees			10.27** (1.071)	4.381** (1.112)
Land ownership	-0.113* (0.048)	0.764** (0.087)	-0.115** (0.048)	0.751** (0.088)
Debt ratio	-0.127 (0.158)	0.451* (0.243)	-0.088 (0.158)	0.365 (0.246)
Investment capital	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
Investment capital squared	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)
Firm size	0.550** (0.086)	-1.149** (0.117)	0.559** (0.087)	-1.161** (0.118)
Firm size squared	-0.108** (0.017)	0.204** (0.021)	-0.108** (0.017)	0.206** (0.021)
Firm age	-0.000 (0.002)	-0.013* (0.006)	-0.000 (0.002)	-0.013* (0.006)
Age	-0.000 (0.002)	-0.009* (0.004)	-0.001 (0.002)	-0.010* (0.004)
Gender	-0.148** (0.051)	0.160* (0.086)	-0.152** (0.051)	0.167* (0.086)
Tenure	-0.008* (0.004)	0.045** (0.007)	-0.008* (0.004)	0.047** (0.007)
Private firms	0.286** (0.104)	-0.119 (0.178)	0.246* (0.106)	-0.109 (0.181)
Partnership / cooperatives	0.044 (0.159)	0.323 (0.249)	-0.062 (0.163)	0.398 (0.253)
Limited liability	0.417** (0.102)	-0.155 (0.173)	0.331** (0.103)	-0.046 (0.173)
Joint stock	-0.252 (0.216)	-0.194 (0.304)	-0.222 (0.218)	-0.256 (0.317)
Intercept	-0.847** (0.186)	-3.424** (0.304)	-0.972** (0.188)	-3.222** (0.307)
Likelihood ratio test	$\chi^2(42) = 8658.99$**		$\chi^2(46) = 8808.64$	
No. of observations	16505		16505	

Note: *: significant at 5% level; **: significant at 1% level. Standard errors are in parentheses.

Table 3: Survival of entrepreneurs

Variables	Cox pro. hazard model		Weibull model	
	Survival dur	Hazard rate	Survival dur	Hazard rate
Habitual entrepreneurs	-0.370** (0.054)	-0.691** (0.037)	-0.491** (0.055)	-0.611** (0.034)
Schooling years	-0.039** (0.007)	-0.961** (0.006)	-0.053** (0.007)	-0.948** (0.006)
Industry experience	1.013** (0.054)	1.755** (0.150)	1.528** (0.054)	1.612** (0.153)
Employee experience	-0.111* (0.051)	-0.894* (0.046)	-0.089 (0.051)	-0.914 (0.047)
Managerial experience	0.185 (0.102)	1.203 (0.123)	0.251* (0.108)	1.284* (0.139)
Innovation intensity	0.135** (0.031)	1.145** (0.036)	0.143** (0.031)	1.154** (0.035)
Share of technical employees	1.746** (0.108)	5.733** (0.621)	2.943** (0.112)	18.984** (2.130)
Share of managerial employee	-1.455** (0.179)	-0.233** (0.041)	-1.672** (0.183)	-0.187** (0.034)
Industry exp*Tech share*Novice	-0.944** (0.151)	-0.389** (0.058)	-1.533** (0.153)	-0.215** (0.033)
Managerial exp*Mana share*Novice	-0.487** (0.057)	-0.952** (0.055)	-0.588** (0.064)	-0.555** (0.035)
Land ownership	0.071 (0.043)	1.074 (0.047)	0.017 (0.044)	1.017 (0.044)
Debt ratio	0.469** (0.119)	1.599** (0.191)	0.567** (0.118)	1.763** (0.209)
Investment capital	-0.000** (0.000)	-0.999** (0.000)	-0.000** (0.000)	-0.999** (0.000)
Investment capital squared	0.000** (0.000)	1** (0.000)	0.000** (0.000)	1** (0.000)
Firm size	-0.162** (0.074)	-1.176* (0.087)	-0.181** (0.074)	-1.198** (0.089)
Firm size squared	0.009 (0.013)	0.991 (0.012)	0.009 (0.013)	0.990 (0.012)
Firm age	-0.015** (0.002)	-0.985** (0.003)	-0.024** (0.002)	-0.957** (0.002)
Age	-0.009** (0.002)	-0.991** (0.002)	-0.014** (0.002)	-0.986** (0.002)
Intercept			-1.342** (0.180)	-0.261** (0.047)
LR statistic	$\chi^2(17)$ = 1679.36**		$\chi^2(17)$ = 2885.43**	

Note : *: significant at 5% level; **: significant at 1% level. Standard errors are in parentheses. 4317 observations

Table A2

Table A2.a: Age

	Sum of Squares	Df	Mean Square	F	Significance
Between Groups	8571.53	2	4285.76	40.49	0.000
Within Groups	1975751.09	18667	105.84		
Total	1984322.62	18669	106.28		

Table A2.b: Firm age

	Sum of Squares	Df	Mean Square	F	Significance
Between Groups	3584.71	2	1792.35	16.8	0.000
Within Groups	2008797.65	18827	106.69		
Total	2012382.37	18829	106.87		

Table A2.c ROS

	Sum of Squares	Df	Mean Square	F	Significance
Between Groups	2.5062	2	1.2531	38.54	0.000
Within Groups	604.211	18581	0.0325		
Total	606.717	18583	0.0326		

Table A2.d Mean age, firm age, ROS and gender

Types of entrepreneurs	**Mean age**	**Mean firm age**	**Mean ROS**	**Female**	**Male**
Novice	46.56	13.19	0.223	24.69%	75.31%
Serial	47.035	13.42	0.235	30.76%	69.24%
Portfolio	48.68	15.25	0.251	28.41%	71.59%
Total	47.17	13.34	0.231	26.45%	73.55%

Table A3.e: Legal ownership

Types of entrepreneurs	**Household**	**Private**	**Partnership**	**Ltd liability**	**Joint stock**
Novice	73.93%	7.86%	3.47%	12.74%	1.96%
Serial	72.72%	9.02%	2.67%	14.07%	1.35%
Portfolio	74.94%	6.94%	2.91%	12.53%	2.24%%
Total	73.67%	8.12%	3.24%	13.07%	1.81%

Table A4: **Summary statistics and matrix of correlation**

	Mean	Std. Dev	Exit	Serial	Portf	Educ	Ind exp	Empl exp	Mana exp	Inn intensi	Techni share	Mana share	Invest	Land own	Debt ratio	Firm size	Age	Gen der
Exit	0.145	0.352	1.00															
Serial	0.271	0.444	-.003	1.00														
Portfolio	0.047	0.212	-.03*	0.002	1.00													
Educati	11.484	3.438	.015	.086*	0.01*	1.00												
Ind exp	0.310	0.462	0.02*	0.06*	0.04*	-.05*	1.00											
Emp exp	0.472	0.499	-.001	-.56*	-.03*	0.26*	.051*	1.00										
Mana exp	0.074	0.261	.057*	-.003	.001	0.17*	.018	0.11*	1.00									
Innovat intensit	0.235	0.742	.003	.014	.011	.039*	0.124*	0.018	.042*	1.00								
Technical share	0.116	0.275	.055*	.023*	-.04*	-.11*	.161*	-.059*	.028*	-.065*	1.00							
Mana share	0.218	0.209	-.05*	-.04*	.014*	-.09*	-.19*	-.05*	-.105*	-.127*	-.227*	1.00						
Invest	10.893	3.903	-.015	-.006	.013	.059*	-.012	.015	-.001	.079*	.041*	-.04*	1.00					
Land own	0.581	0.493	-.011	-.004	.061*	-.16*	-.036*	-.058*	-.057*	.009	.059*	.096*	-.05*	1.00				
Debt ratio	0.075	0.157	.023*	0.001	.024*	.081*	-.003	.027*	.062*	.025*	.009	-.062*	.43*	-.056*	1.00			
Firm size	1.827	1.064	.106*	.021*	-.07*	.318*	.039*	.099*	.205*	.06*	.075*	-.573*	.108*	-.212*	.182*	1.00		
Age	45.39	10.43	.031*	-.06*	.011	-.06*	-.126*	.081*	.087*	-.024*	-.062*	.051*	.012	.052*	.019*	.013	1.00	
Gender	0.735	0.441	-.01*	-.05*	-.01	.095*	.03*	.08*	.016*	.019*	.05*	-.085*	.000	-.027*	-.01	.077*	.016	1.00

*Note: * significant at 1% level. Observations: 18850.*