

DO HUMAN AND SOCIAL CAPITAL INVESTMENTS INFLUENCE SURVIVAL? A STUDY OF FEMALE IMMIGRANT ENTREPRENEURSHIP IN GERMANY

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ABSTRACT

The objective of this study is to examine to what extent investments in human and social capital enhance the survival performance of immigrant and native female entrepreneurs in Germany. The empirical analysis is based on unique data derived from the Chamber of Industrial and Commercial Matters in Munich, Germany. The data set consists of 110,250 companies that were either founded or liquidated in Upper Bavaria during the period 1997-2004. We develop a Gompertz-Makeham hazard model to predict the survival changes of those enterprises.

Our main findings confirm the negative influence of either aforementioned type of capital on the hazard rate. Most notably, the inverted U-shape relation is not only evident between success and human capital endowment, but between social capital and survival duration as well. The latter result is unique in its nature, and has not been detected for the area of immigrant entrepreneurship in general.

INTRODUCTION

Launching a new venture and being a successful immigrant entrepreneur in a new economic and social environment after overcoming the start-up stage are two considerably different subject matters. The economic performance, in particular the survival, of the newly established business can be influenced by factors such as human and social capital. Investments in human and social capital are widely believed to enhance employees' performance (Boselie, Paauwe and Jansen, 2001; Gelderblom and de Koning, 1996; McDuffie, 1995). Similarly, many authors advocate that this relationship should also exist in the case of entrepreneurial performance (Brüderl and Preisendörfer, 1998; Van Praag and Cramer, 2001; Van Praag, 2003). This is understandable, since entrepreneurship is, first, a fundamental characteristic of modern, knowledge-based economic activity. And second, it is because the potential value of new business ideas and knowledge is inherently uncertain. This uncertainty, however, can be absorbed by a large number of individuals starting new enterprises to pursue, investigate and implement ideas (Audretsch and Thurik, 2001).

The links between entrepreneurship and survival have been investigated in a number of social science disciplines, including economics, sociology and regional studies. Numerous studies (see Geroski and Schwalbach, 1991) reported on the research related to the extent, causes and consequences of firm entry into the market. More recently, Geroski (1995) as well as Audretsch and Mata (1995) provided evidence that one of the major conclusions from entry studies is that the entry process does not end with the entry itself. The greatest obstacle in analysing the post-entry performance of firms is the lack of longitudinal databases that identify the actual start-up and closure dates of new firms.

Several studies, however, have investigated the post-entry performance of new enterprises and their determinants. Hall (1987) found, for instance, that the survival rate of new entrants is low, but their survival probability is positively correlated with firm size and age. Phillips and Kirchoff (1989) showed that the probability of survival increases with firm age. They also found that survival rates varied by industrial sectors, with manufacturing indicating the greatest survival rate on average. Finally, Audretsch (1995) used the theory of firm selection and industry evolution to deduce hypotheses (initial start-up size and employment growth rate) about the factors shaping the post-entry performance of newly launched companies, and on the other hand the factors determining their employment growth and survival.

Almost all of the studies aforementioned focus their analysis on manufacturing industries merely. However, none of them investigate the post-entry performance of immigrant entrepreneurs, and more precisely of those venturing in Germany. Consequently, the objective of this chapter is to quantify, aside from other determining factors, the extent to which investments in human and social capital do enhance the immigrants' entrepreneurial success in Upper Bavaria, Germany, the only region for which the Chamber of Industry and Commerce collects data on nationality. We do so by estimating a duration model, in particular, a Gompertz-Makeham hazard model. The extreme scarcity of the application of such techniques to understand business survival is astonishing. To the best of our knowledge, this is the first person-orientated duration analysis for business survival of enterprises established by immigrants in Germany, and on the other hand applying longitudinal data for the same.

THEORETICAL FRAMEWORK ON DETERMINANTS OF SURVIVAL

Several studies have been conducted on industrial dynamics or on the process by which newly established companies either survive and grow, or exit from the market. In the last few years, empirical research that has been undertaken by Fichman and Levinthal (1991) and Brüderl (1992), uses the arguments of organisational ecology, in which they modify the liability of newness argument. This suggests that organisational hazards actually follow an inverted U-shaped pattern rather than continuously declining with age. This argument is associated with the 'liability of adolescence': during the first short period, the hazard (mortality) rate is rather low, but on the other hand, the end of adolescence (after six-nine months) is denoted by a mortality maximum. Moreover, they argue that newly founded enterprises often possess a stock of initial resources, such as human, social and financial capital, for instance. This stock helps them to survive for a specific period of time, during which they can establish their new structure. This early stage of a company life cycle is named 'adolescence'. During early adolescence one might expect lower mortality rates, whereas at the end of this phase, mortality should increase dramatically due to used up initial resources and final evaluation. In this context, it is essential to investigate further the relationship between the human and social capital endowment and the firm founder's performance after the adolescent stage. Do companies with more general and industry-specific human and social capital endowment perform better?

Human Capital Hypothesis

Human capital has long been acknowledged as an important factor for individual productivity (Becker, 1964; Schultz, 1961) and has been increasingly identified as a factor influencing the performance of firms (Bartel, 1989; Howell and Wolff, 1991; Prais, 1995). The development of modern ideas about human capital is largely due to the research of Theodore Schultz and Gary Becker because of their separation (and Becker's coining) of the terms 'general' (off-the-job training) and 'specific' (on-the-job training) human capital. The majority of social science researchers, who have adopted the human capital framework, use synonymously education, skills, and human capital. In particular, in the vast majority of human capital studies, education is the most important component of human capital. There is, however, an increasing number of scholars who point out that formal education is only one way to create skills. Howell and Wolff (1991), for instance, question the adequacy of years of education as a measure of workplace skills. They argue that most jobs require a multitude of different skills for adequate task performance, ranging from physical abilities to cognitive and interpersonal skills. They also consider that in some occupations, educational achievement may not be a direct measure of job-related skills *per se*, but a device used to screen for the ability to learn on the job, and for desirable social and personal characteristics.

The positive impact of human capital on employee performance is widely accepted in social science research. Van Praag and Cramer (2001) made a first attempt to formulate this implication for the case of the business founder. Several authors, including Pennings, Lee and Van Witteloostuijn (1998), Van Praag (2003) and De Wit and Van Widen (1989), have put forth empirical support for the theoretical foundation. As referred to earlier, most of the studies concentrate on human capital-related issues; those associated with human capital theory implicitly assume that survival is not problematic. In fact, most of the existing empirical studies, whether they use statistical analysis (Bartel, 1991) or case studies (Blanchflower and Burgess, 1996; Mason and Wagner, 1999), neglect the issue of survival, focusing their investigation on firms that were in business at the time of the survey or study. A large proportion of firms, however, do not survive as identifiable units beyond their first few years, and only a small proportion achieves significant growth (Baldwin, 1995). Nevertheless, human capital does influence the survival performance of newly established enterprises. In this sense, the existing literature in general gives support to our first hypothesis that

Hypothesis 1: Higher levels of human capital accumulation as measured by age of the entrepreneur are associated with higher survival rates in general.

This relationship, however, will have to be scrutinised while controlling for other influencing factors.

Social Capital Hypothesis

As far as we know, the impact of social capital on a business founder's performance has not yet been put in an appropriate theoretical perspective. In recent years, the concept of social capital has been associated with a number of characteristics vital to public policy making. Referring to features such as trust, norm and networks (Putman, 1993), it has been shown to be a causal factor of corruption (Uslaner, 2001), economic growth (Zak and Knack, 2001) and quality of government (Knack, 2002). Social capital can alternatively also be defined as people's ability to work together in groups and companies for a common purpose (Coleman, 1988). As such, the presence of social capital determines how easily transaction costs are reduced because informal self-enforcement of contracts is possible without third-party enforcement. Having social capital can thus help alleviate Prisoner's dilemma-type situations and in this way, social capital becomes 'the glue that holds societies together', lubricating voluntary collective actions, increasing income, dampening the effect of uncertainty on entrepreneurial performance, and accordingly, serving as an additional production factor.

For the purpose of this analysis, we focus on social capital related to the resources already acquired via the social network and on access to the resources of the network ties, which include both human and social capital of the ties. In this context, research on immigrant entrepreneurship reveals, for instance, that within the closely knit communities of Chinese and Korean immigrants, even distant family members are willing to fund a new business start-up (Bates, 1997).

Additionally, ethnic and linguistic homogeneity appears to be an important factor in creating social capital. The highest levels of human capital within the United States, for instance, are in the states of the Old Northwest, which are among the most homogeneous in the country (Glaeser, 2001). Many authors have identified the percentage Lutheran effect or the Scandinavian effect on social capital, which seems to be linked to the relative homogeneity of these areas. Indeed, out of the six countries with the most social capital, four are Scandinavian. At the bottom of the list is Brazil, which is an enormously heterogeneous area. Ethnic heterogeneity is often accompanied by education and income heterogeneity, both of which also appear to depress the acquisition of social capital. However, we could assume that the impact of ethnic and linguistic homogeneity as proxy for social capital endowment on the survival performance of newly established enterprises would be positive, i.e. enterprises established in countries, regions and industrial sectors characterised by higher levels of homogeneity would have lower transaction costs, and thus, a better chance of survival at least in the first few years after enterprise establishment. Hence, hypothesis two implies that

Hypothesis 2: Higher levels of social capital endowment are associated with greater survival performance.

Specificity of Investment in Human Capital

The capital invested by the business founder can be differentiated with respect to the specificity of investment. In accordance with the human capital theory (Becker, 1964) and the resource-based theories of the firm (Montgomery, 1995), the more specific an investment to its current application, the higher should be the expected returns and its contribution to the firm survival performance, respectively. On the other hand, the returns on a deliberate specific investment in a current activity should be sufficiently sizeable to outweigh the cost associated with this investment. Contrarily, the returns on an investment in a more general asset might accrue to the investor over a long period of time while performing miscellaneous activities. Moreover, the resource-based theory of the firm assumes that success is determined by the extent to which Ricardian rents are earned by the accumulation and development of non-imitable resources. The likelihood of resources being non-imitable is higher when they are obtained through specific investment than through more general investments. Consequently, we should contrast general investment with industry-specific investment in human capital. The latter investment loses part of its value outside the industry, which the enterprise is operating in. Our last hypothesis, therefore, is that

Hypothesis 3: Industry-specific investments in the entrepreneur's human capital have a stronger influence on the survival of a company than general investments.

DATA

The survival analysis is based upon representative longitudinal data from the Chamber of Industry and Commerce in Munich, Germany. The initial data set consists of 117,423 companies that were either founded or liquidated in the region of Upper Bavaria. The data on enterprise registrations are available for the period 1997-2001, and on liquidations for 1997-2004. Due to the specific structure of the empirical data, the survival time is the only measurement of entrepreneurial performance. Additionally, we have constructed a variable measuring the number of years that a firm has been active, as the business registrations is specified by actual date. Besides the survival period, the data provide information on: (i) administrative district ('*Landkreis*') where the enterprise has been established; (ii) cause and mode of liquidation; (iii) first name, date of birth and nationality of the entrepreneur, which gives us also the opportunity to ascertain the gender of the founder in 92.3 % of the cases; and finally (iv) industrial sector, which the enterprise is operating in.

The data set described above is fascinating, but there are some problems due to process-specific matters, which we will explicitly stress in this section. In 173 start-ups, for instance, the year of liquidation was before 1997 or after 2004. Since it was impossible for us to reconstruct which point the company was actually liquidated at, these cases were treated as missing values. Additionally, in 7,000 cases, the date of liquidation was before that of establishment, and therefore these companies as well as those where the reason of liquidation was 'doubly documented' were excluded from the empirical analysis. As a result the further econometric analysis is based on 110,250 registrations and liquidations.

In addition to the fundamental variables stated above, we collected a series of context-specific parameters, in particular such as: (i) number of companies in various industrial sectors according to administrative district at different points in time; (ii) population at different points in time; (iii) unemployment rates; (iv) real gross domestic product; and (v) number of resident foreign population.

SURVIVAL PERFORMANCE IN UPPER BAVARIA

Dimension of Survival by Founder's Nationality

For the period under empirical investigation, Germans in Upper Bavaria established 97,383 enterprises out of 110,250, while foreigners registered the remaining 12,867 companies. Female entrepreneurs accounted for 39,910 (36.2%) foundation in the total sample, though; there exists significant difference between German and immigrant female entrepreneurs. For instance, German female founders established 37,395 enterprises while immigrant females accounted for 2,515 firms. However, table 1 depicts the distribution of the ten most entrepreneurial female individuals by nationality in absolute and relative numbers. According to table 1, German female founders account for 38.40% of the enterprise registrations in Upper Bavaria, followed by those from Austria and Yugoslavia. Among the foreign entrepreneurs every third was holding Austrian citizenship. One possible explanation for this development may be the lower transactions cost associated with the establishment process as Austria is a neighbouring country of Upper Bavaria, and both places have the German language in common, apart from similar institutional regulations pertaining to the foundation process. Finally, the companies listed in table 1 account for 99.35 % of all female business establishments during the period 1997-2001.

[Table 1 about here]

By the end of the period under investigation, of all registered enterprises 56.74% were liquidated. The chances of survival for female entrepreneurs are noticeably lower than for males. Taking all founders into consideration, the median for male founders amounts to 4.71 years (4 years and 8 months), and for females, 4.05 years (4 years and 18 days) respectively. This difference is much less among the immigrant entrepreneurs in Upper Bavaria. The survival duration for companies established by males is 3.34 years, and for those by females, 3.31 years. The median for the German males and females accounts for 4.87 years and 4.11 years, correspondingly. In sum, the difference is 11 days for the benefit of male immigrant entrepreneurs and 278 days for the German male founders. However, approximately eight years later, only 35.75% of the registered companies in Upper Bavaria were still operating on the market.

Industrial Sectors

The data include also the industrial sectors following the five-and six-digit classification by the German Federal Statistic Office. We pooled that information into ten groups and our subsequent analysis is based predominantly on the so generated industrial sectors. However, table 2 illustrates the

distribution of companies in percentage of each group, German versus Non-German founders, operating in the particular industrial sector.

Accordingly, the sector ‘other services’ accounts for by far the largest group (40.23 %) in Upper Bavaria, followed by companies from the retail industry (29.66 %). There are major differences between German and Non-German female founders with respect to the distribution of enterprises by industrial sector. In this context, the industrial sectors ‘other services’ and ‘retail’ are the most interesting. While 40.72% of the companies founded by Germans are operating in the ‘other services’ sector, this holds true only for 33.61% of those established by Non-Germans to Upper Bavaria. Hence, both German and immigrant female entrepreneurs are over-represented in this industrial sector.

[Table 2 about here]

More German entrepreneurs, on the other hand, are operating in the sector ‘retail’, namely 30.15% in contrast to 22.95% of immigrants. Additionally, Non-German entrepreneurs are more likely than German founders to register a company in the sector ‘catering and hotels’, followed by ‘sales agency’, ‘wholesale’, and ‘communication and transport’. The aforementioned differences between the two groups of female entrepreneurs are statistically highly significant.

The survival performance between German and Non-German female entrepreneurs varies across industrial sectors. Table 3 represents the median of the survival duration by the ten industrial sectors regrouped for the purposes of our analysis. The highest chance of survival for Non-Germans is in the ‘paper, print and publishing’ sector, whereas for Germans this is the second best. Within this industrial sector, 62.5 % of the companies established by Non-German founders venture in the ‘print business’, followed by ‘publishing’ (25.0 %), and ‘paper-, cardboard- and paperboard processing’ (12.5 %).

[Table 3 about here]

Furthermore, the sector ‘animal husbandry and agriculture’ offers Germans the best chance of survival, and Non-Germans the least. This tendency may be due to differences in cultural habits and agricultural methods. The ranking of the ‘retail sector’ is for all founders nearly identical: ranking three for Germans and four for Non-Germans according to their survival in years. In total, Non-Germans venturing in Upper Bavaria have poorer survival chances compared with Germans in all industrial sectors.

METHOD OF ECONOMETRIC ESTIMATION

The techniques of survival analysis (Blossfeld and Rohwer, 1995) are used to test the outlined theoretical arguments as they surmount the problems that arise from the straightforward application of OLS and binary dependent regression models. The variable of interest in the duration analysis is the length of time that elapses from the beginning of a particular event (firm foundation) either until its end (liquidation) or until the measurement is taken into consideration (censoring), which may precede termination. The process under observation may have begun at different points in time; therefore, censoring is a pervasive and usually unavoidable problem in the analysis of duration data.

In modelling survival likelihood of business foundations, the quantity of fundamental interest is the so-called hazard rate, which can be defined variously as:

$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{\Pr(T \leq t + \Delta t | T \geq t)}{\Delta t} = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{S(t)} \quad (1)$$

where t denotes time, T is the random variable for the time of the event and $f(t)$, $F(t)$ and $S(t)$ depict the density, cumulative distribution, and the so-called survival probability respectively. The quantity $\Pr(T \leq t + \Delta t | T \geq t)$ in equation (1) gives the probability of having the event (firm liquidation) between time t and $t + \Delta t$, conditional on yet being accoutred. Hence, this quantity provides the probability that the event will emerge between ‘now’, as indexed by t , and some time in the future, as indexed by $t + \Delta t$. For event appearing in conditional time, it is desirable to define over all possible positive t denoted by the limit in (1).

Gompertz-Makeham Hazard Model

The hazard rate, however, is more interesting to be modelled than the survival rate of the density. The assumption of a constant rate seems to be rather unrealistic as it implies that the risk for a particular enterprise to fail at any time of its existence is identically high. Hence, the question about the lapse of

the hazard rate arises. The existing literature, however, gives support to different concepts, which we will briefly state below, in order to explain why we should favour the Gompertz-Makeham model over the other parametric models.

‘The liability of newness’ proposition traces back to Stinchcombe (1965) and it describes the different risks of an enterprise to die during its course of life. This phenomenon states that at the time of founding of a company the risk of dying is the highest and decreases with growing age of the company. There are basically three reasons why this might be the case. First, new enterprises, which are operating in new areas, demand for new tasks to be performed by their members. The learning process takes time and leads to economic inefficiencies. Second, trust among the enterprise members has yet to be developed since in most of the cases, the new employees of a firm do not know each other when the enterprise is launched. And third, new companies have not yet built stable portfolios of clients, which do not hold true for age-old companies. A recent wave of studies has emerged consistently showing that the likelihood of firms to survive tends to increase along with age of the firm (Fichman and Levinthal, 1991, Brüderl, 1992; Audretsch and Mahmood, 1994). This finding holds true across different industrial sectors, time periods and even countries (Audretsch, 1991). Overall, the empirical findings of the entrepreneurial literature confirm ‘the liability of newness’ proposition.

Additionally, Brüderl (1992) used the arguments of organisational ecology, in which he modified ‘the liability of newness’ proposition. He suggested that the company’s hazard rate actually follows rather an inverted U-shape pattern than continuously declining with increasing age. This argument is associated with ‘the liability of adolescence’ proposition. The reasons for this are cognitive, emotional, and financial. First, it will only become clear after some period of time that the firm, or the firm’s performance, is not reaching expectations. It takes the entrepreneur time to acquire insight into the financial figures. A second reason why a firm is closed down after a few years is the presence of an emotional barrier. It is often difficult to admit to oneself and one’s immediate circle that establishing the new enterprise was not really a success. A third factor is that it can take some time to use up the start capital.

Several hazard rate models can represent the aforementioned theoretical arguments. The ‘liability of newness’ hypothesis, for instance, can be modelled applying the Gompertz-Makeham model, whereas the ‘liability of adolescence’ using the log-logistic hazard model. According to our data, an ‘adolescence’-phase employing the log-logistic model can be found, but this is too short (less than month), and thus, can be regarded as negligible.

In the single transaction case, the Gompertz-Makeham-model is based on the assumption that the baseline hazard rate increases or decreases monotonically. The hazard rate is denoted as follows (Blossfeld and Rohwer, 1995):

$$h(t) = \alpha + \beta \exp(\gamma t), \quad \gamma < 0 \quad (2)$$

The parameters in the model specified by equation (2) can be interpreted as follows. Setting $t = 0$ gives the hazard rate at enterprise establishment:

$$h(0) = \alpha + \beta .$$

Setting $t = \infty$ gives the asymptotic hazard rate, the rate that applies to age-old firms:

$$h(\infty) = \lim_{t \rightarrow \infty} [\alpha + \beta \exp(\gamma t)] = \lim_{t \rightarrow \infty} (\alpha) + \beta \lim_{t \rightarrow \infty} [\exp(\gamma t)] = \alpha .$$

Thus β determines the amount by which the initial hazard rate exceeds the asymptotic rate α . Finally, γ governs the speed at which the hazard rate falls with a company’s age, the rate at which the liability of newness wears off. Accordingly, large negative values of γ will imply that the liability of newness diminishes rapidly.

In total, we model the survival performance based on the Gompertz-Makeham hazard model. The hazard rate is represented as a function of a set of exogenous covariates, which entered the model into the β vector, so that

$$h_i(t) = \alpha_i + \exp(b'x) \exp(\gamma_i t) \quad (3)$$

where b' is a vector of parameters, x is a matrix of regional and entrepreneur-specific covariates, and $\beta_i = \exp(b'x)$. We estimate the so specified model by applying the maximum-likelihood-method, and we discuss the obtained results comprehensively in the following section.

EMPIRICAL RESULTS

Results for the human capital endowment

Human capital, proxied by age in the study, appears to influence the survival performance of immigrant and native female entrepreneurs in Upper Bavaria during the period under investigation. Figure 1 illustrates the survival performance of either entrepreneurial group.

[Figure 1 about here]

For all age-groups the survival performance of the immigrant founders is poorer in comparison to the Germans. The survival chance of even the most successful 46-55 age-group among the immigrants is lower than that of the least successful German group. It should be mentioned, however, that the medians lead to similar results. With respect to the immigrant entrepreneurs, the values are: 1.94 years for the 17-25 age-group, 2.57 years for the 26-35 age-group, 3.76 years for the 36-45 age-group, 3.91 years for the 46-55 age-group, and 2.84 years for the 56-older age-group. In other words, the human capital endowment as proxied by age influences the survival performance of female founders in Upper Bavaria, but this first result could not explain why immigrant founders from the same class have a different probability of being successful.

Additionally, we estimated a Gompertz-Makeham attaching as covariates the entrepreneur's age and age-squared (table 4).

[Table 4 about here]

Accordingly, the impact of age on the hazard rate is statistically highly significant and as expected negative. In other words, being one year older when establishing the own company will prolong the survival by 2.22 per cent. Nevertheless, the positive impact of the covariate 'age-squared' corroborates the assumption of the inverted U-shape correlation between age of female entrepreneur and survival duration as measure of success; hence it is almost impossible to predict at what age the negative effect on the hazard will reverse into positive one. Unfortunately, we have to stress that founder's age is the only indicator that can be used as a proxy for the human capital endowment due to the structure of the data set provided by the Chamber of Industry and Commerce in Munich, Germany.

The distribution of the survival (median) by age and industrial sector allows analysing the impact of the industry-specific human capital on the firm performance. For that purpose, we estimated a Gompertz-Makeham model incorporating covariates for the industrial sectors as proxies for the industry-specific human capital investments (Table 5).

[Table 5 about here]

According to the obtained estimates, female entrepreneurs venturing in the industrial sector 'paper, print and publishing' have the highest likelihood to stay longer in business given the fact that the reference group 'other services' belongs to the industries accounting for good survival performance. More precisely, establishing a company in aforementioned sector will decrease the hazard rate by 35.85 per cent compared to the 'other services'. Surprisingly, the retail sector also impacts the hazard rate negatively. Deciding to launch a business in this particular industry will prolong the survival performance by 12.72 per cent. The estimated influence of the agricultural sector on the hazard rate is negative as well, but because of its statistical insignificance, it should be taken into consideration cautiously. Finally, the remaining industrial sectors incorporated in the survival analysis increase the hazard rate compared to the sector 'other services'. The worst survival performance can be expected in communication and transport sector, followed by the catering and hotels. This can be explained in turn by the less industry-specific human capital required there.

Results for the social capital endowment

Social capital also appears to influence the survival of female entrepreneurs. Contacts with other entrepreneurs of the same nationality, for instance, have a positive effect on the economic performance of a business founder (Fertala, 2004). In other words, we can expect that in regions with a relatively high proportion of immigrants, the probability of social networking and survival will both be higher.

To test the second hypothesis, we use as a proxy for the social capital endowment the proportion of resident foreign population by administrative district in Upper Bavaria. The city of Munich, for instance, accounts by far for the highest share of immigrants among the regions under consideration, and therefore requires separate examination. On the other hand, the heterogeneity among immigrants in regions where they are more highly represented may be greater than in regions with a smaller proportion of foreign population. In this context, the social networking in smaller administrative districts and with a smaller proportion of immigrants may be intensive. However, we regard the percentage of immigrants as small when it averages below 7%, as medium-range when it is between 7-12%, and high when it exceeds 12% cent for the period 1997-2004. Accordingly, administrative districts such as Ingolstadt, Munich city and Rosenheim city have a high proportion; the Berchtesgaden region, Bad Toelz, Dachau, Ebersberg, Freising, Fuerstenfeldbruck, Garmisch-Partenkirchen, Miesbach, Munich region and Starnberg have a medium-range proportion; and the regions of Altoetting, Eichstaett, Erding, Landsberg am Lech, Muehldorf, Neuburg-Schrobenhausen, Pfaffenhofen, Rosenheim region, Traunstein and Weilheim-Schongau have the smallest proportion of foreign population. In our view, it would be more precise to incorporate into the analysis the share of each particular nationality when investigating the impact of social capital on survival, but unfortunately these data are not available.

When we consider the survival performance of female entrepreneurs by percentage of foreign population resident in a certain administrative district, we found that it was notably greater in districts with a medium or high percentage of immigrants living there. Figure 2 shows the survival duration of female enterprises by proportion of foreigners in the region.

[Figure 2 about here]

In view of that, female founders are the most successful in districts with a medium share of resident immigrants. The worst economic performance is seen in regions with a relatively low percentage of immigrants, and the likelihood of these companies being liquidated is extremely high in the period between one and five years after foundation. These first results point out to an inverted U-shape relationship between survival and proportion of immigrants in a particular region, which to my best knowledge have not been found yet by other scholars studying the female entrepreneurship.

Before investigating the aforementioned relationship in detail, the industrial structure pertaining to the administrative districts in Upper Bavaria needs to be assessed. For this purpose, we carried out a cluster analysis including variables such as unemployment rate, GDP per capita, trade tax collection rate, population density (proxy for urban and rural area), and share of industrial sectors out of the total number of firms as a reference to whether it concerns rather an agricultural, an industrial or a service region. We used average values over the observed time period, and the K-mean algorithm clustered the established enterprises into four groups.

Hypothesis two is fully confirmed for cluster one. In other words, companies founded in a region with a medium proportion of immigrants show better survival performance, whose median amounts to 3.74 years (1,863 companies). In contrast, the survival performance of companies established in districts with a lower percentage of foreign population is 2.89 years (989 companies). These differences are statistically significant at the one per cent level. In cluster three, the firms founded in districts with a low proportion of immigrants survive longer. More precisely, the median for the higher proportion amounts to 2.43 (498 enterprises) years, as apposed to 2.54 years (338 enterprises) for the low proportion. The estimates are not statistically significant and therefore should be handled with caution in this particular cluster. Cluster four confirmed our hypothesis pertaining to the social capital endowment. Moreover, the median computed is 3.75 years (610 enterprises) for firms founded in regions with a medium share of foreign population in comparison to a median survival performance of 2.92 years (517 enterprises). The differences are statistically significant at the five per cent level.

How does the share of immigrant population in Upper Bavaria influence the hazard rate? We assume that the impact of the share will be stronger for newly founded companies at the beginning whereas this may not be the case for those companies already in operation. Therefore, we estimated three different specifications of the Gompertz-Makeham model: in the first, we excluded the share of the foreign population, while in the second the population is included, and in the third specification, we tested for the inverted U-shape relationship. We also incorporated into the hazard model the covariates: tax trade collection rate, unemployment rate, and population density.

[Table 6 about here]

The estimated hazard model two (table 6) suggests that a one-percentage point increase in the foreign population share yields a 4.31 per cent decrease in the hazard rate. While including the squared share of the foreign population into the model three in order to account for the inverted U-shape relation between social capital and survival, the effect of the foreigners even strengthens. In other words, a one-percentage point increase in the share leads to a 5.28 per cent decline of the hazard rate whereas the squared share causes a 0.21 per cent increase of the same. However, it is extremely difficult to estimate the level at which the still positive effect of the increasing share reverses the impact on the hazard rate. On the whole, we can conclude that there is sufficient support for hypothesis two that social capital positively affects entrepreneurial performance of females in Upper Bavaria but at a declining rate.

CONCLUSION

Combining human and social capital theory with ideas from organisational ecology, we investigated a broad range of factors influencing the mortality process of newly founded enterprises by female immigrants and Germans in Upper Bavaria during the period 1997-2004.

The main finding of our empirical analysis suggests that survival chances vary between the two main groups subject to investigation. We uncovered that the endowed level of human capital of a business founder shows an inverted U-shaped pattern. More precisely, the 17-25 age-group indicates the highest mortality rate among the female entrepreneurs while the 46-55 age-group is the most successful. The results obtained for the founder's age confirm the empirical evidence found by Preisendörfer and Voss (1990) employing data on registrations and deregistrations in the area of Munich and Upper Bavaria for the period 1980-1984. The authors also grouped the age of German founders and used it as a proxy for general human capital as we did. Human capital alone, measured by the entrepreneur's age, influences the hazard rate negatively, but it could not explain the different chances of survival across the female entrepreneurs as peer founders do not necessarily have the same level of human capital endowment. Hence, we can conclude that the general human capital does impact the entrepreneurial success, but is not the unique determinant of survival performance.

Rather investments in industry-specific human capital contribute significantly to explaining the cross-sectional variance of the survival performance of entrepreneurs. Generally, this type of human capital is measured by variables such as industry-specific, self-employment, and leadership working experience (Brüderl et al., 1992), and on the other hands, by industrial sector dummies (Preisendörfer and Voss, 1990). As the Chamber of Industry and Commerce in Upper Bavaria does not collect such data, we tested the impact of the specific human capital on survival by applying industry dummies. This approach, however, is well accepted in the existing literature. Accordingly, we found that the industries such as agriculture, paper, print and publishing, and retail, offer female founders better survival relative to the sector 'other services'. The communication and transport sector show the highest mortality rate. Even in the Brüderl's et al. study, the transportation sector accounted for the worst survival performance, but in comparison to the manufacturing.

The social capital in terms of social homogeneity of a particular region in Upper Bavaria affects positively the survival likelihood of businesses founded by females. We also uncovered empirical evidence for an inverted U-shape relationship between social capital and survival, which to best of our knowledge, is unique in the female entrepreneurship research, and has to be confirmed by other studies in the field.

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APPENDIX

Table 1: Female Enterprise Registrations in Upper Bavaria by Founder’s Nationality, 1997-2002

Nationality of the Founder	Number of Registered Enterprises	Fraction of Enterprises in Percentage
Germany	37,395	38.40
Austria	851	2.13
Yugoslavia	447	1.12
Italy	249	0.62
Greece	198	0.50
Turkey	181	0.45
Poland	128	0.32
U.S.A.	86	0.22
Great Britain and North Ireland	68	0.17
Czech and Slovak Republics	46	0.12
Total	39,649	99.35

Source: Own calculations based on data provided by the Chamber of Industry and Commerce in Munich, Germany.

Table 2: Composition of Data According to Industrial Sector, 1997-2001

Industrial Sector	Immigrant Female Firms	German Female Firms	Total Female Firms
	In Percentage	In Percentage	In Percentage
Animal Farming and Agriculture	0.00	0.30	0.28
Paper, Print and Publishing	0.82	0.85	0.85
Manufacturing	0.00	0.49	0.45
Catering and Hotels	16.39	8.62	9.15
Communication and Transport	5.74	3.76	3.89
Insurance Industry and Finance	4.10	4.55	4.52
Sales Agency	9.02	3.76	4.12
Retail	22.95	30.15	29.66
Wholesale	7.38	6.80	6.84
Other Services	33.61	40.72	40.23

Source: Own calculations based on data provided by the Chamber of Industry and Commerce in Munich, Germany.

Table 3: Female Survival Performance by Industrial Sectors in Years, 1997-2004

Industrial Sector	Survival of Non-German Firms (Median)	Survival of German Firms (Median)	Total Survival (Median)
Animal Farming and Agriculture	2.05	5.64	5.14
Paper, Print and Publishing	4.49	5.19	5.18
Manufacturing	2.50	4.02	3.84
Catering and Hotels	3.17	4.14	3.79
Communication and Transport	3.40	3.45	3.43
Insurance Industry and Finance	2.83	4.35	4.22
Sales Agency	4.02	4.70	4.58
Retail	3.44	5.07	4.86
Wholesale	3.27	4.43	4.18
Other Services	3.51	4.53	4.45

Source: Own calculations based on data provided by the Chamber of Industry and Commerce in Munich, Germany.

Table 4: Impact of Human Capital on Survival Performance of Female Entrepreneurs in Upper Bavaria

Covariates	Coefficient	P-Value
Constant Term, α_i	-4.6438*	0.0953
B Terms of the Hazard Rate		
Constant Term	-3.5673**	0.0428
Age of Entrepreneur	-0.0225*	0.0656
Age-Squared of Entrepreneur	0.0022**	0.0247
Constant Term, γ_i	-0.0308**	0.0319
Number of Observations	39,910	
-2 Log-Likelihood	39,038.470	
χ^2 – Square (P-Value)	51.427 (0.000)	

Note: The number of stars indicates significances of the estimates. One star represents ten per cent, two five per cent, and three one per cent level of significance.

Table 5: Impact of Industry-Specific Human Capital on Survival Performance of Female Entrepreneurs in Upper Bavaria

Covariates	Coefficient	P-Value
Constant Term, α_i	-4.7352***	0.0084
B Terms of the Hazard Rate		
Constant Term	-3.8194***	0.0025
Agricultural Sector	-0.0979	0.1643
Paper, Print and Publishing	-0.4440**	0.0401
Manufacturing	0.3792***	0.0064
Catering and Hotels	0.5651***	0.0037
Communication and Transport	0.6045***	0.0018
Insurance Industry and Finance	0.2152**	0.0389
Sales Agency	0.0776	0.2304
Retail Industry	-0.1360***	0.0021
Wholesale	0.1100*	0.0824
Age of Entrepreneur	-0.0369**	0.0406
Age-Squared of Entrepreneur	0.0036***	0.0054
Constant Term, γ_i	-0.3000***	0.0086
Number of Observations	39,910	
-2 Log-Likelihood	40,696.794	
χ^2 – Square (P-Value)	89.128 (0.000)	

Note: The number of stars indicates significances of the estimates. One star represents ten per cent, two five per cent, and three one per cent level of significance.

Table 6: Impact of Share of Foreign Population on Survival Performance of Female Entrepreneurs in Upper Bavaria

Covariates	Model 1	Model 2	Model 3
Constant Term, α_i	-4.6825***	-4.6409***	-4.5663***
B Terms of the Hazard Rate			
Constant Term	-8.9223***	-9.2383***	-7.8102***
Trade Tax Rate	0.0121***	0.0146***	0.0119***
Unemployment Rate	0.1148***	0.0950***	0.0688**
Population Density	-0.0004***	-0.0004***	-0.0003***
Share of Foreign Population		-0.0441*	-0.0542*
Share of Foreign Population Squared			0.0021**
Constant Term, γ_i	-0.0290***	-0.0311***	-0.0355***
Number of Observations	39,910	39,910	39,910
-2 Log-Likelihood	24,803.321	27,303.143	27,304.705
χ^2 - Square (P-Value)	65.820 (0.000)	88.775 (0.000)	87.150 (0.000)

Note: The number of stars indicates significances of the estimates. One star represents ten per cent, two five per cent, and three one per cent level of significance.

Figure 2: Survival of Female Enterprises by Foreign Population in the Region, 1997-2004

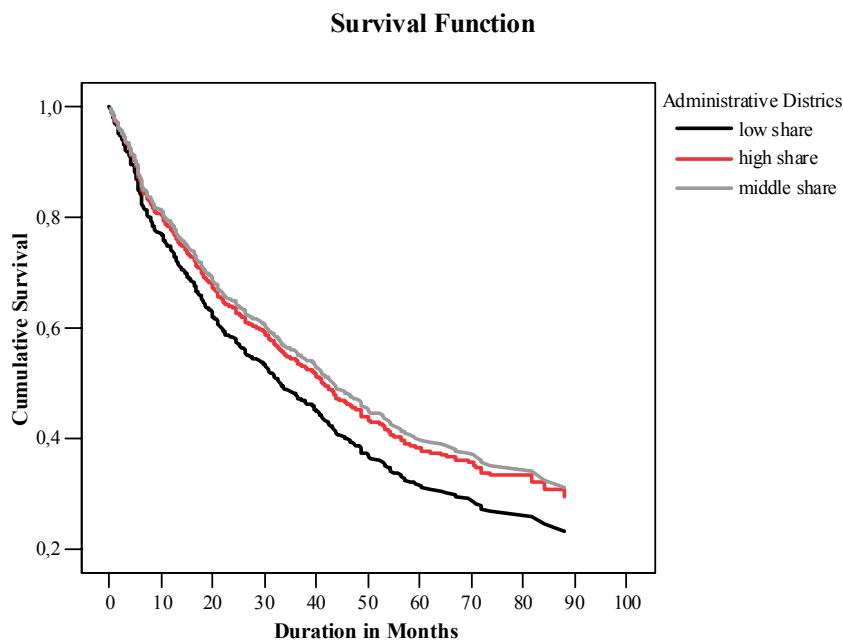


Figure 1: Survival Performance of Female Immigrant and German Enterprises by Various Age-Groups, 1997-2004

