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Roads Leading to Self-Employment: Comparing Transgenerational Entrepreneurs and Self-Made Start-Ups

Boris Blumberg
Gerard Pfann

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Boris Blumberg
Maastricht University

Gerard Pfann
*Maastricht University, Stockholm University
and IZA*

ABSTRACT

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This paper studies the event history of business foundation. Three theoretical concepts of human, financial and social capital are linked to investigate variations over time of people's decision processes to become self-employed. Data from a cohort of Dutch inhabitants born in 1939/1940 who have been interviewed three times during their lives in 1952, 1983, and 1993 allows for testing theoretical hypotheses that state clear differences between two different roads towards business ownership. Empirical results show that the baseline hazard decreases with time for transgenerational entrepreneurs with self-employed parents, but increases for self-made startups. Social capital in the form of strong ties is a better predictor of enterprise than human capital.

Corresponding author:

Boris Blumberg
Maastricht University
School of Business and Economics
PO Box 616
6200 MD Maastricht
The Netherlands
E-mail: b.blumberg@maastrichtuniversity.nl

I. INTRODUCTION

The acquisition of entrepreneurial capital is likely to be the most important mechanism to start a self-employed career. Financial capital, social capital, and human capital are the building blocks. Together they make up the stock of entrepreneurial capital. Financial capital refers to the available amount of monetary wealth, often obtain through inheritance, savings, windfalls, borrowing or crowd funding to overcome entry costs to start or take-over a business.[1] Social capital has originally been defined by Hannifan (1916) as "*those tangible assets [that] count for most in the daily lives of people: namely goodwill, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit.*" Often these social units are small and well defined groups that are characterized by strong ties (Granovetter, 1973).[2] Human capital (Becker (1964) is a factor that contains the knowledge that is obtained through education and experience, and more recently also includes personality traits such as cognitive and non-cognitive skills that contribute to a person's productive capacity[3].

A general theory of entrepreneurship does not exist (*cf.* Ricketts (2008)). Consequently, the three building blocks of entrepreneurial capital have been studied mostly in isolation. This paper attempts to them bring together to fully capture the role of entrepreneurial capital. The goal of the paper is to understand better to what extent differences in initial endowments and in capital acquisition may explain the salient differences in the self-employment career dynamics between transgenerational entrepreneurs and self-made start-ups.[4]

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[1]Early work on financial constraints in entrepreneurship is by Evans and Jovanovic (1989). Modern methods to overcome financial constraints are discussed in Bruton, Khavul, Siegel, and Wright (2015).
[2]Kwon, Heflin and Ruef (2013) discuss the role of social capital and entrepreneurship in communities at large.
[3]Marvel, Davis and Sproul (2014) provide a critical review of the role of human capital in entrepreneurship research.
[4] Using retrospective career life-history data from West-Germany Carroll and Manovski (1987) showed for the very first time the important and fundamental differences of the self-employment career dynamics between these groups.

Habershon, Nordqvist and Zellweger (2010) define transgenerational entrepreneurship as the "*processes through which a family uses and develops entrepreneurial mindsets and family influenced capabilities to create new streams of entrepreneurial, financial, and social value across generations*." This paper investigates the transition process into self-employment and explicitly distinguishes between taking over a family business and the foundation of a new company.

Any complete theory of the self-employment process should at least meet two criteria. First, the modeling framework must take a dynamic perspective. A static approach cannot account for the fact that self-employment is episodic, individuals attributes change over time, and that the self-employment propensity may vary over one's career. Second, the modeling framework should differentiate between the various roads that may lead to self-employment. The factors that characterize these separate roads are likely to be different from each other.

A survey of the theoretical and empirical entrepreneurship literature learns that these recommendations have not been incorporated much. This paper proposes a theoretical model that explains the dynamics of family business succession and self-employment through novel business foundation. The model allows us to derive hypotheses that explain the differences in timing of entry into self-employment for these two different decision processes as well as the roles of the three different types of entrepreneurial capital. The theoretical model advances the literature on self-employment on three fronts: (A) It formally links and tests the theoretical concepts of financial, social, and human capital to the career timing of the decision to become self-employed in a dynamic framework. (B) It differentiates between self-employment career dynamics of transgenerational entrepreneurs and self-made start-ups. (C) The model produces clear and testable predictions why and to what extent the gestation time needed to become self-

employed may differ for individuals who have been exposed in their youth to self-employment through a family owned business in comparison to those who have not had child-hood exposure to self-employment.

Earlier works on the entrepreneurial decisions that did not distinguish between the different roads leading to self-employment consequently suffer from omitted variable bias. Our results indicate that family business succession and start-up self-employment may have opposing or offsetting dynamics. The chances of taking over a family business are initially high and eventually decrease. Conversely, start-up chances of individuals without self-employed parents are initially low and eventually increase with time. The dynamic theory proposed in this paper accounts for these differences.

Outcomes of the implicit entrepreneurial selection process are revealed through ex-post observational variation in the characteristics of people who did or did not became self-employed, and in case they did which road they followed to do so. We find that the relevant and decisive attributes differ between the two entrepreneurial groups as well. Our results indicate that higher parental education is especially relevant for start-ups; they face more binding constraints and need more time to acquire relevant human and financial capital. Unsurprisingly, having self-employed parents shortens the gestation period for family business successors. Not only do these parents transfer important self-employment specific skills and wealth to their offspring, but they also provide an opportunity to take over the family business (Lindquist, Sol and Van Praag (2015)). In addition, the distinction between transgenerational entrepreneurship and self-made start-ups provides important new insights into the traditionally problematic relationship between human capital and self-employment that has been discussed so often in the literature.

The structure of the paper is as follows. Section II introduces a rational choice model of the decision process into self-employment. From this model hypotheses are derived regarding the roles of human, financial and social capital and the different dynamics of family business succession and start-ups. The data are described in Section III. Section IV the econometric model and discusses the methods to test the hypotheses. Section V presents the outcomes of the duration analysis. Section VI concludes.

II.   THEORY DEVELOPMENT AND HYPOTHESES

A Rational Choice Model of the Self-Employment Decision

We build our theoretical model with the following objectives in mind. First, we want to link the theoretical concepts of human, financial, and social capital directly to the gestation period to enter into self-employment. Second, we wish to account for different types of entrepreneurship and how their roads that lead to self-employment differ through time. We are especially interested in the timing dimension, since this is a rather ignored issue in the entrepreneurship literature. The gestation period proxies how much time individuals need to learn how to take the step into self-employment successfully. Third, we will focus on the intertemporal choice of different types of capital accumulation.

Figure 1 provides an economic model of the self-employment decision process over the life course of an individual. This rational choice model assumes that individuals collect information on the alternatives, assess the values of the viable alternatives, and then choose that alternative with the highest perceived utility given all the prevailing constraints. This maximizing behavior is the building block of most dynamic choice models in economics. We

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choose the occupational choice model as our starting point. Within the occupational choice framework, the individual chooses the occupation with the highest perceived income or utility. For example, the individual chooses between working for pay in the labor market and earning income from being self-employed. The individual will opt for self-employment if the expected gains of that option are higher.

Figure 1: Conceptual Model of the Self-Employment Process

Self-employment refers to a particular income generating mechanism that is different from paid work. The utility derived from paid labor depends on income and a vector of personal characteristics (*eg*. education, marital status, and number of children). For a self-employed entrepreneur, the individual's gross earnings are a function of its entrepreneurial ability, the capital invested in the business, and an individual random component summarizing the unknown good or bad fortune of the entrepreneur (Evans and Jovanovic 1989; Holtz-Eakin, Joulfaian et al. 1994; Dunn and Holtz-Eakin 2000). The general equilibrium model of entrepreneurial selection presented by Lucas (1978) states that individuals with high entrepreneurial ability should enter entrepreneurship directly when entering working life. However, most entrepreneurs do not become self-employed immediately, but work first in paid jobs. During the time individuals spend in the labor market, they accumulate specific human capital. Specific human capital raises the income in the labor market and makes wage-earners more reluctant to exit their job and enter self-employment. This is consistent with the finding of Evans and Leighton (1989) that the return to wage experience in self-employment (2.1%) is lower than the return to wage experience in paid jobs (5.6%). So, in theory the existence of non-transferable job specific human capital should induce future entrepreneurs to enter self-employment as early in their career as possible.

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Furthermore, job shopping theory (Johnson 1978) suggests that individuals should take more risky job alternatives early in their careers. By pursuing risky alternatives, individuals learn whether or not they possess abilities that are highly valued and that are being paid accordingly. In the light of these theoretical arguments and echoing Evans and Leighton (1989), the question raises "why do empirical studies not find high self-employment rates for young individuals?"

The answer to this question will probably not be found exclusively in the difference of expected earnings in both earnings options, but more likely in the availability of these options. Even for individuals that are willing to become self-employed and who can earn more as entrepreneur, self-employment may be not an option. Self-employment differs in some important aspects from employment in the labor market. Self-employment demands a variety of skills (Lazear 2005), involves considerable and partially sunk startup costs, while the chances of success are uncertain (Jovanovic 1982), difficult to predict, and therefore hard to finance in the capital market (Zeira 1987). In order to start a new business venture capital must then be raised in the capital market and skills and capabilities must be learned through schooling or work experience. Capital market constraints limit the ability of entrepreneurs to finance new business ventures (Evans & Jovanovic, 1989). And human capital constraints limit the ability of entrepreneurs to manage a business (Calvo and Wellisz 1980). Therefore, willing young individuals lack often financial and human capital to start up a new business from scratch.

Financial constraints are a stylized fact in the self-employment literature. Evans and Jovanovic (1989), Evans and Leighton (1989), Lindh and Ohlsson (1996), Holtz-Eakin, Joulfaian, and Rosen (1994; 1994) and Blanchflower and Oswald (1998) provide evidence that greater personal wealth, winning lotteries, or inheritance relaxes liquidity constraints and eases the transition into self-employment. With perfect capital markets, entrepreneurs would not face

liquidity constraints. However, starting entrepreneurs face liquidity constraints because the exact profitability of the business idea is not measurable (Zeira 1987). The expected profitability hinges on the business owner's perception of his entrepreneurial ability (Jovanovic 1982; Frank 1988) and he often finds it "impossible to persuade potential providers of equity capital to share his subjective belief" (Steigum 1978: p.637). The capital market is not the only means through which an entrepreneur can raise capital. Basu and Parker (2001) point that family loans are the largest source of funds after bank loans. Family members share more easily the beliefs of their offspring and have more trust in the propensity of the offspring to pay back the loans. In the absence of external financing possibilities, the prospective entrepreneur might finance the business itself by working and saving money to overcome the financial capital thresholds. However raising capital through saving is time consuming and therefore the absence of external financing options increases the waiting time into self-employment.

Besides financing a business, a business must be managed. The entrepreneur must be a jack-off-all-trade (Lazear 2005). Searching and evaluating business opportunities, building and fulfilling contracts, hiring and firing employees, and managing and bookkeeping are part of the entrepreneur's tasks. Some researchers claim that these mentioned capabilities are inborn (Lucas 1978; Jovanovic 1982), while others argue that these capabilities are acquired through a learning process (Calvo and Wellisz (1980)). Dunn and Holtz-Eakin (2000) find evidence for generational transfer of these skills. The offspring of self-employed parents are more likely to enter self-employment and children of more successful entrepreneurs are more likely to enter self-employment than children of less successful entrepreneurs. While differing on the source of these capabilities, all researchers argue that individuals that acquire sufficient knowledge of these entrepreneurial processes become entrepreneur. The speed of learning and accumulating of

these capabilities determine the waiting time into self-employment (see Figure 2).

Figure 2: Entrepreneurial Capital Accumulation and the Timing to Self-employment

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The entrepreneur not only chooses self-employment, he also chooses for a certain type of self-employment. There are various types of self-employment (Webster 1977; Cooper and Dunkelberg 1986). The two most important ones are transgenerational entrepreneurship and self-made start-ups. Certainly, the human and financial capital thresholds will depend on the route followed. People who take over a family business cannot be compared to those who found an entirely new business. Newly founded firms suffer from liability of newness, i.e. they face lower early survival chances because they miss stable exchange relations, do not have established a reputation yet, or must learn by doing (Hannan and Freeman 1989; Jovanovic and Lach 1989). Furthermore, start-ups are faced with the burden of financing the sunken entry costs, while continuation of a family business is like entering self-employment with a valuable set of assets already existent. Because of this internal learning and financing, the human and financial capital thresholds are presumably lower for individuals entering family business (Threshold I) and will therefore require less time to enter self-employment. This effect is shown in Figure 2 as $C_I < C_{II}$. As a consequence start-ups must accumulate more financial and human capital to overcome the threshold (Threshold II) in order to enter the self-employment stage. This process will lengthen the gestation period to become self-employed ($T_{II} > T_I$).

We summarize these theoretical arguments revisiting Figure 1. Figure 1 shows the relationships between human, financial, and social capital and their relationship to the different roads that may lead to self-employment. Most theories focus on the direct link between human capital and self-employment. We argue that it is more complex. A complete theory must include

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the intervening human capital as well as the roles of social and financial capital to explain the relationship between the time dependent capital endowments and self-employment types. Constraints to any of these can be perceived as attributes of the alternative initial conditions to the road to self-employment. We argue that these constraints differ, and we assume that start-ups face higher financial and human capital constraints than transgenerational entrepreneurs.

Entrepreneurial Capabilities and Human Capital

Calvo and Wellisz (1980) explain the impact of educational attainment on the probability of selection into an entrepreneurial position through managerial ability. Investment in education enhances managerial ability, which would relax the human capital constraint and therefore increase the choice for self-employment as shown in Figure 1.

But there is also an indirect link between educational attainment and self-employment selection. The indirect link between human capital and self-employment represents the role of opportunity costs of becoming self-employed. This is the value of the outside option of, for example, working in the labor market. Le (1999) argues that higher levels of education might generate better outside options (i.e. better working conditions or better pay). Therefore, better outside options through education might decrease the probability of self-employment. While educational attainment relaxes human capital constraints, it raising better outside options at the same time. These offsetting forces can account for the fact that some studies find a positive effect of education on the probability of self-employment while others find a negative, or no effect at all (Marvel *et al*., 2014).

Figure 3 provides a graphical representation of this mechanism. If an individual invests in education, he relaxes his human capital constraint (Figure 3, Line A). At the same time, the

investment in education generates better outside options (Figure 3, Line B). These better outside options act as opportunity costs for becoming self-employed. Note that the opportunity costs of becoming self-employed are higher for transgenerational entrepreneurs than for self-made start-ups ($O_I > O_{II}$). Consequently, high education lowers the gestation period of self-employment. Because $E_I < E_{II}$, this period will be shorter for transgenerational entrepreneurs than for self-made start-ups. Logically, there is a point (point Z in Figure 3) where an increase in the level of education beyond E^* raises opportunity costs such that the outside option shall prevail as the preferred choice.

 Figure 3: Human Capital Accumulation and Self-Employment Chances

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Lazear (2005) provides a related argument with his jack-off-all-trades hypothesis of entrepreneurship. He states that self-employment requires a variety of skills. Entrepreneurs must have sufficient knowledge in a variety of fields to put together the many tasks needed for survival and success in business, while for wage earners it suffices and pays to be a specialist in the field demanded. Higher or specialist education, like university studies, often implies a higher level of specialization than vocational studies. While on the other hand, primary schooling and lower vocational schooling might not produce enough human capital to overcome the required human capital constraint for self-employment. These arguments show that it pays for specialized and low educated to work in the labor market, while a vocational education is preferable for self-employment.

These theoretical considerations allow us to derive the first hypothesis:

Hypothesis 1: Higher education decreases the gestation time to become self-employed, with a stronger effect for vocational than for general education.

If starting up a business requires more human capital than taking over a family business the pioneering founder faces a higher human capital constraint and it follows that the role of vocational schooling is larger for transgenerational entrepreneurship. In Figure 3 we showed that the human capital constraint for a family business is lower than for self-made start-ups ($E_I < E_{II}$). People are more easily employed within family firms without specific qualifications. Therefore, vocational schooling often suffices while start-ups need more specific human capital.

Hypothesis 1a: The role of schooling is stronger (in terms of shorter gestation) for transgenerational entrepreneurs.

Social Capital and Family Background

Next to human capital we introduce social capital as another important input for self-employment. Social capital refers to resources that individuals have at their disposal, or which they can access by means of their social relations. Social capital differs between people and can form a considerable advantage in learning how to focus on becoming self-employed (*cf.* Coleman 1988; Burt 1992). The importance of social capital for the success in the labor market, i.e. finding a job, has initially been studied by Granovetter (1973). He distinguishes two kinds of relations: strong and weak ties. Strong ties are characterized by frequent and intense communication. Loose contacts to other people, like former colleagues and college friends, represent weak ties. Empirical evidence suggests that strong ties are the dominant factor for

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successful business founding (Brüderl and Preisendorfer 1998; Jong & Marsili 2013). In our study, we focus on strong ties, namely one's parents.

The social ties considered here offer various forms of resources that may be helpful to succeed in starting a business. First, social relations can offer access to financial capital. Research on ethnic entrepreneurship reveals for example that within the closely knitted communities of Chinese and Korean immigrants, business starters obtain financial start capital from their social relations (Bates 1997). Another tie providing income security is a working partner, whose earnings can cover private expenses for housing, food etc. when the new business does not yet generate sufficient income. Second, social relations form an inexhaustible source of knowledge, know-how and experiences. In general, network ties can form an essential complement to one's own human capital and those network ties accumulate important information through time as well. Family members with specific human capital, for example a mother with a degree in accounting or law, are valuable contacts for fiscal and juridical problems. Very special ties are self-employed parents. Children from self-employed parents learn what it needs to be self-employed early in their childhood. Their parents are their entrepreneurial role model. And, parents with self-employment experience are more likely to support the self-employment decision of their children because their own experience enables them to assess such a decision more accurately[5].

To assess an individual's strong ties, we focus on the parents' educational levels and their self-employment experience. Experience refers mainly to specific entrepreneurial capabilities that have been transferred from the parents to the child during the upbringing. Parental educational attainment is an indicator capturing the transfer of more general human capital as

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[5] In this paper, we assume that strong ties are productive. Clearly, there is evidence in the family firm literature of severed ties and conflict between family members (Levinson 1971).

well as a proxy for the amount of financial resources accessible through family ties.

Parental self-employment experience and educational level characterize the parents' background. Having a self-employed parent has been found to be one of the most consistent predictors for off-spring self-employment (e.g. Carroll & Mosakowski 1987; Dunn & Holtz-Eakin 2000; Mungai & Velamuri 2009). However, there are many reasons why having self-employed parents increases offspring self-employment (Dawson et. al. 2013). Dunn and Holtz-Eakin (2000) study in particular these intergenerational links. They argue and find evidence for two possible mechanisms through which self-employed parents increase offspring self-employment. Successful self-employed may be more willing and able to provide offspring with financial capital to relax liquidity constraints. The second reason why self-employment may be correlated among generations is because parents may transfer entrepreneurial capabilities and skills through valuable work experience, reputation, or other entrepreneurial human capital. The direct transfer of entrepreneurial skills is also consistent with the rational choice of occupational following, which states that parents transfer job specific human capital for intergenerational welfare maximization (see e.g. Becker and Tomes 1979; Laband and Lentz 1983).

The educational level of the parents is an indicator capturing the transfer of more general human capital as well as a proxy for the amount of financial resources accessible through family ties. Thereby, we assume that higher educated parents are wealthier relative to lower educated parents. The intergenerational transfer of wealth relaxes the financial constraints (see Figure 2), thereby increasing the chances that the offspring may overcome initial set up costs and reduce the time into self-employment. These arguments lead to the following hypotheses:

Hypothesis 2: Having a self-employed parent shortens the offspring's gestation time to self-employment.

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Hypothesis 3: Having high educated parents shortens the offspring's gestation time to self-employment.

Is it possible that the presence of self-employed parents merely reflect family self-employment instead of the transfer of entrepreneurial skills? This question was legitimately raised by Dunn and Holtz-Eakin (2000) in their research on intergenerational transfers of skills and wealth. Although they indirectly tested for this possibility by comparing father and son's occupation and industry classification, a formal test of this possibility has not been undertaken up to today. The possibility of family self-employment is indicated in Figure 1 by the link between self-employed parents and the availability of family business constraint. Although individuals may take over a family business from aunts and uncles, the offspring from self-employed parents are more likely to have the possibility to take over a family business. The existence of a direct link between self-employed parents and the probability that a family business is available should be reflected in a stronger effect of self-employed parents on taking over a family business as opposed to starting up a business from scratch. Therefore,

Hypothesis 2a: The role of a having self-employed parent is stronger for transgenerational entrepreneurs than for self-made start-ups.

The reverse can be said for the role of the educational level of the parent. Although, some general skills might be transferred from parent to children, the main effect of the educational level of the parent is the transfer of wealth. We assume a positive relation between the education level of the parents and the availability of financial resources, and expect that financial capital is more relevant for real founders than for self-employed who take over a family business.

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Hypothesis 3a: _The role of the parents' education is stronger for self-made start-ups than for transgenerational entrepreneurs._

III.   THE DATA

The hypotheses developed above will be tested on a data set consisting of 1134 people. This sample is part of the North Brabant longitudinal data set which contains information about 3167 individuals who were born 1939/1940 and went to school in the Dutch province North Brabant in 1952. In 1952 researchers took a random sample of pupils who attended the sixth grade of primary school. Information on their school performance and family background was obtained from 2874 individuals. In 1983 all 3167 individuals were contacted again. 2588 people responded and were asked about their later education, labor market status, earnings, and household composition (Hartog and Pfann, 1985). In 1993 at the age of approximately 54 the 3167 school children of 1952 were approached for the third time. The questionnaire mailed in 1993 contained questions on the labor market status since 1983 and especially on self-employment experience. This latter survey is used to obtain information whether the individual has been self-employed in his or her career; 2099 individuals answered in 1993 (Jonker, 1995). Due to untraceable individuals and non-response 1339 individual were interviewed at all three points of time, i.e. in 1952, 1983 and 1993. Taking the 1952 data as a population for the data collection in 1983 non response is not systematic for family background and school performance (see Hartog, 1989); 205 individuals provided incomplete information, which leads to a final sample of 1134 individuals.

From the 1993 survey 186 respondents responded affirmatively to the question "have you

ever (now or in the past) been self-employed as an owner/director?" and provided information on the year of founding or acquiring business (see Jonker (1995) for more detailed information on the dataset). If a person is a serial entrepreneur we coded the first event as the end of the gestation period - a completed spell - to become self-employed. Furthermore, the 64 respondents indicated that they took over a family business and 122 were indicated as self-made start-ups. Figure 4 provide details about the structure of the dataset. Furthermore, the Figure indicates whether the respondents had a self-employed parent at the time of the first survey in 1953, to account for exposure to family self-employment.

Figure 4: Structure of the Data Set

Two variables from the 1983 survey serve as indicators for human capital: (1) VOCATIONAL SCHOOLING and (2) HIGHER EDUCATION. VOCATIONAL SCHOOLING is a time varying dummy taking the value of 1 at the time the individual completed MBO (Middelbaar Beroeps Onderwijs). MBO is a general vocational education in the Netherlands. The variable HIGHER EDUCATION is a time varying dummy taking the value of 1 at the time the individual completes his higher education. Higher education in the Netherlands is HBO (higher vocational schooling) or a university degree.

Table 1: Descriptive Statistics

The social capital variable is SELF-EMPLOYED FATHER. This variable is taken from the 1953 survey and is a dummy that equals one if the respondent had a self-employed father and hence grew up in an entrepreneurial environment. The respondent's access to financial resources

is proxied by the EDUCATIONAL LEVEL OF THE FATHER. This variable was also taken from the 1953 survey and consists of 7 consecutive levels. These variables are constant through time.

The acquired education of the respondent is also measured in 7 consecutive levels. For the purpose of this analysis we created two variables VOCATIONAL SCHOOLING and HIGHER EDUCATION. These are indicator variables of the respondent's highest obtained diploma obtained before becoming self-employed. Although educational levels have been measured in all three surveys in this analysis we only use the constant indicator variables.

Two control variables, MARRIED and CHILDREN are not necessarily constant through time. Since the year is known that a person got married and eventually divorced and remarried again the variable MARRIED can vary over time for each respondent. It takes the value one in the years a respondent is married and the value zero otherwise. The variable CHILDREN turns one in the year that the first child is born and turns zero again when the youngest child becomes 16.[6] All our respondents were born in 1939/40, so that age is not included as control variable. Our last control variable is the constant FEMALE indicator variable.

Endogeneity of education

Treating education as exogenous may be problematic as it is possible that individuals make their employment option (e.g. wage worker or self-employed) jointly with their education decision. For example, an individual choosing to take over a family business may also choose (at the same time) fewer years of schooling if education is not rewarded highly in the family business or if most human capital is better acquired learning internal in the family business. To deal with the fact that education affects but is also affected by the decision to become self-employed, we use

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[6] Defining 16 as the age that a child does no longer influences the father's self-employment decision is admittedly arbitrary. However, changing the independence year to 21 did not alter the results.

2SLS instrumental variable (IV) estimation. First we estimate a multinomial logit model to model the probability of lower, vocational or higher education. The instrumental variable is the respondent's IQ, holding constant for gender, self-employed father, and the education of the father. Identification stems from the non-linear functional form of the multinomial logit and the exogenous nature of the explanatory variables. The model has a good fit and the results are straightforward. Individuals with a higher IQ have a higher probability of choosing higher education. The educational level of the father is a good predictor for high education of offspring. Females have a lower chance of obtaining higher formal education. Individuals with self-employed parents (father) choose mainly vocational education. The second step of the 2SLS-IV estimation is to include the predicted values, *PR*(VOCATIONAL EDUC) and *PR*(HIGHER EDUC) into the estimation of the gestation period to becoming self-employed.

IV.   THE ECONOMETRIC MODEL

The appropriate method to study durations is estimating a survival model. Let t be a continuous duration random variable with density function *f(t)*, cumulative density function (Failure function) *F(t)* and hazard function $\theta(t)$. Note that $\theta(t) = f(t)/S(t)$. We first model the duration of a spell t, the time it takes before an individual becomes self-employed after finishing compulsory school, without distinguishing the entry routes. Let t_1, t_2,...,t_n be the observed durations in our sample, where an indicator c_i equals 1 if the spell is completed and 0 if the spell is censored. Then the contribution of the *i-th* individual to the log likelihood is given by (cf. Lancaster 1990; Jenkins 2004):

(1) $\ln L_i = c_i \ln \theta_i(t_i) + \ln S_i(t_i)$

where $S_i(t_i)$ is the survivor function, which is equivalent to $1-F(t)$. The survivor function is related to the hazard function by:

(2) $S_i(t_i) = \exp\left[-\int_0^{t_i} \theta_i(u)du\right]$

So that the log-likelihood contributions in (1) can be written in terms of the hazard as:

(3) $\ln L_i = c_i \ln \theta_i(t_i) - \int_0^{t_i} \theta_i(u)du$

where the continuous time hazard rate, $\theta(t)$, can take several functional forms. As we consider the different entry routes, transgenerational entrepreneurship (*TG*) and self-made start-ups (*SU*), we model duration t jointly with the entry route. Let E be a discrete random variable indicating the entry route or cause of exit from the not self-employed state. So that we consider the joint distribution of t and E. Denote the j-th (j = 1 for *TG*, 2 for *SU* cause-specific hazard for individual i by $\theta_{ji}(t)$.

   If we assume independent failure types (independent multiple risks), the overall hazard function is given by:

$$(4) \qquad \theta_i(t) = \theta_{1i} + \theta_{2i} = \sum_{j=1}^{2} \theta_{ji}$$

and the overall survivor function by:

$$(5) \qquad S_i(t_i) = \exp\left[-\int_0^{t_i} \sum_{j=1}^{2} \theta_i(u)\,du \right]$$

Let c_{ji} be an indicator which equals 1 if i enters via route j, and 0 otherwise (censored or entry via other route). Then the log-likelihood contributions are given by:

$$(6a) \qquad \ln L_i = \sum_{j=1}^{2} c_{ji} \ln \theta_{ji}(t_i) + \ln S_i(t_i)$$

$$(6b) \qquad \ln L_i = \sum_{j=1}^{2} c_{ji} \ln \theta_{ji}(t_i) - \int_0^{t_i} \sum_{j=1}^{2} \theta_i(u)\,du$$

$$(6c) \qquad \ln L_i = \sum_{j=1}^{2} \left[c_{ji} \ln \theta_{ji}(t_i) - \int_0^{t_i} \theta_i(u)\,du \right]$$

The overall log-likelihood can be separated into a sum of independent single cause-specific hazards, which can be estimated separately by treating the durations ending for other reasons as censored (Narendrenathan and Stewart 1991; Thomas 1996; Jenkins 2004). From equation (6c) it becomes clear that each cause-specific hazard can have its own parametric functional form. The

appropriateness of the multiple risks specification (versus the single risk model) can be tested by a non-nested likelihood-ratio test (Narendrenathan and Stewart (1991)). Under the null hypothesis of equal risks ($\theta_{1i} = \theta_{2i} = 1/2\theta_i$), the maximum log-likelihood value of the multiple risk model equals the maximum log-likelihood of the single risk model plus the logarithm of a ½, multiplied by the total number of uncensored observations (the total number of entrants into self-employment irrespective of the route).

V.   ESTIMATION RESULTS

Transgenerational entrepreneurship

In essence our model assumes that all individuals have a chance to take over a family business or start self-employment from scratch. A precondition for transgenerational entrepreneurship in the form of parental business succession is that there must be a family business in the first place. Our data shows that individuals who do not have self-employed parents still have a chance to take over a family business (16.4%). The most likely candidates of taking over a family business are that of ones relatives, parents-in-law, and from extended family (aunts, uncles, and so on). This would put almost all the individuals in our sample at least at a theoretical risk of taking over a family business. In order to take away the concern that the chance of taking over a family business is not randomly distributed (for example, one can specifically choose to marry a partner with parents that own a business), we will assume that having self-employed parents acts as a precondition to enter a family business. Hence, we divide our sample into two parts: one part consists of people with self-employed parents, and the other part consists of individuals without self-employed parents. Moreover, in all the regressions we are controlling for the timing of

getting MARRIED. Our estimation procedure remains the same, but taking account of this particular form of unobserved heterogeneity minimizes the risk of misspecification of the likelihood function.

An important reason to take over the family business is when the founder retires or dies. Unfortunately, in our data we do not observe the age at which a founder or self-employed parent leaves the business. Given our data's characteristic cohort composition we would not expect much variation anyway due to the fact that all our respondents were born in 1939/1940. [7]

The dynamics of entering self-employment over the lifecycle

The dependent variable is the difference between year of entry into self-employment and the year of finishing compulsory education. Since there is no univocal theoretical prediction in the entrepreneurship literature for the best parametric distribution to be used for modelling gestation time, we estimate several functional forms. We choose the appropriate functional form on the basis of three criteria: (1) theoretical background: are the functional forms consistent with our theory; (2) statistical tests: because most of the models are non-nested, we use Akaike Information Criterion (AIC) for model selection (Kennedy 2003: p.117); and (3) appropriate for testing our hypotheses. The last point is especially important in our case. Thomas (1996) shows that parameter estimates are only directly comparable if the parametric distribution of each risk take the proportional hazards form. In order to test our hypotheses, we restrict our analyses to the family of proportional hazards distributions.

Our dynamic theory dictates that the baseline hazards must have at least the following features. The baseline hazard for transgenerational entrepreneurship must be initially high and then decreasing afterwards. The baseline hazard for self-made start-up should be initially low,

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[7] We thank the referees for pointing out to us the importance of this particular point.

then increasing and possibly decreasing at later stages of the lifecycle. There are several parametric distributions of the baseline hazard that are sufficiently flexible to test these theoretical predictions. They all have to be of the proportional hazard form.

Cleves et al. (2004) suggest Akaike Information Criterion (AIC) in order to choose to appropriate parametric form. The distributions we consider are the Weibull and Gompertz distributions and – as a third alternative – the exponential distribution that predicts a constant hazard rate. Table 2 provides the AIC values for those parametric distributions: (see Cleves, Gould et al. 2004 for a detailed description of the distributions). All possible combinations provide one unique optimal distribution, denoted by the bold and italic AIC's in Table 2. We apply these models to estimate proportional hazards distributions for our multiple risk models to test our hypotheses.

Table 2: Selection of Parametric Duration Distributions – AIC values
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Next, we would like to say some words about unobserved heterogeneity. Unobserved heterogeneity poses the risk that the duration dependence might be the result of omitted variable bias. The inclusion of unobserved heterogeneity in our model is complicated. First, the inclusion of unobserved heterogeneity with time-varying regressors raises many complications. The inclusion of unobserved heterogeneity in a multiple risk framework poses even extra challenges. Multiple risk models can be estimated from computer programs designed for single risk models. However, the inclusion of unobserved heterogeneity cannot be estimated in a single risk model, but should be programmed separately. Even if this would be possible, the interpretations of these coefficients are not straightforward (Jenkins 2004).

As an alternative we might gain some understanding of the presence and severity of unobserved heterogeneity by estimating two separate single risk models with individual unobserved heterogeneity specifications. The results from these estimations found no unobserved heterogeneity for transgenerational entrepreneurship and some unobserved heterogeneity for start-ups. Fortunately, the direction of the effects of the parameter estimates remained largely consistent, with some reductions in significance levels in the single risk of start-ups.[8] And, more importantly, the shape of the baseline hazard proved consistent for both specifications with and without unobserved heterogeneity.

Table 3: Estimation Results

Table 3 shows the results of the duration analyses. Concerning the interpretation of the coefficients, it must be noted that a positive coefficient in the proportional hazards model signifies an increase in the hazard of becoming self-employed. Hence, large positive coefficients correspond to shorter gestation periods to enter into self-employment, *ceteris paribus*. For negative coefficients the reverse holds true.

Models 1, 4, and 7 estimate duration analysis models for the probability of becoming self-employed, irrespective of the entry route followed, for the whole sample, the sample of respondents with self-employed parents, and the sample of respondents without self-employed parents respectively. These models are used to test hypotheses 1, 2 and 3. Models 2 and 3; 5 and 6; 8 and 9 estimate independent competing risks models for the probability of entering self-employment as transgenerational entrepreneur (*TG*) or as self-made start-up (*SU*), for all respondents, for the sample with self-employed parents, and for the sample without self-

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[8] Reduction in significance is often observed (and debated) when including unobserved heterogeneity.

employed parents respectively. These models are used to test hypotheses 1a, 2a, and 3a.

All models have good model fits, except one: our model is inadequate to estimate the probability of taking over a family business conditional on not having self-employed parents. Since we are estimating independent competing risk models, interpretation of model 9 is still possible in absence of adequate model fit for model 8 (see equations 6a – 6c). Parameter estimates are often weak or insignificant for the sample of individuals without self-employed parents. At first sight, these results indicate that it is more difficult to predict self-employment, irrespective of the entry route, for individuals who did not have self-employed parents.

First we will discuss the results of our instrumental variables that serve as a proxy for human capital. The results from model 1 in Table 3 show that vocational schooling increases the probability of self-employment. The positive and significant sign of the variable vocational schooling indicates that the variety of skills offered at vocational schooling reduces the human capital constraint and reduces the waiting time into self-employment. Therefore, individuals with a high probability of vocational schooling have a higher chance to become self-employed. This supports hypothesis 1. However, the results from model 4 and 7 put some constraints on the generalizability of this claim. The positive and significant sign of vocational schooling in model 4 indicates that vocational schooling increases the probability of self-employment for individuals with self-employed parents. The insignificant result of the variable vocational schooling in model 7 shows that vocational schooling has no effect on the probability of self-employment.

The positive and significant coefficient estimate of the variable higher education in model 1 indicates that individuals with a high probability of higher education have a higher chance of becoming self-employed. Vocational education increases self-employment more that higher education ($\beta_{VS} - \beta_{HE} = 1.190 - .749 = .441$ with a p-value $< .01$) thereby proving the second part

of hypothesis 1. The difference between vocational schooling and higher education is also significant in model 4 for individuals with self-employed parents, but not for individuals without self-employed parents in model 7.

The results from model 1, 4, and 7 indicate that human capital is only an important predictor for self-employment for individuals with self-employed parents. One interpretation of this result may be the accuracy of the schooling choice. Self-employed parents may know what schooling choice is best for their offspring in order to become self-employed at a later stage in life. Therefore, schooling choices related to self-employment of individuals from self-employed family seem more intentional. They choose a study that aligns with their career choice and the deliberate schooling becomes a push strategy into self-employment. Individuals without self-employment exposure through their family are rather pulled into self-employment, not because of their schooling choices or skills, but more as a matter of fate or luck. They seem to be entrepreneurs by accident. Therefore, these results may indicate a hidden selection mechanism, as individuals from self-employed parents can better predict there career path.

Hypothesis 1a claimed that the role of vocational schooling was larger for transgenerational entrepreneurs. The positive and significant coefficient from model 2 and the insignificant coefficient of model 3 confirm this hypothesis. This result is consistent under the alternative assumption that only individuals with self-employed parents have the possibility to take over a family business. From model 5 and 6 it follows that the role of vocational schooling in this model is also higher for family self-employment (testing difference in coefficients between model 5 and 6, $\beta_{model5} - \beta_{model6} = 2.850 - 2.761 = .089$ with a p-value < 0.01)[9].

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[9] Proof for this procedure can be found in Thomas (1996).

The results of the coefficients of the variable vocational schooling from all models indicate that vocational schooling is only a good predictor of self-employment for individuals with self-employed parents. Interestingly, for this group vocational schooling is a good predictor for self-employment via both entry routes. For higher education the same pattern emerges. The negative effect of higher education is only significant for individuals with self-employed parents. The lower effect of higher education on the probability of self-employment seems to indicate that higher education increases the availability and pay of the outside option more than that it reduces the human capital constraint or the pay as self-employed. The lower effect of higher education than vocational is especially pronounced for individuals with self-employed parents. This finding is consistent with the argument of Laband and Lentz (1983) that later acquisition of human capital such as formal education is negatively related to the incidence of following.

The results of our human capital indicators pose some interesting new light on the effect of human capital on self-employment. The stronger effect of vocational schooling on transgenerational entrepreneurs than on self-made start-ups provides new information on the mechanism through which human capital affects self-employment selection. First of all, this effect suggests that individuals that take over a family business are less human capital constrained. As they are less human capital constrained, they may enter self-employment earlier, and do not accumulate unnecessary large amounts of labor market job-specific human capital. Moreover, we find evidence that formal education reduces self-employment in general and occupational following in particular.

Next to human capital, we suggested social capital as an important determinant of self-employment selection. The strong and positive effect of the variable SELF-EMPLOYED FATHER in model 1 supports hypothesis 2. Having a self-employed father reduces the time into self-

employment significantly. The presence of a significant effect of SELF-EMPLOYED FATHER on the probability to start-up a business from scratch in model 3 annihilates the possibility that a self-employed father means only family self-employment. These results indicate that self-employed parents transmit entrepreneurial specific skills to their offspring. Because the effect of the self-employed parent is stronger for transgenerational entrepreneurs, we do find strong support for our hypothesis that self-employed parents increase the chance of taking over a family business. Therefore, we find support for hypothesis 2a. We will discuss the role of self-employed parents further in relation to the time dimension.

The effect of the variable EDUCATIONAL LEVEL FATHER is positive and marginally significant in model 1. Since a highly educated father is our proxy for better access to financial resources, a highly educated father may transfer wealth to his offspring relaxing the financial constraint. So, we find marginal support for hypothesis 3. The assumed relation between parent's education and wealth is strengthened by the stronger effect of the father's education on start-up self-employment in models 2 and 3. The results show that the effect of the educational level of the father is not significant for taking over the family business, but is marginally significant and positive for self-made start-ups. Since start-ups are more financially constrained, the effect of a wealthy father is predicted to be stronger for this road leading to self-employment. This finding supports marginally hypothesis 3a. The result of the educational level of the father is more significant for individuals with self-employed parents, while the effects are not significant for individuals without self-employed parents. These results may indicate that self-employed parents may be more willing to support their offspring, as they can better assess the uncertainty and survival chances of their offspring's business adventure.

The dynamics patterns of the different roads to self-employment

What can we say about the dynamics of self-employment? Figure 5 shows graphically the estimated baseline hazards for the single risk model of becoming self-employed and the multiple risk models of transgenerational entrepreneurship and self-made start-ups. Figure 5a-5c shows the estimated baseline hazard of becoming self-employed over the period 1953-1993 of a cohort of individuals for the whole sample, the sample with individuals with self-employed parents and the sample of individuals without self-employed parents. Figure 5a shows that the hazard to become self-employed decreases over time. However, this picture changes dramatically if we look at the separated sample in Figures 5b and 5c. For individuals with self-employed parents the hazard of self-employment is very high for the first ten years and afterwards the hazard is slowly declining. This finding is consistent with Lentz and Laband's theory of occupational succession. If individuals become self-employed like their parents, they do so early in their career.

Figure 5: Baseline Hazards

For individuals without self-employed parents the hazard is the mirror image. In contrast with individuals that have self-employed parents, for individuals without exposure to self-employment via a family business, the hazard of becoming self-employed is low initially and rises than sharply in a declining rate. Two possible mechanisms may account for this finding. The most obvious mechanism arises from the fact that many individuals simply take over the family business. Consistent with our theory, we find that if individuals take over a family business, they do so in the beginning of their career. The longer they postpone that decision, the less likely they are to do so.

Alternatively, some form of learning or human capital acquisition may be the mechanism by which exposure to self-employment through a family owned business raises the probability of one becoming self-employed. The accumulation of self-employment specific human capital through youth may make the offspring more fit to become self-employed. The Figures 5f, 5i, and 5j provide some hints at which this mechanism may be responsible for the shape differential. We refrain from making conclusions from Figure 5e as this model is not significant. Obviously, the baseline hazard for becoming self-employed via a family business for individuals from self-employed parents has a sharply decreasing shape, as is indicated in Figure 5f. The relatively sharper decline of the baseline hazard for family business in Figure 5f than start-up self-employment in Figure 5j confirms the fact that the availability of a family business shortens the gestation time to become self-employment. However, individuals from self-employed parents who do not take over the family business but who start their own business still have a declining, although less steep, hazard. This provides evidence for the fact that there is some form of learning or human capital acquisition through which early juvenile exposure to self-employment through a family owned business raises the probability of one becoming self-employed.

Figure 5i shows that for individuals without self-employed parents the hazard of becoming self-employed is initially low, and increases over time at a decreasing rate. This finding suggests that for start-up entrepreneurs (formal) human capital acquisition may indeed matter. This is in line with our theoretical prediction that the probability an individual starts a business from scratch is initially low. Only after having acquired sufficient entrepreneurial capital, an individual may be able to surpass the threshold to become self-employed. Our results indicate that taking over a family business or starting from scratch are two different processes. Aggregating these two processes will offset duration dependence.

VI.   CONCLUSIONS

In this paper, we investigated the dynamics of self-employment. We have built an economic theory of the self-employment process, where an individual's human capital, financial capital, and social capital determine the gestation period to become self-employment. Our analysis reveals clear differences between people who took over an existing family business and people who founded a new firm, and between people who have had or did not have exposure to family self-employment in their youth.

The roads leading to transgenerational entrepreneurship and to start-up business ownership are fundamentally different. Continuation of a family business is like entering self-employment with a valuable set of assets already existent, while start-ups enter self-employment with the burden of financing the sunken start-up costs. Furthermore, the uncertainty of the expected profitability is much lower for a company that has learned about its true productivity, than for the novel start-up firm. The expected profitability of self-made start-ups is much more a reflection of the subjective beliefs of the business owner. This is also reflected in the finding that the probability of entering self-employment is age dependent and that the shape of the duration dependence is self-employment road dependent. The self-made start-up business has to accumulate sufficient entrepreneurial capital to overcome the set up costs that determine the self-employment threshold. This threshold is lower for transgenerational entrepreneurs. This is the mechanism behind our result that explains why for people without entrepreneurial parents the probability of beginning a self-employment career is initially low and increases only gradually with time. Vice versa, the chances of taking over a family business are initially high and decrease with time.

We tested hypotheses about the influences of social, financial and human capital on the gestation time to enter self-employment, and used a data set with a cohort structure that is unique in terms of gathered information, composition and the duration time. Earlier work on the entrepreneurial decisions that did not distinguish between the different roads leading to self-employment consequently suffered from omitted variable bias. Our results show that transgenerational entrepreneurship and self-made start-ups can have opposing or offsetting self-employment career dynamics. Moreover, the distinction between transgenerational entrepreneurship and self-made start-ups provides important new insights into the traditionally problematic relationship between human capital and self-employment that has been discussed so often in the literature.

Our study also knows limitations. First, our results can only be generalized through repetitive studies with comparable data in different locations for different time periods. Our data are collected in a special geographical location and considers the careers of people who were born at a very specific moment in time, namely during the outbreak of the Second World War. Second, for today's standards our measurement of financial and social capital are narrowly defined and measured. It would be interesting to know if the results of our study prevail when the data are much richer in nature. Third, we consider the beginning of a self-employment career regardless the type of enterprise, the size of the firm, or the company's productivity. Additional information on the type of work the company is involved in will extend the analysis beyond ours.

We like to end with some lessons that can be drawn from this study. First and foremost, the time dimension must be brought into theorizing and econometric modelling of self-employment selection. Our results show that aggregating the two separate roads leading to self-employment might offset the dynamic nature of self-employment. Moreover, disentangling these

roads alters the causal nature of some of the most relevant determinants of entrepreneurship. One important novel implication we can derive from these results is that for people without entrepreneurial social capital the onset of a self-employment career can be enhanced if the possibility to acquire entrepreneurial capital is facilitated early in life.

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TABLE 1

Descriptive Statistics

	Mean	St. Dev.
VOCATIONAL SCHOOLING*	.21	.41
HIGHER EDUCATION*	.27	.44
SELF-EMPLOYED FATHER	.39	.49
EDUCATIONAL LEVEL FATHER	2.52	.86
MARRIED*	.83	.38
CHILDREN*	.11	.31
FEMALE	.36	.48
IQ	104.73	10.27

Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) VOCATIONAL SCHOOLING*	1.00							
(2) HIGHER EDUCATION*	-.31	1.00						
(3) SELF-EMPLOYED FATHER	.07	-.02	1.00					
(4) EDUCATIONAL LEVEL FATHER	-.09	.26	.05	1.00				
(5) MARRIED*	.01	-.00	-.03	-.02	1.00			
(6) CHILDREN*	.00	.17	.08	.08	.03	1.00		
(7) FEMALE	-.12	-.11	.04	.04	.11	-.17	1.00	
(8) IQ	-.06	.33	-.14	-.14	.00	.01	.07	1.00

* in 1993

TABLE 2

Selection of Parametric Distributions – AIC values[*]

Duration Distribution		**Exponential**	**Weibull**	**Gompertz**
Sample				
Whole	*SE*	1294.0	1296.0	***1280.5***
	TG	579.0	574.4	***539.1***
	SU	943.1	***939.6***	945.1
Self-employed parents	*SE*	574.7	***571.0***	576.2
	TG	***143.4***	145.4	144.6
	SU	499.2	***494.2***	499.8
No self-employed parents	*SE*	708.0	706.1	***677.0***
	TG	435.1	427.5	***390.5***
	SU	443.4	445.1	***443.3***

[*] *SE* = Self-Employed ; *TG* = Transgenerational Entrepreneurs ; *SU* = Self-Made Start-ups. Italic and bold numbers represent the lowest Akaike Information Criterion for the different distributions and hence denotes the selected model.

TABLE 3

TABLE 3
Estimation Results[*]

Sample	Whole Sample			Self-Employed Parents			No Self-employed Parents		
Model	1	2	3	4	5	6	7	8	9
	SE	TG	SU	SE	TG	SU	SE	TG	SU
Human Capital (IV)									
Pr(*Vocational Educ*)	1.190	2.383	0.587	2.773	3.262	2.761	-0.987	1.792	-1.559
	(0.568)*	(0.976)*	(0.708)	(0.824)**	(1.226)**	(1.112)*	(0.927)	(2.573)	(1.002)
Pr(*Higher Educ*)	0.749	1.156	0.442	0.683	0.784	0.604	0.433	2.700	-0.023
	(0.332)*	(0.574)*	(0.413)	(0.430)	(0.645)	(0.576)	(0.578)	(1.467)+	(0.635)
Social Capital									
Self-employed Father	1.036	2.117	0.607						
	(0.152)**	(0.335)**	(0.183)**						
Financial Capital									
(*Proxied by:*)									
Educ Level Father	0.184	0.066	0.238	0.324	0.079	0.496	0.034	-0.014	0.035
	(0.101)+	(0.193)	(0.121)*	(0.134)*	(0.222)	(0.174)**	(0.164)	(0.398)	(0.181)
Control Variables									
Married	0.953	1.820	0.461	0.969	1.410	0.882	-0.337	-0.919	-0.210
	(0.225)**	(0.342)**	(0.283)	(0.283)**	(0.389)**	(0.394)*	(0.320)	(0.719)	(0.358)
Children	-0.263	-0.947	0.165	-0.686	-1.161	-0.363	0.519	0.120	0.597
	(0.169)	(0.313)**	(0.207)	(0.213)**	(0.333)**	(0.290)	(0.264)*	(0.742)	(0.284)*
Female	-0.638	-0.546	-0.726	-0.679	-0.855	-0.487	-0.832	0.739	-1.168
	(0.217)**	(0.360)	(0.272)**	(0.274)*	(0.416)*	(0.363)	(0.379)*	(0.936)	(0.422)**
Constant	-6.550	-7.855	-7.083	-5.804	-5.201	-7.591	-7.407	-8.700	-7.858
	(0.384)**	(0.715)**	(0.471)**	(0.608)**	(0.823)**	(0.782)**	(0.827)**	(1.507)**	(0.948)**
Distribution	Gompertz	Gompertz	Weibull	Gompertz	Gompertz	Gompertz	Weibull	Exponent	Weibull
Specification Tests									
$H_0 : \theta_{1i} = \theta_{1i} = \frac{1}{2}\,\theta_i$									
$\chi^2(12)$	121.5**	120.9**	39.7**	87.9**	71.3**	32.4**	14.3*	5.9	15.7*
N	1134	1134	1134	443	443	443	691	691	691
Observations	42182	42182	42182	15263	15263	15263	26919	26919	26919

[*] *SE* = Self-Employed ; *TG* = Transgenerational Entrepreneurs ; *SU* = Self-Made Start-ups. Standard errors are reported in parentheses.
+ significant at 10%; * significant at 5%; ** significant at 1%

FIGURE 1

Conceptual Model of the Self-Employment Process
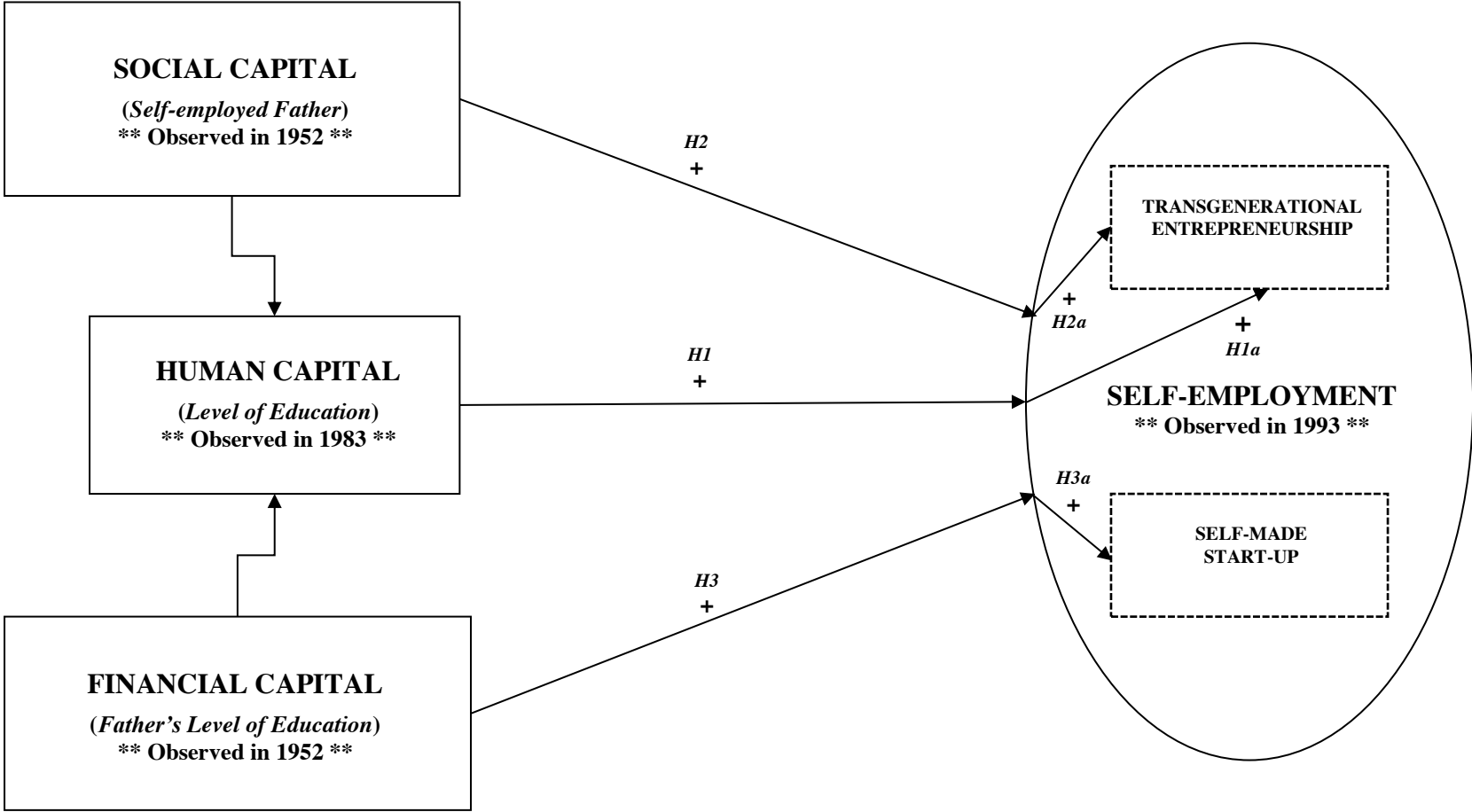
SOCIAL CAPITAL

(*Self-employed Father*)
** Observed in 1952 **

HUMAN CAPITAL

(*Level of Education*)
** Observed in 1983 **

FINANCIAL CAPITAL

(*Father's Level of Education*)
** Observed in 1952 **

H2
+

H1
+

H3
+

+
H2a

+
H1a

H3a
+

**TRANSGENERATIONAL
ENTREPRENEURSHIP**

SELF-EMPLOYMENT
** Observed in 1993 **

**SELF-MADE
START-UP**

FIGURE 2

Entrepreneurial Capital Accumulation and the Timing to Self-employment

Entrepreneurial Capital

C_{II} — Threshold II: Self-made Start-up

C_I — Threshold I: Transgenerational Entrepreneurship

Time

T_I T_{II}
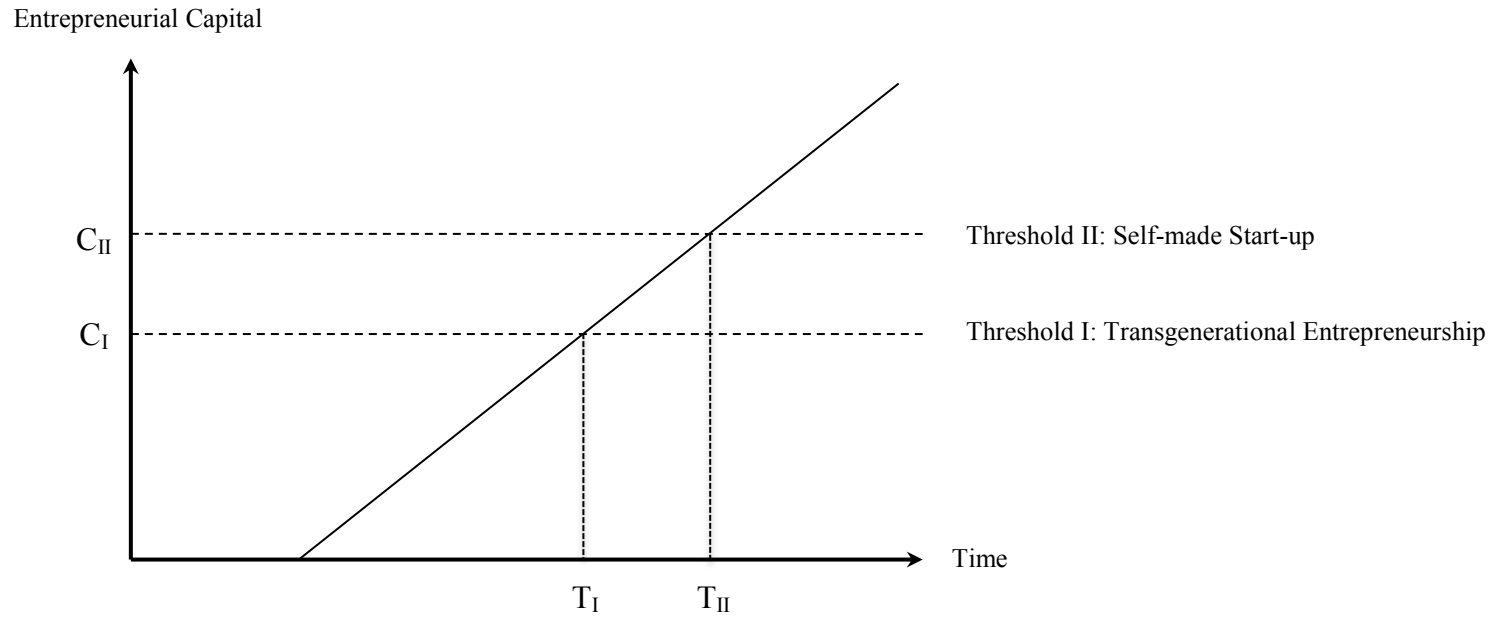
FIGURE 3

Human Capital Mechanism

Opportunity Costs

Line A = Outside Option Value

O_I .... Threshold I: Transgenerational Entrepreneurship

O_{II} -- Threshold II: Self-made Start-up

Z

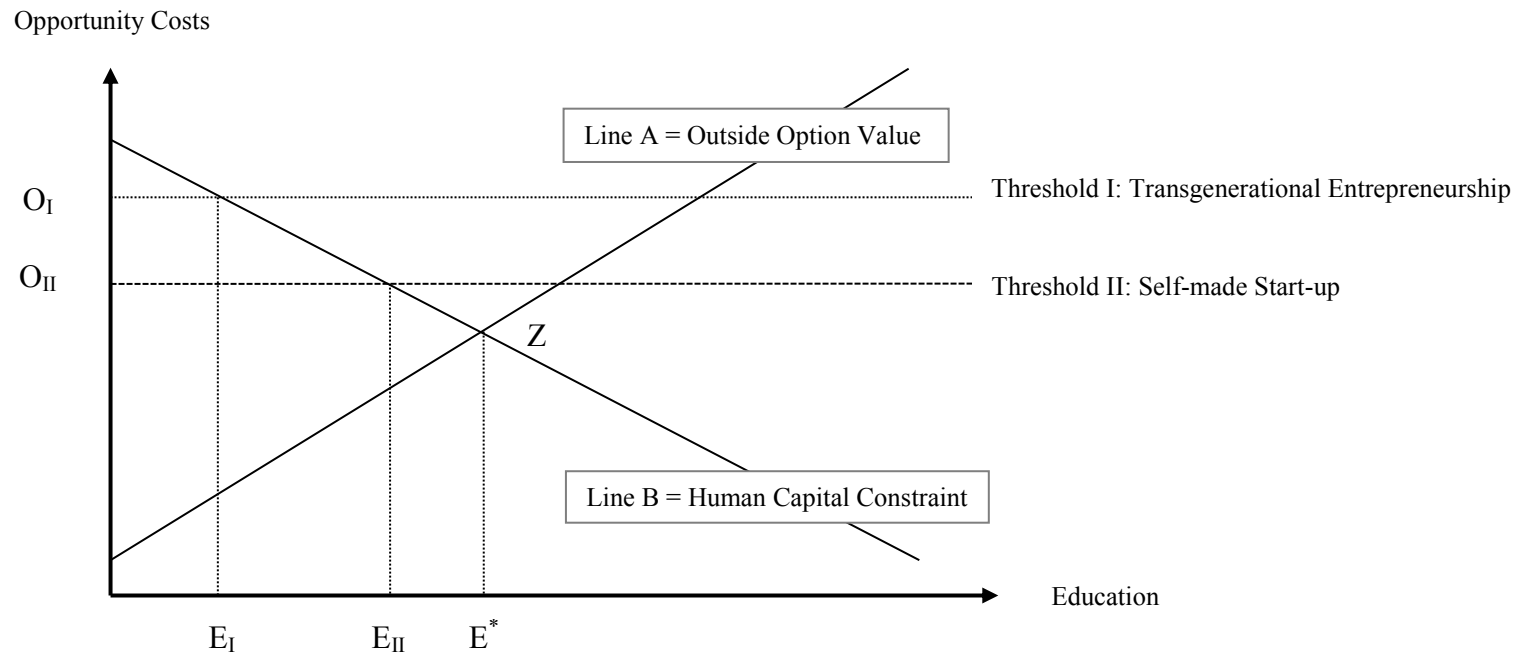Line B = Human Capital Constraint
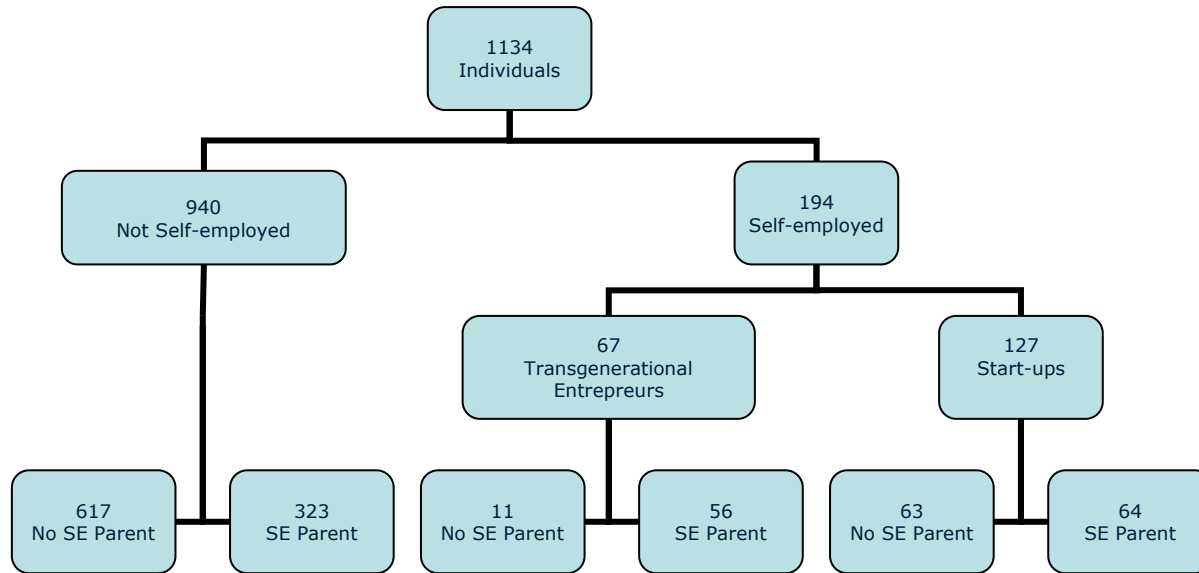
Education

E_I E_{II} E^*

FIGURE 4.

Structure of the Dataset (N=1134)

FIGURE 5

Baseline Hazards

	Whole Sample	**No SE Parents**	**SE Parents**
SE	Gompertz regression (a)	Weibull regression (b)	Gompertz regression (c)
TG	Gompertz regression (d)	Exponential regression (e)	Gompertz regression (f)
SU	Weibull regression (g)	Weibull regression (h)	Gompertz regression (i)