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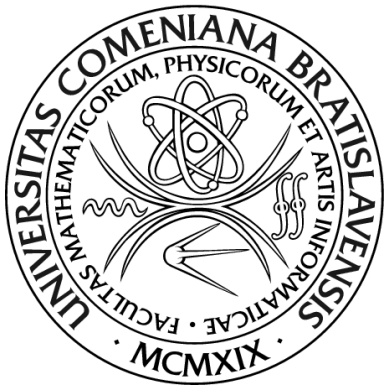

MICROECONOMETRIC ANALYSIS OF ENTREPRENEURSHIP

Diploma Thesis

2012 Bc. Michal Prievalský

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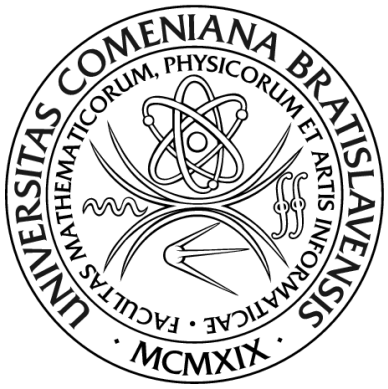

MICROECONOMETRIC ANALYSIS OF ENTREPRENEURSHIP

Diploma Thesis

Study Programme: Economic and Financial Mathematics

Field of Study: 1114 Applied Mathematics

Training work place: Department of Applied Mathematics and Statistics

Supervisor: Prof. Dr. Jarko Fidrmuc

Bratislava 2012 Bc. Michal Prievalský

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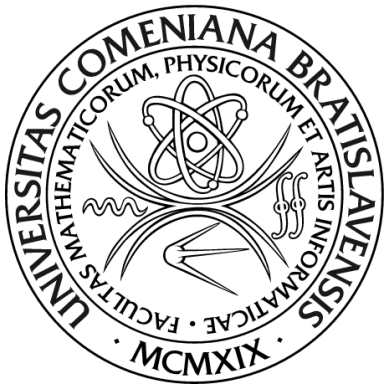

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Cieľ: Entrepreneurship is an important determinant of economic growth. However, reliable data on business activity is hardly available especially for small and medium enterprises. Therefore, we will use household surveys, which provide income structure (income from employment and private business) and basic social-demographic data (education, age, household size). The diploma thesis will review the theoretical models of entrepreneurship. The main part of the diploma thesis will estimate the microeconomic determinants of business activity of Slovak households.

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Declaration on Word of Honour

This is to declare that the presented diploma thesis has been carried out by myself using the mentioned literature and advice of my supervisor.

Michal Prievalský

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I would like to especially thank my supervisor Prof. Dr. Jarko Fidrmuc for all his guidance and advice he provided me throughout the elaboration of this thesis. I also thank my family and friends for all their help and support. Most of all, I thank God for lots of strength and love he gives me every day.

Abstract

The main goal of this diploma thesis is to estimate the microeconometric determinants of entrepreneurial activity in Slovakia using the Life in Transition Survey conducted in countries of Eastern Europe and Central Asia in late 2010. Moreover, we estimate determinants of business success, opportunity entrepreneurship and corporate default caused by the financial crisis. Estimating several specifications of the probit model we find suggestive evidence that in Slovakia, corruption is positively associated with entrepreneurship but on the other hand, enterprises whose owners tend to corrupt have higher probability to default. Also, education, gender and individual attitudes such as risk-taking, greed, willingness to move and trust in other people are important determinants of entrepreneurship. Conversely, we do not find robustly significant evidence that sociological variables increase the probability of being an entrepreneur.

Keywords: entrepreneurship, probit model, business success, corporate default, financial crisis

Abstrakt

Hlavným cieľom tejto diplomovej práce je odhad mikroekonometrických determinantov podnikateľskej činnosti na Slovensku. Použijeme pritom údaje z prieskumu 'Life in Transition', ktorý bol realizovaný v krajinách východnej Európy a strednej Ázie koncom roka 2010. Zároveň odhadujeme aj determinanty podnikateľského úspechu, podnikania plynúceho z príležitosti a podnikového bankrotu z dôvodu finančnej krízy. Odhadnutím niekoľkých probit modelov sme zistili, že podnikanie na Slovensku sa spája s vyššou mierou korupcie, ale na druhej strane podnikatelia, ktorí majú sklon korumpovať, majú aj vyššiu pravdepodobnosť, že ich podnik skrachuje. Ďalšími dôležitými determinantmi podnikania na Slovensku sú vzdelanie, pohlavie a postoje jednotlivcov, ako napríklad postoj k riziku, chtivosť, ochota presťahovať sa a dôvera v ľudí. Naopak, z odhadnutých modelov sme nezistili signifikantne robustný vplyv sociologických premenných na pravdepodobnosť, že respondent bol niekedy podnikateľ.

Kľúčové slová: podnikanie, probit model, podnikateľský úspech, krach podniku, finančná kríza

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Chapter 1

Introduction

In the last few years we have witnessed the world financial crisis. Governments have been looking for ways to start up the economic growth again and decrease the public debt at the same time. A lot of authors claim that entrepreneurial activity is an important determinant of economic growth and a key to innovations in economy which are now more important than ever before. Surprisingly, empirical research on entrepreneurship is limited. That is why we decided to deal with entrepreneurship in this diploma thesis.

One of the goals of this diploma thesis is to provide a review of literature regarding theory of entrepreneurship. As it is an under-researched topic in economics there is no single widely-accepted theory. We also supply findings from previous papers which tried to estimate determinants of entrepreneurial activity in transition countries.

The main goal of this paper is to estimate the microeconometric determinants of entrepreneurial activity in Slovakia. Also, we estimate determinants of business success, opportunity entrepreneurship and corporate default caused by the financial crisis. We use probit models which belong to the group of binary outcome models, and linear regression models in order to verify the robustness of estimates. Since there are barely available any reliable data for small and medium enterprises we use the latest Life in Transition Survey conducted by the European Bank for Reconstruction and

Development and the World Bank. It contains data for more than 39,000 households in 35 countries.

The thesis is structured as follows. The next chapter provides the review of literature. Chapter 3 summarises econometric methods we use in the empirical part of the thesis. Chapter 4 describes our dataset and Chapter 5 presents our estimation results. Finally, Chapter 6 concludes and Appendix provides definitions of variables we use in the empirical part.

Chapter 2

Literature Review

In this chapter we gradually review literature on entrepreneurship starting with theory of entrepreneurship which also includes three different conceptual perspectives on entrepreneurship. Later on, we continue with entrepreneurship in transition economies together with determinants of entrepreneurship in these countries. Then we try to describe the differences between necessity and opportunity entrepreneurship and conclude by determinants of corporate default.

2.1 Theory of entrepreneurship

It has been recognised that entrepreneurship contributes crucially to economic growth and development. According to endogenous growth theory by Aghion and Howitt [1] entrepreneurial dynamism is fundamental for innovation and growth. Also institutions like the World Bank [2] emphasise the role of entrepreneurs and the development of small and medium enterprises in the process of economic development. Therefore it is essential to understand the factors which enable and hinder entrepreneurial activities.

Nowadays entrepreneurship is an underresearched field of economics even though it was not always so. In 1934, Schumpeter [3] imagined the entrepreneur as a creative, driven individual who finds new combinations of factors

of production to develop a new product, corner a new market or design a new technology. For decades, the main interest of economics has been the allocation of resources and the way it is achieved by governments and markets. Just recently, there is a revival of interest in the matters of economic growth.

Due to these facts there is not a single widely-accepted theory of entrepreneurship. Djankov et al. [4] suggested three different conceptual perspectives on entrepreneurship:

I. Individual characteristics of entrepreneur

This perspective includes psychological traits associated with entrepreneurship. McClellan [5] suggests a personal need for achievement, McGhee and Crandall [6] belief in the effect of personal effort on outcomes while Liles [7] suggests attitudes towards risk, and individual self-confidence. There is also a recent work of Lazear [8] who found out that people who become entrepreneurs have a special ability to gain general skills which they then apply to their own businesses.

II. Sociological variables shaping entrepreneurship

These variables were researched by Cochran [9] and Young [10]. The former points to the role of values whereas the latter emphasises the role of social networks which either promote or discourage entrepreneurial activities. Social networks can be understood in terms of family, relatives, friends or social groups in general.

III. Institutional perspective

This perspective is emphasised by economists and some political scientists and focuses on the role of economic, political and legal institutions in fostering or restricting entrepreneurship in different countries at various times. Banerjee and Newman [11] highlight the importance of credit constraints which make it impossible for the poor to borrow money to set up their own businesses. The literature on transition from socialism to capitalism reveals the

role of institution securing property rights (Johnson, McMillan and Woodruff [12]), the role of predatory behaviour by government bureaucrats (Djankov et al. [13]), the role of organised crime (Frye and Zhuravskaya [14]) and the role of civil liberties and corruption (EBRD [15]).

2.2 Entrepreneurship in transition economies

Transition economies are those which are changing from centrally planned to free market. McMillan and Woodruff [16] state that formerly centrally planned economies were dominated by large firms producing just few consumer goods whereas small and medium enterprises almost did not exist. Therefore the transition in these countries has been widely accompanied by privatisation of state enterprises. They also claim that sales and employment grow faster in entrepreneurial ventures than in state or privatised firms and that new businesses are more efficient than old ones.

Djankov et al. [4] mentions that entrepreneurship is only emerging in transition economies where it is possible to observe its development towards steady state. According to Berkowitz and DeJong [17] it is just entrepreneurial activity which makes transition economies successful and contributes to the structural change. It is so because enterprises create industries that did not exist or revitalise those which were stagnant under socialism.

According to the European Bank for Reconstruction and Development [15] entrepreneurship is an indispensable ingredient of a sustainable growth model in advanced economies including the new EU members. The model emphasises innovations rather than booms in consumption and investment in non-tradeable sectors fuelled by debt inflows. Also, entrepreneurial ventures may be an effective way to mitigate income shocks associated with economic crises, by providing households with an alternative source of employment.

2.3 Determinants of entrepreneurship in transition economies

Djankov et al. [4] published several studies regarding entrepreneurship in the largest transition economies in the world such as Russia, China and Brazil which confirm that all three conceptual perspectives matter. Firstly, they ascertain that individual characteristics such as educational background, performance on a test of cognitive ability, personal confidence, greed and willingness to take risks are all important determinants of entrepreneurship which echoes Schumpeter and others.

Secondly, they find a suggestive evidence that social networks play a large role in determining entrepreneurial activity. Individuals whose relatives or school friends are entrepreneurs are more likely to be entrepreneurs. The family members of entrepreneurs also had more education and were more likely to be directors or former members of the Communist Party.

Finally, they suggest that institutional environment is an important determinant of business growth. Better perceived attitude of the population and government towards entrepreneurs raises the probability that individual is an entrepreneur. The best for entrepreneurs are governments which do not interfere in daily business activities - neither in trying to help nor hinder business environment. Moreover, it is lower perceived corruption which encourage potential entrepreneurs to start a business.

There is another report conducted by the European Bank for Reconstruction and Development [15] in transition economies of Eastern Europe and Central Asia. It reveals that development of the financial sector and access to credit are important determinants of entrepreneurial success.

At the individual level, it suggests that more education is associated with a higher propensity to set up a business, although not with a higher likelihood of success. The report also finds that entrepreneurship is linked with individual attitudes, such as a willingness to take risks, and that women are less likely to attempt to set up a business, although they are not less likely

to succeed than men when trying to be entrepreneurs.

Finally, the report contains evidence which supports the theory that entrepreneurial activity develops in clusters. In regions where such activity is more common, individuals appear more likely to try to set up a business and to succeed in doing so. Also, it confirms the previous findings that higher levels of corruption decrease the probability of being an entrepreneur whereas higher levels of perceived civil liberties are positively associated with entrepreneurship.

2.4 Necessity and opportunity entrepreneurship

Entrepreneurial activity comes from various circumstances and motives which drive the decision to set up a business. Bhola et al. [18] suggest that the decision to become self-employed may spring from the push effect of the threat of unemployment, but also from the pull effects induced by a thriving economy producing entrepreneurial opportunities. Reynolds et al. [19] explicitly distinguish between opportunity-based and necessity-based entrepreneurship and claim that it is possible to label more than 97 per cent of those who are entrepreneurially active as either opportunity or necessity entrepreneurs.

Necessity entrepreneurship involves people who set up a business because other employment options are either absent or unsatisfactory. Its growth benefits are limited as it is not based on new ideas and it does not generate a knowledge transfer (Acs and Varga [20]). However, it is not detrimental to economic development and growth, and may in fact have benefits by increasing employment.

Opportunity entrepreneurship involves those who start their business by taking advantage of an entrepreneurial opportunity (Bhola et al. [18]). According to the Global Entrepreneurship Monitor 2004 [21] there is a great variability in the relative distribution of opportunity and necessity entrepreneurship. The opportunity entrepreneurs tend to be more dominant

in the high-income countries while necessity entrepreneurship is usual in low income countries. Accordingly, countries with a low ratio of opportunity to necessity entrepreneurship have low GDP per capita. Reynolds et al. [19] put forward that since richer countries are characterised by a more developed labour market and better social welfare there is a lower need for starting up a business and therefore these countries exhibit lower necessity-based entrepreneurial activity rates.

The report by the EBRD [15] confirms that higher GDP per capita is connected with higher probability of being an opportunity entrepreneur. Likewise, individual characteristics such as higher education level, higher individual income and membership in the Communist Party is linked with opportunity entrepreneurship. Vice versa, higher corruption level decreases the probability of being an opportunity entrepreneur.

2.5 Determinants of corporate defaults

The determinants of corporate defaults are widely discussed in the previous papers. Altman [22] suggests that the causes of default are issues in terms of indebtedness, profitability, liquidity and solvency. Enterprises are more likely to default if they are highly indebted, less profitable, less liquid and if the legal system does not create efficient incentives to repay the loans. According to Altman and Beaver [22, 23] some of the financial ratios related to these factors can be used to predict the probability of corporate bankruptcy in developed financial markets.

Another factor that matters is liability which is largely determined by the legal form. For instance, natural persons are fully liable for their losses whereas owners can limit their liability by incorporating the firm as a legal body with limited liability. Bester [24] reveals in his paper that if the debtor is liable and loses assets in case of failure, the probability of default is much lower.

There are not many papers available for the new EU member states.

Fidrmuc and Hainz [25] pursue the determinants of loan defaults in Slovakia which are closely related to corporate defaults. They confirm that high indebtedness as well as low profitability and liquidity are important determinants of default which is in line with findings in developed financial markets. Moreover, they find significant differences between sectors which are much higher than in developed countries.

Chapter 3

Econometric Methods

In this chapter we summarise econometric methods we use in the empirical part of this thesis. The following is processed according to books by Cameron and Trivedi [26], Studenmund [27], Wooldridge [28] and Johnston [29].

3.1 Binary outcome model

Binary outcome model is a nonlinear probability model where the dependant variable y takes just one of two values

$$y = \begin{cases} 1 & \text{with probability } p, \\ 0 & \text{with probability } 1 - p. \end{cases}$$

Models are formed by parametrising the probability p in order to depend on a regressor vector $\boldsymbol{x_i}$ and a parameter vector $\boldsymbol{\beta}$. Models usually used are of single-index form with conditional probability given by

$$p_i \equiv P(y_i = 1|\boldsymbol{x_i}) = F(\boldsymbol{x_i}^T\boldsymbol{\beta}),$$

where $F(\cdot)$ is a specified function. A natural choice of this function which translates $\boldsymbol{x_i}^T\boldsymbol{\beta}$ into a number between zero and one in a sensible way is a cumulative distribution function.

Model	$F(\boldsymbol{x_i}^T\boldsymbol{\beta})$
Logit	$\Lambda(\boldsymbol{x_i}^T\boldsymbol{\beta}) = \exp(\boldsymbol{x_i}^T\boldsymbol{\beta})/[1+\exp(\boldsymbol{x_i}^T\boldsymbol{\beta})]$
Probit	$\Phi(\boldsymbol{x_i}^T\boldsymbol{\beta}) = \int_{-\infty}^{\boldsymbol{x_i}^T\boldsymbol{\beta}}(2\pi)^{-1/2}\exp(-z^2/2)dz$
Complementary log-log	$C(\boldsymbol{x_i}^T\boldsymbol{\beta}) = 1-\exp\Big(-\exp(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)$
Linear probability	$\boldsymbol{x_i}^T\boldsymbol{\beta}$

Table 3.1: Probabilities in binary outcome models

There are four most commonly used binary outcome models whose probabilities are presented in Table 3.1.

The *logit model* arises if $F(\cdot)$ is the cumulative distribution function of the logistic distribution. The *probit model*, which is a matter of our concern, arises if $F(\cdot)$ is the standard normal cumulative distribution function. In not so often used *complementary log-log model*, $F(\cdot)$ is the cumulative distribution function of the extreme value distribution. It varies from the other models in being asymmetric around zero and it is used if one of the outcome is rare. The last one is the *linear probability model* which does not use a cumulative distribution function but instead lets $p_i = \boldsymbol{x_i}^T\boldsymbol{\beta}$. The main disadvantage of this model is that fitted probabilities can be less than zero or greater than one. An example of predicted probabilities from logit, probit and linear probability model are plotted as a function of a single dependant variable in Figure 3.1.

3.2 Maximum likelihood estimator

Maximum likelihood estimator is usually used to estimate unknown parameters of the logit and probit model. Let us consider a sample $(y_i, \boldsymbol{x_i})$ for $i = 1, .., n$ assuming independance over i. Then the outcome is Bernoulli

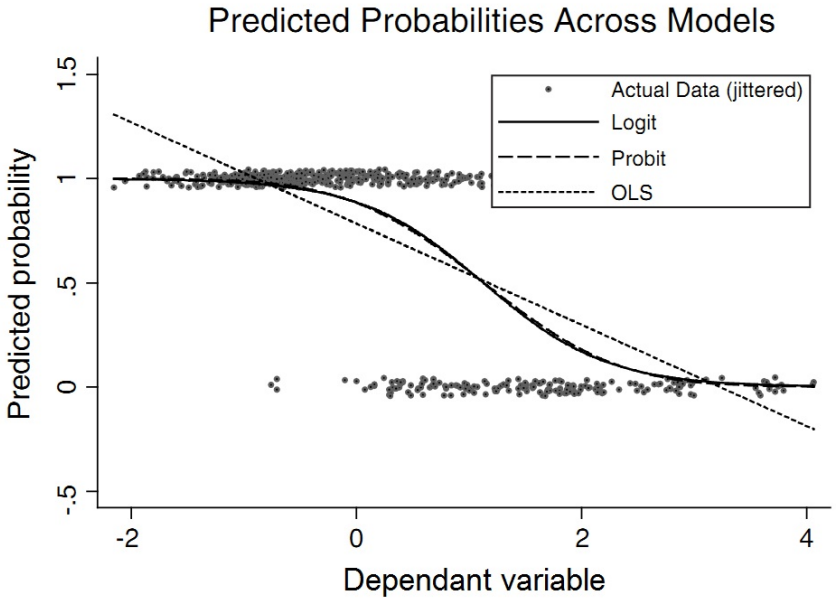

Figure 3.1: Comparison of predicted probabilities from logit, probit and linear probability model

distributed and the density of y_i is

$$f(y_i|\boldsymbol{x_i}) = p_i^{y_i}(1-p_i)^{1-y_i},$$

where $p_i = F(\boldsymbol{x_i}^T\boldsymbol{\beta})$ and $y_i \in \{0,1\}$. We can see that if $y_i = 1$ then it yields $f(1) = p^1(1-p)^0 = p$, otherwise $f(0) = p^0(1-p)^1 = 1-p$.

The log-likelihood function for observation i can be obtained by taking the log of the density function above:

$$\ell_i(\boldsymbol{\beta}) = y_i \ln p_i + (1-y_i)\ln(1-p_i).$$

The maximum likelihood estimator of $\boldsymbol{\beta}$ maximises the log-likelihood function of the whole sample which can be obtained by summing $\ell_i(\boldsymbol{\beta})$ across all observations:

$$\mathcal{L}(\boldsymbol{\beta}) = \sum_{i=1}^{n} \ell_i(\boldsymbol{\beta}) = y_i \ln\left(F(\boldsymbol{x_i}^T\boldsymbol{\beta})\right) + (1-y_i)\ln\left(1-F(\boldsymbol{x_i}^T\boldsymbol{\beta})\right) \to \max_{\boldsymbol{\beta}}.$$

Because of nonlinear nature of this maximisation problem, we cannot provide explicit formulas for the estimates. Instead, by differentiating the previous formula we have that $\hat{\boldsymbol{\beta}}_{ML}$ solves

$$\sum_{i=1}^{n}\left(\frac{y_i}{F_i}F_i'\boldsymbol{x_i}-\frac{1-y_i}{1-F_i}F_i'\boldsymbol{x_i}\right)=\mathbf{0},$$

where $F_i = F(\boldsymbol{x_i}^T\boldsymbol{\beta})$ and $F_i' = F'(\boldsymbol{x_i}^T\boldsymbol{\beta})$. After converting to fraction with common denominator and further simplifying it yields the ML first-order conditions

$$\sum_{i=1}^{n}\frac{y_i-F(\boldsymbol{x_i}^T\boldsymbol{\beta})}{F(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big(1-F(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)}F'(\boldsymbol{x_i}^T\boldsymbol{\beta})\boldsymbol{x_i}=\mathbf{0},$$

which is solved by the Newton–Raphson iterative procedure. For the logit and probit models, the log-likelihood function is globally concave in $\boldsymbol{\beta}$ which implies that the formula above is the ML second-order condition as well. Moreover, under some general conditions the ML estimate $\hat{\boldsymbol{\beta}}$ is consistent, asymptotically normal, and asymptotically efficient.

The MLE first-order conditions for the logit model simplify to

$$\sum_{i=1}^{n}\Big(y_i-\Lambda(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)\boldsymbol{x_i}=\mathbf{0},$$

as $\Lambda'(z)=\Lambda(z)\Big(1-\Lambda(z)\Big)$.

For the probit model, the MLE first-order conditions yield

$$\sum_{i=1}^{n}w_i\Big(y_i-\Phi(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)\boldsymbol{x_i}=\mathbf{0},$$

where $w_i=\phi(\boldsymbol{x_i}^T\boldsymbol{\beta})/[\Phi(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big(1-\Phi(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)]$ is the weight of i^{th} observation.

3.3 Determining model adequacy

Generalisation of the R^2 measure for nonlinear models is called *pseudo-*R^2. McFadden proposes the pseudo-R^2 measure for binary outcome models as a ratio of the log-likelihood function of the intercept model and the log-likelihood function of the full model

$$R^2_{MF}=1-\frac{\mathcal{L}(\hat{\boldsymbol{\beta}})}{\mathcal{L}(\bar{y})}=1-\frac{\sum_{i=1}^{n}\Big(y_i\ln\hat{p}_i+(1-y_i)\ln(1-\hat{p}_i)\Big)}{n\Big(\bar{y}\ln\bar{y}+(1-\bar{y})\ln(1-\bar{y})\Big)},$$

where $\hat{p}_i = F(\boldsymbol{x_i}^T\hat{\boldsymbol{\beta}})$ and $\bar{y} = n^{-1}\sum_{i=1}^{n} y_i$. The log-likelihood of the full model is treated as the residual sum of squares and the log-likelihood of the intercept model is treated as a total sum of squares. The interpretation of pseudo-R^2 is similar to R^2 - the higher value of pseudo-R^2, the better fit of the full model compared with the intercept model.

Another measure of the goodness of fit is so-called *percent correctly predicted* which is evaluated by comparison of fitted and actual values. An obvious prediction rule is to set $\hat{y}_i = 1$ if $\hat{p}_i = F(\boldsymbol{x_i}^T\hat{\boldsymbol{\beta}}) > 0.5$ and $\hat{y}_i = 0$ if $\hat{p}_i = F(\boldsymbol{x_i}^T\hat{\boldsymbol{\beta}}) \leq 0.5$. The percentage of times the predicted value $\hat{y}_i$ matches the actual y_i is the percent correctly predicted. The disadvantage of this approach is that it is possible to get high percentages correctly predicted whereas the model is useless.

3.4 Marginal effects

Concern often lies in measuring marginal effects which is the change in conditional probability that $\boldsymbol{y} = 1$ when regressor variables change by one unit

$$\frac{\partial P(y_i = 1|\boldsymbol{x_i})}{\partial x_{ij}} = F'(\boldsymbol{x_i}^T\boldsymbol{\beta})\beta_j,$$

where $F'(z) = \partial F(z)/\partial z$. For the linear regression model,

$$\mathrm{E}(\boldsymbol{y}|\boldsymbol{X}) = \boldsymbol{X}\boldsymbol{\beta}$$

implies that

$$\frac{\partial \mathrm{E}(\boldsymbol{y}|\boldsymbol{X})}{\partial \boldsymbol{X}} = \boldsymbol{\beta}$$

so the coefficient has a direct interpretation as the marginal effect. For nonlinear regression models this interpretation is no longer possible as the marginal effects depend on $\boldsymbol{x_i}$ as well as β_j. Table 3.2 presents the marginal effects for usually used binary outcome models.

When interpreting a model, the interest mostly lies in the average marginal effect of a unit regressor change. The best way to compute is to use

Model	**Marginal effect**
Logit	$\Lambda(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big(1-\Lambda(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)\beta_j$
Probit	$\phi(\boldsymbol{x_i}^T\boldsymbol{\beta})\beta_j$
Complementary log-log	$\exp\Big(-\exp(\boldsymbol{x_i}^T\boldsymbol{\beta})\Big)\exp(\boldsymbol{x_i}^T\boldsymbol{\beta})\beta_j$
Linear probability	β_j

Table 3.2: Marginal effects in binary outcome models

the sample average of marginal effects $N^{-1}\sum_{i=1}^{n}F'(\boldsymbol{x_i}^T\hat{\boldsymbol{\beta}})\hat{\beta}_j$. Instead, some programs evaluate at the sample average of the regressors $F'(\bar{\boldsymbol{x}}^T\hat{\boldsymbol{\beta}})\hat{\beta}_j$.

Chapter 4

Data Description

In the empirical part of this thesis we use the latest Life in Transition Survey conducted jointly by the European Bank for Reconstruction and Development and the World Bank in late 2010. In the survey, almost 39,000 households in 35 countries were interviewed including 5 countries of Western Europe and 30 transition countries of Eastern Europe and Central Asia. Therefore, the dataset is ideal for comparing the results for countries of Western Europe with those for countries in transition.

The questionnaire consists of 165 questions and is divided into 8 parts from which three are collected at household level and five at individual level. The questions aim to find out basic social-demographic data (education, age, household size, attitudes, values), structure of income (income from employment and private business) as well as impact of the crisis on households.

Table 4.1 shows **descriptive statistics** of chosen variables that we later used in econometric models. The variables are divided into four groups which follows the classification stated in Section 2.1 plus a group of dependant variables used in our models. All these variables are collected at individual level except for 'Default'. Note that detailed description of all these variables can be found in the appendix.

Variables belonging to the group of dependant variables are all dummy variables except for 'Years as entrepreneur' which is a number of years that

Variable name	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Dependant variables					
Trial	38864	0.135	0.341	0	1
Success	5231	0.685	0.464	0	1
Entrepreneur	38861	0.092	0.289	0	1
Entrepreneur 12 Months	38864	0.076	0.266	0	1
Opportunity entrepreneur	8631	0.221	0.415	0	1
Opportunity entrepreneur 12	8633	0.195	0.396	0	1
Years as enterpreneur	38859	1.017	4.464	0	63
Default	25939	0.043	0.203	0	1
Individual characteristics					
Secondary education	38864	0.663	0.473	0	1
University degree	38864	0.202	0.402	0	1
Age	38843	45.89	17.38	18	99
Age at trial	5039	33.65	10.80	15	65
Male	38820	0.396	0.489	0	1
Risk score	38864	4.514	2.671	0	10
Willingness to move	38864	0.258	0.438	0	1
Vote	38864	0.773	0.419	0	1
Greed	38864	0.265	0.441	0	1
Communist Party	38864	0.052	0.221	0	1
Trust score	38864	2.811	1.209	0	5
Urban	38864	0.468	0.499	0	1
Sociological variables					
Father's education	38836	6.938	5.370	0	25
Mother's education	38840	6.661	5.168	0	25
Father Communist Party	38864	0.091	0.287	0	1
Mother Communist Party	38864	0.039	0.194	0	1
Institutional environment					
Borrowed money	5115	0.272	0.445	0	1
Perceived corruption	38864	1.595	1.046	0	5
Perceived liberties	38864	3.213	0.878	0	5

Table 4.1: Descriptive statistics of variables used in econometric models

individual runs a business. The mean value of this variable is 1.017 which is so because if an individual has never been an entrepreneur it takes the value of zero. Looking at dummy dependant variables we can see that about 13.5 per cent of respondents have ever ever tried to set up a business from which 68.5 per cent were successful. For purposes of estimating determinants of entrepreneurship in the next chapter we used variables 'Entrepreneur' and 'Entrepreneur 12 Months'. The former says whether an individual has ever set up a business, the latter says if an individual worked as self-employed during the past 12 months. We can see that around 9.2 per cent of respondents have ever set up a business and approximately 7.6 per cent of respondents worked as self-employed during the past 12 months. In terms of opportunity entrepreneurship we can see that 22.1 per cent of respondents who prefer to be self-employed has ever set up a business and 19.5 per cent of those who prefer to be self-employed also worked as self-employed during the past 12 months. Furthermore, about 4.3 per cent of businesses defaulted because of the crisis.

Variables belonging to the group of individual characteristics capture that the highest level of education for 66.3 per cent of respondents is secondary education whereas 20.2 per cent of respondents have a university degree. The average age of respondents is almost 46 years and the average age at a business trial is almost 34 years. Looking further at the table we can see that about 39.6 per cent of respondents are males and 46.8 per cent of respondents live in an urban setting. In terms of individual attitudes and values, the average risk score of respondents is approximately 4.5 where 0 means that respondent is not willing to take risks at all and 10 means respondent is very much willing to take risks. Around 25.8 per cent of respondents are willing to move elsewhere in the country for employment reasons and 77.3 per cent of respondents voted in the most recent elections. The variable called 'Greed' indicates whether respondents prefer higher salary, a lot of chance for promotion and significantly less job security to average salary, not much chance for promotion and more job security. We can see that about

26.5 per cent of people responded positively. Moreover, approximately 5.2 per cent of respondents were members of the Communist Party in the past and the average reached trust score is about 2.8 where 0 means respondent completely distrust most people and 5 means complete trust to most people.

Variables belonging to the group of sociological variables show that fathers of respondents have almost 7 years of full time education whereas mothers of respondents have slightly more than 6.5 years of full time education on average. About 9.1 per cent of respondents' fathers were members of the Communist Party compared with only 3.9 per cent of respondents' mothers.

Variables belonging to the group of institutional environment reveal that 27.2 per cent of individuals who tried to set up a business were successful in borrowing money for the business. Finally, the average perception of corruption is about 1.6 and the average perception of civil liberties is around 3.2 where 0 means strong disagreement and 5 means strong agreement with existence of corruption and liberties, respectively.

Now we look at the **differences in means** between the entrepreneurs and non-entrepreneurs in Slovakia presented in Table 4.2. From the perspective of individual characteristics, for over 74 per cent of entrepreneurs and 72 per cent of non-entrepreneurs the higher level of completed education is the secondary education whereas over 24 per cent of entrepreneurs and 18 per cent of non-entrepreneurs have a university degree so there is no statistically significant difference in education of entrepreneurs and non-entrepreneurs. The difference in age between these two groups is less than a year which is also not statistically significant. Vice versa, there is a clear, even if not significant, difference in gender - almost 45 per cent of entrepreneurs and 37.6 per cent of non-entrepreneurs are males whereas there is about 39.6 per cent of males in the whole sample. Entrepreneurs score significantly higher than non-entrepreneurs in willingness to take risk and trust in other people. Moreover, they are also significantly more willing to move and have significantly higher greed. Probably a little bit surprising is that only 0.8 per cent of entrepreneurs were members of the Communist party compared with 2.8

Variable name	**Entrep.**	**Non-Entrep.**	**Std. Error**
Individual characteristics			
Secondary education	0.746	0.725	0.043
University degree	0.246	0.185	0.042
Age	42.36	41.39	1.107
Male	0.449	0.376	0.049
Risk score	5.627	4.588	0.211***
Willingness to move	0.441	0.282	0.048***
Vote	0.788	0.655	0.041***
Greed	0.525	0.366	0.049***
Communist Party	0.008	0.028	0.010*
Trust score	2.754	2.510	0.113**
Urban	0.669	0.608	0.046
Sociological variables			
Father's education	8.814	7.249	0.584***
Mother's education	8.881	7.438	0.551***
Father Communist Party	0.153	0.120	0.035
Mother Communist Party	0.008	0.021	0.010
Institutional environment			
Perceived corruption	2.004	1.763	0.097**
Perceived liberties	3.432	3.386	0.058

Table 4.2: **Equality of means *t*-test** Note: Table above reports the differences in means between entrepreneurs and non-entrepreneurs, standard errors of differences and the significance of differences. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Sample: respondents from Slovakia.

per cent of non-entrepreneurs, but on the other hand, there are significantly more entrepreneurs who voted in the most recent elections. There are also more entrepreneurs living in an urban setting than non-entrepreneurs.

From the perspective of sociological variables, the difference in education of parents is highly significant. The fathers of entrepreneurs have slightly more than 1.5 year of extra education whereas the mothers of entrepreneurs have slightly less tan 1.5 year of extra education on average. On the contrary, there is no significant difference in membership of parents in the Communist Party. Fathers of entrepreneurs are more often the former members of the Communist Party whereas for non-entrepreneurs, mothers are more often the former members of the Communist Party.

Finally, from the perspective of institutional environment, entrepreneurs scored significantly higher in perception of corruption than non-entrepreneurs whereas there is almost no difference in perception of civil liberties.

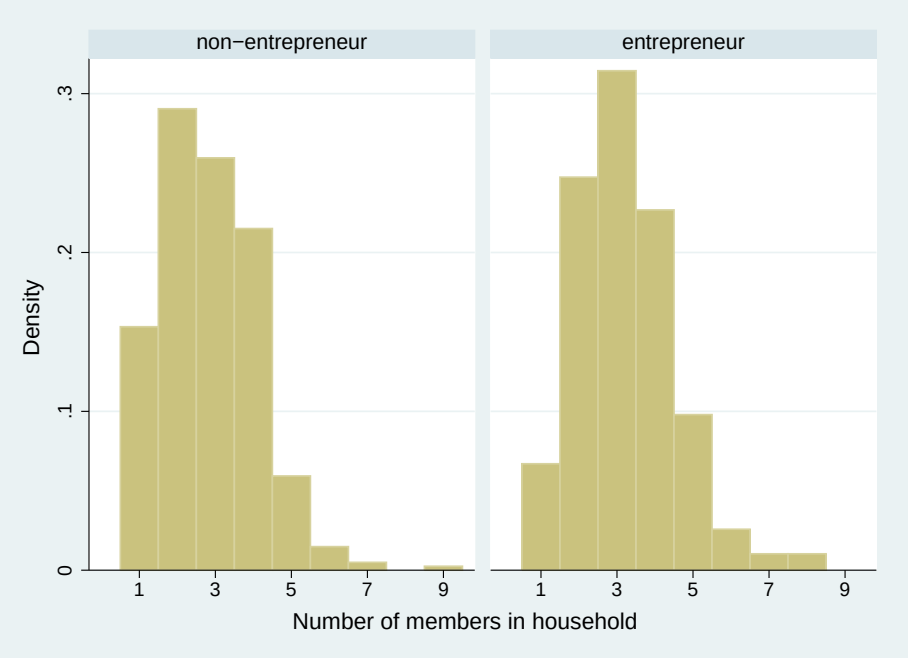

Figure 4.1: Number of members living in households of entrepreneurs and non-entrepreneurs

We conclude this chapter by a glimpse of Figure 4.1. It reveals an interesting ascertainment that entrepreneurs live in larger households than non-entrepreneurs. The average number of household members living in non-entrepreneurial households is about 2.8 whereas in entrepreneurial it is 3.2.

Chapter 5

Estimation Results

5.1 Empirical strategy

We estimate several specifications of the probit model using maximum likelihood estimator,

$$P(\boldsymbol{y} = 1) = \Phi(\beta_0 + \beta_1 \mathbf{C} + \beta_2 \mathbf{E} + \beta_3 \mathbf{S} + \boldsymbol{u})$$

where **C**, **E**, **S** denote individual characteristics, institutional environment and sociological variables, $\boldsymbol{y}$ is one of the dependant variables described in Chapter 4. Moreover, we estimate a few linear regression models using ordinary least squares estimator in order to verify the robustness of the estimates,

$$\mathbf{Y} = \beta_0 + \beta_1 \mathbf{C} + \beta_2 \mathbf{E} + \beta_3 \mathbf{S} + \boldsymbol{u}$$

where **Y** is the number of years as entrepreneur. In all the probit models we report the average marginal probability effects.

The **choice of variables** we use in our models is mostly based on papers which we quoted in Chapter 2. We also include the variable 'Vote' since according to the EBRD [15] it may be correlated with several omitted individual characteristics relevant to entrepreneurship which are not fully captured by the Life in Transition Survey.

Furthermore, the EBRD suggests that household income and wealth are important determinants of entrepreneurship. However, it is difficult to mea-

sure them and they do not represent values at the time of an entrepreneurial attempt very well. Therefore, it is wise to use parent education level, respondent's and parent membership in the Communist Party as the proxies for individual income at the time of a business attempt. Similarly, education level may be a proxy for the individual characteristics which encourages business attempts, for example greater self-confidence or perceived ability. However, they do not have to be necessary for some kinds of enterprises captured in the survey.

All the variables we use can be plausibly considered exogenous to the fact of being an entrepreneur. Note that we divided variables 'Age' and 'Age at trial' by 10 in order to have higher coefficients.

5.2 Determinants of entrepreneurship

In order to estimate determinants of entrepreneurial activity, we carry out separate econometric models for Slovakia, transition economies and Western Europe using dependant variables 'Entrepreneur', 'Entrepreneur 12 Months' and 'Years as entrepreneur' which enable us to conduct a vast sensitivity analysis. For each of the dummy dependant variables we conduct three specifications estimated by the probit model and moreover, we conduct a linear regression model with dependant variable 'Years as entrepreneur' for the purposes of robustness check.

Firstly, we focus on **determinants of entrepreneurship in Slovakia** which are presented in Tables 5.1 and 5.2. Looking at the individual characteristics of respondents we can see that higher levels of education are significantly positively associated with likelihood of being an entrepreneur. For instance, secondary education increases the probability of being an entrepreneur by 9.4 to 10.4 percentage points. Similarly, having an university degree raises the likelihood of being an entrepreneur by about 16.3 to 19.8 percentage points. Highly significant and exceptionally robust seems to be the effect of age. According to the signs of age and its second power it follows

Dependant variable	**Entrepreneur**			**Years**
Specification	**SK1**	**SK2**	**SK3**	**SK4**
Secondary education	0.104**	0.094*	0.094*	0.505
	(0.038)	(0.037)	(0.037)	(0.361)
University degree	0.198**	0.164*	0.163*	0.769*
	(0.113)	(0.103)	(0.104)	(0.413)
Age	0.200***	0.203***	0.202***	1.561***
	(0.049)	(0.049)	(0.049)	(0.443)
Age^2	-0.021***	-0.021***	-0.021***	-0.141***
	(0.006)	(0.006)	(0.006)	(0.050)
Risk score	0.016***	0.013***	0.012***	0.180***
	(0.004)	(0.004)	(0.004)	(0.045)
Willingness to move	0.078***	0.081***	0.081***	0.281
	(0.024)	(0.025)	(0.025)	(0.219)
Vote	0.045**	0.041**	0.040**	0.248
	(0.018)	(0.018)	(0.018)	(0.203)
Greed		0.028	0.030	0.380*
		(0.020)	(0.020)	(0.204)
Communist Party		-0.078*	-0.075*	-0.579
		(0.019)	(0.021)	(0.601)
Trust score		0.013	0.013	0.181**
		(0.008)	(0.008)	(0.083)
Father's education			0.000	0.032
			(0.003)	(0.030)
Mother's education		0.003*	0.003	-0.023
		(0.002)	(0.003)	(0.031)
Father Com. Party			0.012	0.187
			(0.029)	(0.298)
Mother Com. Party			-0.046	0.143
			(0.046)	(0.695)
Perceived corruption	0.021**	0.022**	0.023**	0.241**
	(0.009)	(0.009)	(0.009)	(0.094)
Perceived liberties			0.009	0.135
			(0.014)	(0.142)
Number of obs.	1011	1011	1011	1011
Pseudo-R^2/R^2	0.102	0.120	0.122	0.074
Log-likelihood	-327.206	-320.544	-320.003	

Table 5.1: **Determinants of entrepreneurship in Slovakia I.** Note: Specifications SK1 to SK3 are estimated by the probit model, specification SK4 is estimated by OLS. Coefficients in specifications SK1 to SK3 report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Dependant variable	**Entrepreneur 12 Months**			**Years**
Specification	**SK5**	**SK6**	**SK7**	**SK8**
Secondary education		0.049	0.048	0.462
		(0.033)	(0.033)	(0.361)
University degree		0.054	0.044	0.747*
		(0.064)	(0.062)	(0.411)
Age	0.162***	0.147***	0.141***	1.609***
	(0.041)	(0.042)	(0.042)	(0.445)
Age^2	-0.018***	-0.016***	-0.016***	-0.147***
	(0.005)	(0.005)	(0.005)	(0.050)
Male	0.046***	0.040**	0.037**	0.125
	(0.018)	(0.017)	(0.017)	(0.194)
Risk score		0.005	0.006	0.178***
		(0.004)	(0.004)	(0.045)
Willingness to move	0.046**	0.041**	0.040**	0.253
	(0.021)	(0.020)	(0.020)	(0.218)
Vote		0.016	0.015	0.247
		(0.016)	(0.016)	(0.202)
Greed	0.043**	0.034*	0.034*	0.366*
	(0.018)	(0.019)	(0.019)	(0.205)
Trust score	0.018**	0.015**	0.016**	0.192**
	(0.007)	(0.007)	(0.007)	(0.083)
Father's education			0.004	0.032
			(0.003)	(0.030)
Mother's education			-0.005*	-0.020
			(0.003)	(0.031)
Father Com. Party			0.015	0.168
			(0.027)	(0.298)
Mother Com. Party			-0.021	0.004
			(0.045)	(0.688)
Perceived corruption	0.029***	0.028***	0.027***	0.235**
	(0.008)	(0.008)	(0.008)	(0.093)
Number of obs.	1010	1010	1010	1010
Pseudo-R^2/R^2	0.091	0.100	0.107	0.073
Log-likelihood	-271.749	-269.066	-266.981	

Table 5.2: **Determinants of entrepreneurship in Slovakia II.** Note: Specifications SK5 to SK7 are estimated by the probit model, specification SK8 is estimated by OLS. Coefficients in specifications SK5 to SK7 report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

that the probability of being an entrepreneur is a concave function of age. The probability increases until the age of about 44 to 48 and decreases after that. Being a male as well as voting in the last elections also significantly increases the probability of running a business by around 4 percentage points. Surprisingly, respondent's membership in the Communist Party significantly decreases the probability of being an entrepreneur. Individual attitudes such as willingness to take risk, willingness to move, greed and trust score are all significantly positively associated with entrepreneurship. For example, one point rise in the risk score increases the likelihood of being an entrepreneur by 1.2 to 1.6 percentage points whereas one point rise in the trust score increases the likelihood of being an entrepreneur by 1.5 to 1.8 percentage points. Moreover, willingness to move increases the probability by 4.0 to 8.1 percentage points while greed just by 3.4 to 4.3 percentage points.

Sociological variables such as parent education and parent membership in the Communist Party does not seem to have a significant effect on probability of being an entrepreneur in Slovakia. Looking at the institutional variables we can see that perceived corruption is highly significant and robustly associated with entrepreneurship. Surprisingly, the one point rise in level of perceived corruption increases the probability of being an entrepreneur by 2.1 to 2.9 percentage points. Finally, respondent's perception of civil liberties does not seem to have a significant effect.

These results are mostly in line with previous papers by Djankov et al. [4] and the EBRD [15] except for the respondent's membership in the Communist party and perceived corruption. Both have significantly contrary effect which may be caused by the lustration law adopted after the Velvet Revolution and problems with corruption in Slovakia, respectively.

Secondly, we focus on **determinants of entrepreneurship in transition region** which are presented in Tables 5.3 and 5.4. Looking at the individual characteristics of respondents we can see that education is an important and highly significant determinant of entrepreneurship. However, its effect is much smaller than in Slovakia. The probability of being an entrepre-

Dependant variable	**Entrepreneur**			**Years**
Specification	**TRAN1**	**TRAN2**	**TRAN3**	**TRAN4**
Secondary education	0.035***	0.032***	0.031***	0.197***
	(0.004)	(0.004)	(0.004)	(0.058)
University degree	0.071***	0.060***	0.060***	0.259***
	(0.008)	(0.008)	(0.008)	(0.071)
Age	0.087***	0.089***	0.088***	1.021***
	(0.005)	(0.005)	(0.005)	(0.061)
Age^2	-0.009***	-0.009***	-0.009***	-0.085***
	(0.001)	(0.001)	(0.001)	(0.006)
Risk score	0.014***	0.013***	0.013***	0.148***
	(0.001)	(0.001)	(0.001)	(0.007)
Willingness to move	0.025***	0.024***	0.024***	0.291***
	(0.003)	(0.003)	(0.003)	(0.046)
Vote	0.014***	0.013***	0.013***	0.123***
	(0.003)	(0.003)	(0.003)	(0.045)
Greed		0.013***	0.013***	0.167***
		(0.003)	(0.003)	(0.045)
Communist Party		0.025***	0.024***	0.346***
		(0.007)	(0.007)	(0.084)
Trust score		0.000	0.000	0.007
		(0.001)	(0.001)	(0.015)
Father's education			-0.000	0.011*
			(0.000)	(0.006)
Mother's education		0.001***	0.001**	-0.001
		(0.000)	(0.000)	(0.006)
Father Com. Party			0.007	0.056
			(0.005)	(0.070)
Mother Com. Party			-0.000	-0.004
			(0.007)	(0.102)
Perceived corruption	0.001	0.001	0.001	-0.031*
	(0.001)	(0.001)	(0.001)	(0.017)
Perceived liberties		0.003*	0.003**	0.090***
		(0.002)	(0.002)	(0.022)
Number of obs.	33 337	33 337	33 337	33 337
Pseudo-R^2/R^2	0.082	0.085	0.085	0.030
Log-likelihood	-8678.682	-8653.985	-8652.705	

Table 5.3: **Determinants of entrepreneurship in transition region I.** Note: Specifications TRAN1 to TRAN3 are estimated by the probit model, specification TRAN4 is estimated by OLS. Coefficients in specifications TRAN1 to TRAN3 report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Dependant variable	**Entrepreneur 12 Months**			**Years**
Specification	**TRAN5**	**TRAN6**	**TRAN7**	**TRAN8**
Secondary education		0.026***	0.025***	0.188***
		(0.004)	(0.004)	(0.058)
University degree		0.030***	0.028***	0.269***
		(0.007)	(0.007)	(0.071)
Age	0.086***	0.079***	0.078***	1.019***
	(0.005)	(0.005)	(0.005)	(0.061)
Age^2	-0.011***	-0.010***	-0.010***	-0.084***
	(0.001)	(0.001)	(0.001)	(0.006
Male	0.049***	0.043***	0.044***	0.392***
	(0.003)	(0.003)	(0.003)	(0.039)
Risk score		0.006***	0.006***	0.140***
		(0.000)	(0.000)	(0.007)
Willingness to move	0.004	-0.003	-0.003	0.266***
	(0.003)	(0.003)	(0.003)	(0.046)
Vote		0.012***	0.012***	0.145***
		(0.003)	(0.003)	(0.045)
Greed	0.018***	0.010***	0.010***	0.146***
	(0.003)	(0.003)	(0.003)	(0.045)
Trust score	0.004***	0.003***	0.003***	0.016
	(0.001)	(0.001)	(0.001)	(0.015)
Father's education			-0.000	0.011*
			(0.000)	(0.006)
Mother's education			0.000	0.000
			(0.000)	(0.006)
Father Com. Party			0.009**	0.060
			(0.005)	(0.070)
Mother Com. Party			0.007	0.052
			(0.007)	(0.102)
Perceived corruption	0.007***	0.006***	0.006***	-0.034**
	(0.001)	(0.001)	(0.001)	(0.017)
Number of obs.	33 298	33 298	33 298	33 295
Pseudo-R^2/R^2	0.061	0.074	0.075	0.032
Log-likelihood	-8456.209	-8341.359	-8336.719	

Table 5.4: **Determinants of entrepreneurship in transition region II.** Note: Specifications TRAN5 to TRAN7 are estimated by the probit model, specification TRAN8 is estimated by OLS. Coefficients in specifications TRAN5 to TRAN7 report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

neur rises until the age of about 39 to 49 years and then diminishes. Being a male increases the probability of becoming an entrepreneur to approximately same extent like in Slovakia. Conversely, respondent's membership in the Communist Party significantly increases the likelihood of being an entrepreneur. Like in Slovakia, individual attitudes of respondents are positively associated with entrepreneurship but the effect of willingness to move, voting in the last elections, greed and trust in other people is about three times smaller.

Sociological variables does not seem to have a significant effect except for mother's education and father's membership in the Communist Party whose effect is almost negligible, though. Looking at the institutional variables we can see that the perception of civil liberties and corruption have a significant and quite robust positive effect. However, the effect of perceived corruption is about three times smaller compared with Slovakia.

These results are mostly in line with former papers except for perceived corruption which has a positive effect on probability of being an entrepreneur. This result indicates problems with high corruption level in transition countries, even if not as big as in Slovakia.

Finally, we focus on **determinants of entrepreneurship in Western Europe** which are presented in Tables 5.5 and 5.6. Looking at the individual characteristics of respondents we can see that education has significantly positive effect on likelihood of being an entrepreneur but not as robust as in previous specifications. Similar to Slovakia and transition countries, age stays highly significant and robust determinant of entrepreneurship. It suggests that the probability of being an entrepreneur rises by the age of about 47 to 61 and then falls. Being a male is highly significant and robustly positively associated with being an entrepreneur although the effect of that is smaller than in Slovakia and transition region. Individual attitudes such as willingness to take risk and greed are also highly significant and robust determinants of entrepreneurship. Moreover, the effect of risk score is twice as large as in Slovakia and transition region whereas the effect of greed is

Dependant variable	**Entrepreneur**			**Years**
Specification	**WEST1**	**WEST2**	**WEST3**	**WEST4**
Secondary education	0.002	-0.006	-0.006	-0.417
	(0.016)	(0.016)	(0.016)	(0.355)
University degree	0.029	-0.006	-0.009	-1.108***
	(0.019)	(0.018)	(0.018)	(0.417)
Age	0.194***	0.197***	0.196***	2.070***
	(0.019)	(0.018)	(0.018)	(0.369)
Age^2	-0.016***	-0.016***	-0.016***	-0.094***
	(0.002)	(0.002)	(0.002)	(0.035)
Risk score	0.033***	0.027***	0.027***	0.468***
	(0.002)	(0.002)	(0.002)	(0.048)
Willingness to move	0.002	-0.005	-0.004	-0.001
	(0.010)	(0.010)	(0.010)	(0.231)
Vote	0.027**	0.017	0.017	0.454
	(0.012)	(0.013)	(0.013)	(0.292)
Greed		0.088***	0.088***	1.552***
		(0.012)	(0.012)	(0.250)
Trust score		0.008*	0.007	0.040
		(0.005)	(0.004)	(0.104)
Father's education			0.002	0.022
			(0.001)	(0.035)
Mother's education		0.003**	0.001	0.018
		(0.001)	(0.002)	(0.038)
Perceived corruption	-0.024***	-0.020**	-0.020**	-0.273
	(0.009)	(0.009)	(0.009)	(0.198)
Perceived liberties			0.005	0.245*
			(0.006)	(0.147)
Number of obs.	5503	5500	5494	5492
Pseudo-R^2/R^2	0.097	0.114	0.115	0.076
Log-likelihood	-2137.754	-2097.771	-2094.062	

Table 5.5: **Determinants of entrepreneurship in Western Europe I.** Note: Specifications WEST1 to WEST3 are estimated by the probit model, specification WEST4 is estimated by OLS. Coefficients in specifications WEST1 to WEST3 report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Dependant variable	**Entrepreneur 12 Months**			**Years**
Specification	**WEST5**	**WEST6**	**WEST7**	**WEST8**
Secondary education		0.036***	0.035***	-0.452
		(0.011)	(0.011)	(0.354)
University degree		0.031**	0.024	-1.152***
		(0.017)	(0.016)	(0.416)
Age	0.122***	0.123***	0.114***	2.065***
	(0.012)	(0.012)	(0.012)	(0.368)
Age^2	-0.013***	-0.012***	-0.012***	-0.095***
	(0.001)	(0.001)	(0.001)	(0.035)
Male	0.036***	0.028***	0.028***	1.176***
	(0.006)	(0.006)	(0.006)	(0.216)
Risk score		0.011***	0.011***	0.438***
		(0.001)	(0.001)	(0.048)
Willingness to move	-0.004	-0.011**	-0.011**	-0.086
	(0.006)	(0.005)	(0.005)	(0.231)
Vote		-0.006	-0.007	0.442
		(0.008)	(0.008)	(0.290)
Greed	0.062***	0.038***	0.037***	1.456***
	(0.008)	(0.007)	(0.007)	(0.250)
Trust score	0.001	0.000	0.000	0.055
	(0.003)	(0.003)	(0.003)	(0.102)
Father's education			0.001*	0.019
			(0.001)	(0.035)
Mother's education			-0.000	0.023
			(0.001)	(0.038)
Perceived corruption	-0.010*	-0.012**	-0.012**	-0.302
	(0.006)	(0.005)	(0.005)	(0.197)
Number of obs.	5503	5503	5503	5492
Pseudo-R^2/R^2	0.095	0.128	0.129	0.081
Log-likelihood	-1311.548	-1264.084	-1261.763	

Table 5.6: **Determinants of entrepreneurship in Western Europe II.** Note: Specifications WEST5 to WEST7 are estimated by the probit model, specification WEST8 is estimated by OLS. Coefficients in specifications WEST5 to WEST7 report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

even three times larger compared with transition region and two times larger compared with Slovakia. Conversely, trust score and voting in the last elections are not very robust and the effect is smaller than in Slovakia but larger than in transition countries. Surprisingly, willingness to move is significantly negatively associated with probability of being an entrepreneur which is in stark contrast to results in Slovakia and transition region.

Looking at the sociological and institutional variables we can see that parent education and perception of liberties have only negligible and not robust effect. Vice versa, perception of corruption has significantly negative effect on probability of being an entrepreneur which is in stark contrast to Slovakia and transition countries. It means that higher levels of corruption discourage potential entrepreneurs from setting up the businesses.

These results are almost in line with former papers except for willingness to move which is negatively associated with entrepreneurship. This may be caused by a higher share of opportunity entrepreneurs in countries of Western Europe.

5.3 Determinants of business success

In order to ascertain determinants of business success we estimate four probit specifications using dummy dependant variables 'Trial' and 'Success'. Note that we do not conduct any specification for Slovakia as the number of observations we have is insufficient.

Looking at the Table 5.7 we can see that in transition countries, education has significantly positive effect on probability of trying to start a business but it does not significantly increase the probability of success. The probability of a business attempt and success is a concave function of age and for example business starters have the highest probability to succeed at the age of almost 39. Males are significantly more likely to try to set up a business but females are equally likely to succeed. Living in an urban setting significantly increases the probability of success in transition countries but

Dependant variable	**Trial**		**Success**	
Specification	**TRAN11**	**WEST11**	**TRAN12**	**WEST12**
Secondary education	0.051***	-0.003	-0.012	-0.041
	(0.006)	(0.018)	(0.034)	(0.042)
University degree	0.092***	0.002	0.008	-0.090*
	(0.010)	(0.020)	(0.037)	(0.055)
Age	0.132***	0.224***		
	(0.006)	(0.020)		
Age^2	-0.014***	-0.019***		
	(0.001)	(0.002)		
Age at trial			0.070*	-0.065
			(0.041)	(0.068)
Age at trial^2			-0.009*	0.006
			(0.006)	(0.009)
Male	0.053***	0.081***	0.013	0.013
	(0.004)	(0.010)	(0.016)	(0.023)
Risk score	0.016***	0.029***	0.018***	0.008*
	(0.001)	(0.002)	(0.003)	(0.005)
Willingness to move	0.052***	-0.002	-0.073***	-0.049**
	(0.004)	(0.011)	(0.016)	(0.023)
Vote	0.017***	0.016	0.045**	0.035
	(0.004)	(0.014)	(0.020)	(0.036)
Greed	0.009**	0.085***	0.042**	0.048**
	(0.004)	(0.012)	(0.017)	(0.023)
Communist Party	0.032***		0.035	
	(0.008)		(0.030)	
Trust score	-0.001	-0.004	0.007	0.052***
	(0.001)	(0.005)	(0.006)	(0.010)
Urban	0.004	0.003	0.041***	-0.013
	(0.003)	(0.010)	(0.015)	(0.022)
Father's education	-0.000	0.001	-0.002	0.005
	(0.000)	(0.002)	(0.002)	(0.004)
Mother's education	0.001***	0.002	0.001	-0.005
	(0.001)	(0.002)	(0.002)	(0.004)
Father Com. Party	0.013**		-0.016	
	(0.006)		(0.025)	
Mother Com. Party	0.014		-0.047	
	(0.009)		(0.036)	
Borrowed money			0.169***	0.097***
			(0.016)	(0.021)
Perceived corruption	0.006***	-0.020**	-0.034***	-0.026
	(0.001)	(0.010	(0.007)	(0.023)
Perceived liberties	-0.005**	-0.003	0.054***	0.032**
	(0.002)	(0.007)	(0.010)	(0.015)
Number of obs.	33 298	5503	3942	975
Pseudo-R^2	0.098	0.117	0.050	0.094
Log-likelihood	-11437.465	-2302.577	-2415.278	-374.680

Table 5.7: **Determinants of entrepreneurial trial and success in transition region and Western Europe.** Note: All the specifications are estimated by the probit model. Coefficients report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

does not have a significant effect on probability of trying. Being a member of the Communist Party is significantly associated with higher probability of a business attempt but does not have an effect on probability of success. From the perspective of individual attitudes we can see that risk-tolerant respondents are significantly more likely to try and succeed at setting up a business. Willingness to move has a significantly positive effect on the probability of trying but on the other hand it decreases the probability of success. According to the EBRD [15] the reason for this may be that people willing to make sacrifices for their business idea are more likely to attempt to start a business but once they successfully launched it they may tend less to relocate their current place. Voting in the last elections is positively associated with the probability of an attempt and success but it is significant only in transition countries. Greed has a significantly positive effect on probability of both trying and succeeding and trust in other people has a significantly positive effect only on the probability of success in the Western Europe.

Looking at the sociological and institutional variables we can see that mother's education and father's membership in the Communist Party negligibly increase the probability of a business attempt but do not have a significant effect on the likelihood of success. Successfully borrowed money highly increase the probability of success in both subsamples which confirms the findings of various papers that access to money is an important determinant of success. Surprisingly, higher perception of corruption significantly increases the probability of a business attempt but decreases the probability of success in the transition countries. In Western Europe, the effect is always negative. The effect of perceived liberties seems to be almost negligible in terms of trying but it has a positive effect on the probability of success.

These results are mostly in line with the previous paper by the EBRD [15] except for respondent's education which does not significantly increase the probability of a business attempt in Western Europe, and living in an urban setting which conversely increases the probability of a business success in transition countries. Also, higher perception of corruption increases the pro-

bability of an attempt whereas higher perception of civil liberties decreases the probability of a business attempt in transition countries. However, the effect of these institutional variables is almost negligible.

5.4 Determinants of opportunity entrepreneurship

In order to ascertain determinants of opportunity entrepreneurship we estimate four probit specifications using the dependant variables 'Opportunity entrepreneur' and 'Opportunity entrepreneur 12'. Note that we do not carry out a specification for Slovakia as the number of observations we have is insufficient.

Looking at the table 5.8 we can see that coefficient signs almost always agree with those in Section 5.2 except for willingness to move which has a negative coefficient now. The reason for this may be the pull effect which means that individuals start the businesses by taking advantage of an entrepreneurial opportunity at the place they live. Examining individual characteristics of respondents we can see that higher education level, being a male, higher risk and trust score, voting in the last elections, greed and individual's membership in the Communist Party are connected with opportunity entrepreneurship. Moreover, the age at which the respondent's probability of being an opportunity entrepreneur is the highest, is a few years higher compared with results in Section 5.2. Looking at the sociological variables we can see that the effect of parent education is almost negligible whereas father's membership in the Communist Party increases the probability of being an opportunity entrepreneur by almost 3 per cent. Conversely, higher levels of perceived corruption are negatively associated with opportunity entrepreneurship as it discourages opportunity entrepreneurs from setting up a business. Finally, higher levels of perceived liberties are linked with opportunity entrepreneurship.

Note that there are no differences between our empirical results and those

Dependant variable	**Opport. entrep.**		**Opport. entrep. 12**	
Specification	**TRAN9**	**WEST9**	**TRAN10**	**WEST10**
Secondary education	0.048***	0.015	0.065***	0.158***
	(0.016)	(0.048)	(0.016)	(0.044)
University degree	0.082***	-0.060	0.073***	0.118**
	(0.022)	(0.053)	(0.022)	(0.060)
Age	0.183***	0.329***	0.203***	0.357***
	(0.017)	(0.057)	(0.018)	(0.051)
Age^2	-0.018***	-0.024***	-0.023***	-0.038***
	(0.002)	(0.005)	(0.002)	(0.005)
Male			0.079***	0.083***
			(0.009)	(0.022)
Risk score	0.028***	0.036***	0.013***	0.018***
	(0.002)	(0.006)	(0.002)	(0.005)
Willingness to move	0.009	-0.044	-0.037***	-0.072***
	(0.010)	(0.029)	(0.010)	(0.022)
Vote	0.015	0.045	0.029***	0.008
	(0.011)	(0.037)	(0.010)	(0.030)
Greed	0.022**	0.109***	0.017*	0.056**
	(0.010)	(0.029)	(0.010)	(0.024)
Communist Party	0.053**			
	(0.026)			
Trust score	0.003	0.020	0.006*	0.010
	(0.004)	(0.014)	(0.004)	(0.011)
Father's education	-0.001	0.007*	0.002	0.007**
	(0.001)	(0.004)	(0.001)	(0.003)
Mother's education	0.004***	0.000	-0.001	-0.001
	(0.001)	(0.004)	(0.001)	(0.003)
Father Com. Party	0.028*		0.024	
	(0.017)		(0.017)	
Mother Com. Party	0.019		0.026	
	(0.024)		(0.025)	
Perceived corruption	-0.004	-0.054*	0.001	-0.049**
	(0.004)	(0.028)	(0.004)	(0.023)
Perceived liberties	0.017	0.060***		
	(0.005)	(0.020)		
Number of obs.	7290	1335	7281	1335
Pseudo-R^2	0.078	0.117	0.056	0.104
Log-likelihood	-3301.532	-777.937	-3329.561	-641.426

Table 5.8: **Determinants of opportunity entrepreneurship in transition region and Western Europe.** Note: All the specifications are estimated by the probit model. Coefficients report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

presented in the former paper by the EBRD [15] .

5.5 Determinants of corporate default

In order to ascertain determinants of corporate default we estimated one probit specification for Slovakia, transition region and Western Europe using the dependant variable 'Default'.

Looking at Table 5.9 we can see that there are not many significant regressors in specifications SK9 and WEST13 which is caused by a small share of defaulted enterprises in Slovakia and Western Europe. In terms of individual characteristics, higher levels of education significantly decrease the probability of default and the probability function is again a concave function of age. Willingness to take risks is positively associated with the probability of business default whereas voting in the last elections has a negative effect. Trust in other people as well as urban setting has a negative effect. In terms of sociological and institutional variables, father's education and perceived corruption has a positive effect whereas mother's education and membership in the Communist Party have a negative effect on probability of a business default.

Note that compared with the previous paper by Fidrmuc and Hainz [25] we use different regressors because of our dataset. Therefore it is difficult to compare the empirical results.

Dependant variable		**Default**	
Specification	**SK9**	**TRAN13**	**WEST13**
Secondary education	-0.004	-0.017***	-0.003
	(0.016)	(0.005)	(0.006)
University degree	-0.003	-0.017***	-0.005
	(0.014)	(0.004)	(0.006)
Age	0.005	0.009*	0.002
	(0.017)	(0.005)	(0.006)
Age^2	-0.000	-0.002***	-0.000
	(0.002)	(0.001)	(0.001)
Risk score	0.001	0.002***	0.001
	(0.002)	(0.001)	(0.001)
Willingness to move	0.001	0.005	0.001
	(0.009)	(0.003)	(0.004)
Vote	-0.013	0.002	-0.011**
	(0.011)	(0.003)	(0.006)
Greed	0.003	0.000	-0.006
	(0.009)	(0.003)	(0.004)
Communist Party		0.006	
		(0.007)	
Trust score	0.004	-0.003**	0.003
	(0.004)	(0.001)	(0.002)
Urban	0.002	-0.006**	-0.005
	(0.008)	(0.003)	(0.004)
Father's education	0.001	0.002***	-0.000
	(0.001)	(0.000)	(0.001)
Mother's education	-0.001	-0.001***	-0.000
	(0.001)	(0.000)	(0.001)
Father Com. Party		0.001	
		(0.005)	
Mother Com. Party		0.014*	
		(0.009)	
Perceived corruption	0.002	0.005***	-0.001
	(0.004)	(0.001)	(0.003)
Perceived liberties	0.003	-0.001	-0.002
	(0.006)	(0.002)	(0.002)
Number of obs.	644	22 338	3551
Pseudo-R^2	0.058	0.018	0.045
Log-likelihood	-44.647	-4188.139	-259.056

Table 5.9: **Determinants of corporate default in Slovakia, transition region and Western Europe.** Note: All the specifications are estimated by the probit model. Coefficients report the average marginal probability effects. Standard errors are presented in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Chapter 6

Conclusions

The main goal of this diploma thesis was to estimate the microeconometric determinants of entrepreneurial activity in Slovakia using the LiTS survey. Our choice of variables was based on previous papers which had emphasised the role of individual characteristics, sociological and institutional variables.

Taken together, the results of our empirical analysis in Slovakia are mostly in line with former papers but we found highly significant and robust evidence that the higher levels of corruption are positively associated with probability of being an entrepreneur in Slovakia and transition countries. However, businesses whose bosses tend to corrupt were more likely to default because of the crisis. This is in stark contrast with countries of Western Europe where the higher levels of corruption decrease the probability of being an entrepreneur.

In terms of individual characteristics we found suggestive evidence that education is an important determinant of entrepreneurship, however its effect is different in each subsample. It is the largest in Slovakia while in transition region and Western Europe it is about three times smaller. Probability of being an entrepreneur is significantly a concave function of age in all the specifications. The results further suggest that being a male increases the probability of being an entrepreneur in all the subsamples. Individual attitudes such as willingness to move, willingness to take risk, trust in other people, voting in the last elections and greed are all highly significant and

robust determinants of entrepreneurship. Their effect is almost always positive with the only exception for willingness to move which has a negative effect in Western Europe. Respondent's membership in the Communist Party significantly decreases the probability of being an entrepreneur in Slovakia whereas it has got a contrary effect in transition region. These two findings are in contrast to the previous papers and may be a consequence of a higher share of opportunity entrepreneurs in Western Europe and the lustration law adopted after the Velvet Revolution in Slovakia, respectively.

Finally, the effect of sociological variables is very small and not convincingly robust in all the subsamples. Similarly, the effect of perceived liberties is convincingly robust only in transition countries but it is almost negligible.

Chapter 7

Resumé

Hlavným cieľom tejto diplomovej práce bolo odhadnúť mikroekonometrické determinanty podnikateľskej činnosti na Slovensku s použitím dát z prieskumu Life in Transition Survey. Pri výbere premenných do našich modelov sme vychádzali z výsledkov článkov, ktoré zdôrazňujú úlohu individuálnych čŕt jednotlivca, sociologických a inštitucionálnych premenných.

Výsledky našej empirickej analýzy podnikania na Slovensku väčšinou korešpondujú s výsledkami publikovanými v minulosti, avšak z odhadnutých modelov sme zistili, že podnikanie na Slovensku a v tranzitívnych ekonomikách sa spája s vyššou mierou korupcie. Na druhej strane podnikatelia, ktorí majú sklon korumpovať mali aj vyššiu pravdepodobnosť, že ich podnik skrachuje vplyvom finančnej krízy. Tieto zistenia sú v protiklade s krajinami západnej Európy, v ktorých vyššia miera korupcie znižuje pravdepodobnosť, že respondent bol niekedy podnikateľ.

Z hľadiska individuálnych čŕt jednotlivca sme zistili, že vzdelanie je dôležitý determinant podnikateľskej činnosti, avšak jeho vplyv je rôzny. Najvýraznejší je na Slovensku, kým v tranzitívnych ekonomikách a v západnej Európe je asi trikrát menší. Pravdepodobnosť, že respondent bol niekedy podnikateľ je vo všetkých modeloch konkávna funkcia jeho veku. Výsledky z našich modelov ďalej naznačujú, že muži majú vyššiu pravdepodobnosť stať sa podnikateľmi. Postoje respondentov ako ochota presťahovať sa kvôli práci, ochota riskovať,

dôvera v ľudí, hlasovanie v posledných voľbách a chtivosť sú všetky vysoko signifikanté a robustné determinanty podnikateľskej činnosti. Ich efekt je takmer vždy kladný s jedinou výnimkou v prípade ochoty presťahovať sa, ktorá má v krajinách západnej Európy negatívny vplyv. Členstvo v komunistickej strane na Slovensku signifikantne znižuje pravdepodobnosť, že respondent bol niekedy podnikateľ, zatiaľ čo efekt v tranzitívnych ekonomikách je opačný. Tieto dve zistenie sú v protiklade s výsledkami publikovanými v minulosti. Vysvetlením môže byť, že podiel podnikateľov, ktorí podnikajú z dôvodu vyskytujúcej sa príležitosti je v západnej Európe vyšší, respektíve v prípade členstva v komunistickej strane to môže byť dôsledok lustračného zákona prijatého po nežnej revolúcii na Slovensku.

Nakoniec, zo všetkých našich modelov zisťujeme, že efekt sociologických premenných je veľmi malý a nie je presvedčivo robustný. Podobne, efekt vnímaných slobôd je presvedčivo robustný iba v tranzitívnych ekonomikách, avšak jeho veľkosť je takmer zanedbateľná.

Appendix A

Variable Definitions

Trial: Dummy variable equals 1 if respondent has ever tried to set up a business, 0 otherwise
Success: Dummy variable equals 1 if respondent has tried and succeeded to set up a business, 0 if tried but failed
Entrepreneur: Dummy variable equals 1 if respondent has ever set up a business, 0 otherwise
Entrepreneur 12 Months: Dummy variable equals 1 if respondent worked as self-employed during the past 12 moths, 0 otherwise
Opportunity entrepreneur: Dummy variable equals 1 if respondent has ever set up a business and prefers to be self-employed, 0 otherwise
Opportunity entrepreneur 12: Dummy variable equals 1 if respondent worked as self-employed during the past 12 moths and prefers to be self-employed, 0 otherwise
Years as entrepreneur: Number of years that respondent has been an entrepreneur
Default: Dummy variable equals 1 if family business of respondent's family was closed because of crisis in the past two years, 0 otherwise
Secondary education: Dummy variable equals 1 if respondent's highest level of education already completed is lower secondary, upper secondary or post secondary education, 0 otherwise

University degree: Dummy variable equals 1 if respondent's highest level of education already completed is Bachelor's or Master's degree or more, 0 otherwise
Age: Age of respondent
Age at trial: Age of respondent when trying to set up a business
Male: Dummy variable equals 1 if respondent is male, 0 otherwise
Risk score: Score of respondent's willingness to take risk in general on a scale from 0 (least) to 10 (most)
Willingness to move: Dummy variable equals 1 if respondent is willing to move within country for employment reasons, 0 otherwise
Vote: Dummy variable equals 1 if respondent has voted in the most recent local, parliamentary, or presidential elections, 0 otherwise
Greed: Dummy variable equals 1 if respondent prefers a high salary, a lot of chance for promotion, but significantly less job security, 0 if respondent prefers an average salary, not much chance for promotion, but safe long-term job
Communist Party: Dummy variable equals 1 if respondent was a member of the Communist Party, 0 otherwise
Trust score: Score of respondent's trust in other people on a scale from 0 (least) to 5 (most)
Urban: Dummy variable equals 1 if respondent lives in an urban setting, 0 otherwise
Father's education: Years of respondent's father full time education
Mother's education: Years of respondent's mother full time education
Father Communist Party: Dummy variable equals 1 if respondent's father was a member of the Communist Party, 0 otherwise
Mother Communist Party: Dummy variable equals 1 if respondent's mother was a member of the Communist Party, 0 otherwise
Borrowed money: Dummy variable equals 1 if respondent borrowed money for the business successfully, 0 otherwise
Perceived corruption: Average of the corruption existence score

(calculated as the average of scores on a scale from 0 to 5 of existence of unofficial payments or gifts when requesting official documents or when going to courts for a civil matter)

Perceived liberties: Average of the liberties existence score (calculated as the average of scores on a scale from 0 to 5 of existence of free elections, law and order, freedom of speech, peace and stability, independent press, political opposition, free and fair courts, minority rights and freedom to travel

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