WHAT IS THE RELATIONSHIP BETWEEN ENTREPRENEURSHIP AND UNEMPLOYMENT IN VISEGRAD COUNTRIES?

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The presented study aims to quantify the determinants of entrepreneurship in the four countries of the Visegrad (V4) group (the Czech Republic, Hungary, Poland and Slovakia) with a particular focus on the relationship between entrepreneurship and unemployment. The purpose of the research was to analyze whether, during the periods of higher unemployment rate, individuals more likely engage into entrepreneurial activity. Data were collected from the national statistical offices of the Visegrad countries, World Bank, Eurostat and Heritage Foundation. The collected sample covered years 1998-2015. To achieve the main objective of the article, regression models with the dependent variable, the rate of registered businesses per economically active inhabitant, were quantified. Estimated regressions proved a positive relationship between entrepreneurship and unemployment. A higher unemployment rate was associated with the increase in overall entrepreneurial activity. Estimated models further confirmed the negative influence of the administrative barriers on the overall entrepreneurial activity. Several policy and research implications are discussed in the study.

Keywords: entrepreneurial activity; registered business activity; unemployment; administrative barriers; Visegrad countries
JEL classification: M2, M1, L260

1. Introduction

Entrepreneurship has been for the last decades frequently discussed as one of the key driving forces of economic growth not only in Europe, but also in all countries over the world (e. g. Ferreira et al., 2017, Lukeš, 2013 or Koellinger and Thurik, 2012). Policy makers and other stakeholders therefore try to boost entrepreneurial activity, hoping for higher economic growth and lower unemployment. At the same time, entrepreneurship scholars investigate the determinants of entrepreneurship to provide policy makers with the empirical evidence, mapping the patterns in entrepreneurial behavior on the levels of individuals, countries and regions. Nevertheless, findings of empirical researchers (e. g. Baptista and Thurik, 2007 or Grilo and Thurik, 2008) show that the impacts of the factors driving entrepreneurship may change over time and across countries. Scholars also point out that entrepreneurship needs to be studied with respect to the local conditions. The question of the relationship between entrepreneurship and its determinants remains empirical and creates a research gap in the countries, where entrepreneurship has not deserved much research attention so far.

Empirical investigations in Central and Eastern European post-communist countries, experiencing the process of economic transition, are still among the under-researched

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areas in the field of entrepreneurship (e. g. Welter and Smallbone, 2011 or Cieślik and Van Stel, 2012). However, one needs to point out that the situation is slowly improving since there were some studies published recently. Danik et al. (2016) have compared the characteristics of Polish and Czech companies. Holienka et al. (2016) and Munk et al. (2014) have studied the driving forces of entrepreneurship in the countries of the Visegrad Group from the individual level perspective based on the data obtained from the Global Entrepreneurship Monitor. Data from Global Entrepreneurship Monitor were also used in the study by Lukeš and Zouhar (2013). Other scholars (e. g. Dvouletý and Mareš, 2016a or Šebestová et al., 2015) study the entrepreneurial activity from the regional perspectives. However, to the best knowledge of the author, no one has recently tried to study entrepreneurial activity from the aggregated perspective in the whole Central and Eastern European region, despite the fact that investigation of the relationship between entrepreneurship and economic development in the region may have important implications for the policy makers (Polok et al., 2016). This paper aims to contribute to the local knowledge by the empirical investigation of the determinants of entrepreneurial activity in the countries of the Visegrad Group (the Czech Republic, Hungary, Poland and Slovakia) with a particular focus on the relationship between entrepreneurship and unemployment. All four countries united in the Visegrad Group (or also V4 region), have many things in common and their cooperation has lasted for more than 25 years. According to the Global Entrepreneurship Monitor (2017), on average 5.9% of economically active inhabitants in the whole Visegrad region were involved in established business activity, which demonstrates the importance of entrepreneurship in the V4 region. Visegrad countries are post-communist economies which cooperate on the political, economic and cultural levels and which also exchange best policy practices (e. g. Polok et al., 2016) and therefore they may be studied together in this quantitative research study.

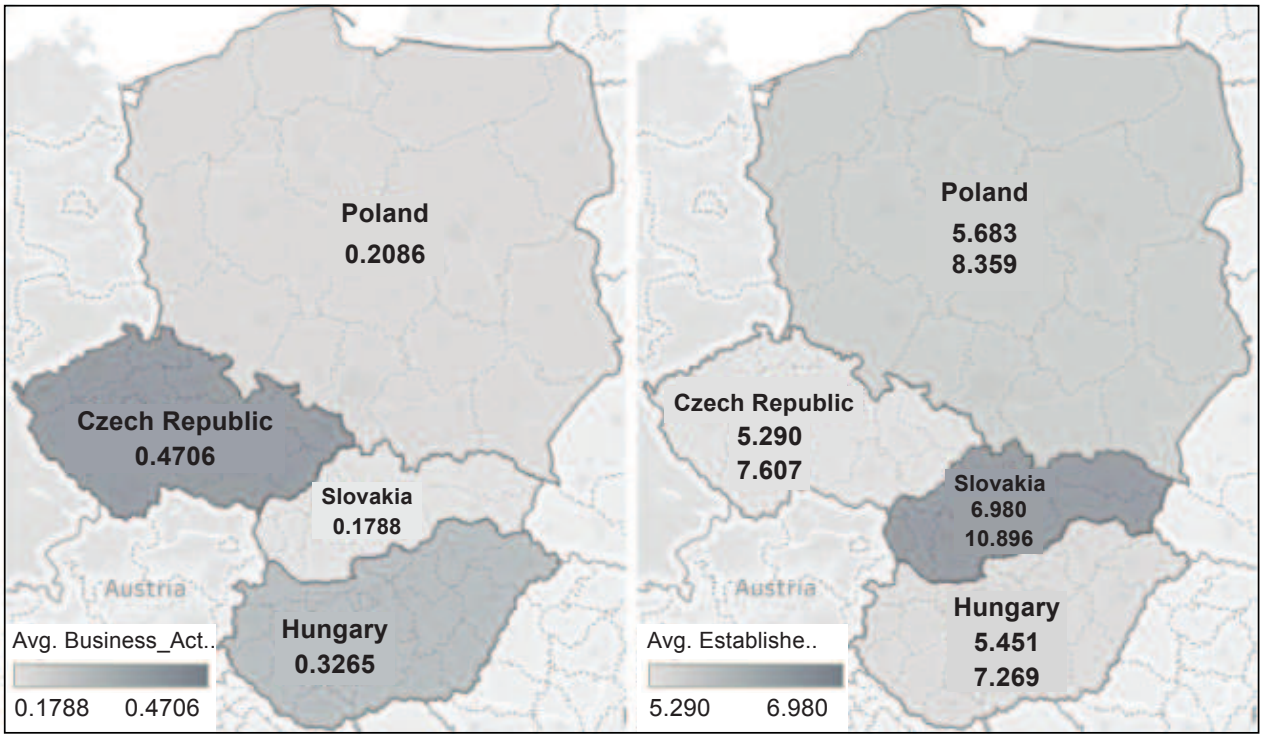
As already mentioned, the main research challenge in this article is to map entrepreneurial patterns in the Visegrad region over the period of years 1998-2015 and to investigate the determinants of entrepreneurship with the focus on the relationship between entrepreneurial activity and unemployment. The next section presents to the reader obtained data together with the theoretical justification for each of the used variables. The following part describes the empirical approach, tested hypothesis and it employs the regression analysis with the fixed effects approach to fulfil the main aim of the study. After the estimation of econometric models, the results are interpreted in the light of previously published studies, discussed and based on the findings, policy and research implications are discussed in the concluding part of the article.

2. Data

The empirical part of this article is based on the collected panel of four Visegrad countries (the Czech Republic, Hungary, Poland and Slovakia), covering the period of years 1998-2015. The dependent variable was calculated as an amount of officially registered businesses per economically active inhabitant aged 15-64 years (*Entrepreneurial Activity*), representing country level of entrepreneurial activity. The number of registered entities was obtained from the national statistical offices of Visegrad countries (Central Statistical Office of Poland, 2017; Czech Statistical Office, 2017; Hungarian Central Statistical Office, 2017 and Statistical Office of the Slovak Republic, 2017) and the population

of economically active inhabitants was obtained from Eurostat (2017a). Only business entities were considered as active enterprises, and therefore all public institutions, organizations and foundations were excluded from the registered business activity. The need to use registered business activity as a substitute for the results of the population surveys such as Global Entrepreneurship Monitor (2017) results from the need to work with longer time series, which are unfortunately in the case of Visegrad countries not available. In the Visegrad region, most frequently was the Global Entrepreneurship Monitor (GEM) research conducted in Hungary, and at least in the Czech Republic (GEM Coverage in years: the Czech Republic: 2006, 2011 and 2013; Hungary: with exception of 2003 all years from 2001 to 2015; Poland: 2001, 2002, 2004 and 2011-2015; and Slovakia: 2011-2015). Registered business activity is also frequently used in empirical studies published currently by entrepreneurship scholars (e. g. Dvouletý, 2017a; Fritsch et al., 2015; Koellinger and Thurik, 2012 or Dvouletý and Mareš, 2016a).

Figure 1 | Average Registered Business Activity and Entrepreneurial Activity obtained from the Global Entrepreneurship Monitor



Note: Left Chart: Average rate of registered businesses per economically active population (years 1998-2015); Right chart: Average Established Business Ownership rate (on the top) and Average Total Early-Stage Entrepreneurial Activity (on the bottom) as percentage shares of economically active population (years 2001-2015)

Source: Tableau, own calculations based on the data from the national statistical offices of Visegrad countries and Global Entrepreneurship Monitor (2017)

Nevertheless, it is always very interesting to observe the differences between the two measures of entrepreneurial activity, the one obtained from the population surveys (established business ownership rate) and the registered business activity. Therefore, Figure 1 compares these two measures, depicting the average rates of entrepreneurial activity in

the Visegrad countries. If we look at Figure 1 and turn our attention towards the registered business activity per capita, we may see that on average the densest representation of enterprises was during the period of years 1998-2015 in the Czech Republic, followed by Hungary, Poland and Slovakia. The development of the indicator is further depicted in Appendix 1. One may see the overall increase in the level of registered entrepreneurial activity. The most significant growth took place in Hungary during the period of economic crisis, which took place during the period of years 2008-2010. However, if we take into account GEM surveys and their average data for the period of years 2001-2015, then we have a completely different picture. In terms of established business ownership rate, the highest entrepreneurial activity was on average in Slovakia, followed by Poland, Hungary and the Czech Republic. On average, 5.9% of economically active inhabitants in the whole Visegrad Region, were active in owning, managing and running business, receiving payments for more than 42 months and at the same time 8.5% were either a founder or owner of nascent business activity during the years 2001-2015 (Global Entrepreneurship Monitor, 2017). The differences in the indicators of entrepreneurial activity may be caused by the missing data from the GEM population surveys and the objective of this section is to remind researchers how important it is to have longer and comparable time series of different variables measuring entrepreneurship.

Table 1 | Summary statistics

Variable / Statistics	Mean	S. D.	Min	Max	N
Entrepreneurial Activity	.2962	.1230	.1383	.5324	72
Unemployment Rate	10.6264	4.3751	4.4	20	72
Tertiary Educated Population	14.1208	4.2841	7.7	24.4	72
Population Density	120.6206	9.4511	108.7267	136.5893	72
Days to Start Business	26.2308	18.1763	4	103	52
Business Freedom Index	69.8292	6.3766	53.7	85	72

Source: STATA 14, own calculations

The objective of the paper is to quantify the relationship between entrepreneurship and unemployment and therefore additional variables used in the empirical analysis need to be introduced. The main investigated explanatory variable, unemployment rate in percentages (*Unemployment Rate*), was obtained from Eurostat (2017b) as was the percentage share of tertiary educated population (*Tertiary Educated Population)*, representing the resource based view on entrepreneurship (e.g. Coleman, 1988). From the regional perspective, a control variable representing the population density (*Population Density)* operationalized in inhabitants per square kilometer was added to analysis and the variable was obtained from World Bank database (2017). According to previous research, the business environment has a very important role in determining entrepreneurial activity (e. g. Freytag and Thurik, 2007 or Dvouletý, 2017a), and therefore I use two proxy variables controlling for it on the country level; the business freedom index (*Business*

Freedom Index) obtained from Heritage Foundation (2017) and Doing Business statistics (World Bank, 2017) containing information about the amount of time required to start a business in days (*Days to Start Business)*. Table 1 presents summary statistics below. The next part of the article is dedicated to the empirical analysis investigating the determinants of entrepreneurial activity in the Visegrad countries with the focus on the role of unemployment.

3. Empirical Approach

Regression analysis is used to achieve the aim of this study, to quantify the relationship between entrepreneurial activity and unemployment rate in Visegrad countries, to concretely observe whether during the times of higher unemployment rate, people more likely join entrepreneurial activity as a way out of unemployment or not. The tested hypothesis is formally stated below:

H1: The higher unemployment rate in the Visegrad region was associated, during the period of years 1998-2015, with the higher level of entrepreneurial activity.

Econometric models are usually utilized in the studies investigating entrepreneurship on the level of (cross) countries (e. g. Carmona et al., 2016, Llopis et al., 2015; Fritsch et al., 2015; Cieślik, and Van Stel, 2012 or Grilo and Thurik, 2008) and therefore this article also follows the established empirical approach, and with the usage of econometric software STATA 14, regression models are quantified. Before the estimation of econometric models, all variables need to be checked for stationarity to avoid misleading estimates. After the employment of Levin, Lin & Chu unit root tests (see Appendix 1), no unit root was detected and one may conclude that the collected variables are stationary (Levin et al., 2002). As a first step of analysis, a suitable estimation technique for panel data needs to be selected. A fixed effects approach was selected based on the characteristics of the collected dataset. Panel is based on the countries, which usually do not change over the time. Selection of the fixed effects approach was also supported by the Hausman test of redundancy of fixed effects Hausman ($p < 0.001$). Models were further estimated with robust standard errors which deal with the consequences of autocorrelation and heteroscedasticity. The level of collinearity among independent variables was tested by the Variance Inflation Factors test (see Appendix 3). Finally, normality of residuals was checked based on the results of Jarque Bera test (see Appendix 4). All estimated econometric models are depicted in Table 2 below. Models were found to be statistically significant, their model fit in terms of R-Squared was quite good and the econometric assumptions were satisfied (Verbeek, 2012). Therefore, one may proceed towards the interpretation of obtained coefficients.

4. Results and Discussion

In estimated models, the influence of unemployment rate on the entrepreneurial activity with up to two year lag was investigated, since responses of agents in the economy towards the economic development may be delayed (e. g. Koellinger and Thurik, 2012). All three variables confirmed statistically significant positive impact of unemployment on entrepreneurship, showing that higher unemployment rate was associated with higher level of entrepreneurial activity in Visegrad countries during the analyzed period of years 1998-2015. The tested hypothesis (H_1) is therefore empirically supported. According to

this finding, during the times of higher unemployment, entrepreneurship may become a (temporary) solution for individuals who lost their jobs or better alternative opportunity on the labor market in terms of earnings, time and other social and economic values, as it was empirically observed for example in the studies by Fritsch et al. (2015), Cueto et al. (2015) or Dvouletý and Mareš (2016b). This observation may also be supported by the obtained coefficient for the variable representing economic crisis during the period of years 2008-2010, which indicates that, compared to other years, during the economic crisis was the entrepreneurial activity on average higher which is in favor of the theory of necessity entrepreneurship (Reynolds et al., 2005).

Table 2 | Model Table

Independent Variables / Model	Dependent Variable: Entrepreneurial Activity		
	Model (1)	Model (2)	Model (3)
Unemployment Rate	0.004* (0.001)		
Unemployment Rate (-1)		0.005** (0.001)	
Unemployment Rate (-2)			0.004** (0.001)
Tertiary Educated Population	0.005** (0.001)	0.006*** (0.001)	0.006*** (0.001)
Population Density	-0.003 (0.004)	-0.003 (0.002)	-0.001 (0.002)
Days to Start Business	-0.001* (0.000)	-0.001** (0.000)	-0.001* (0.000)
Business Freedom Index	0.001 (0.001)	0.001 (0.001)	0.002** (0.000)
Economic Crisis 2008-2010	0.018 (0.007)	0.030** (0.008)	0.028** (0.008)
Constant	0.500 (0.464)	0.411 (0.273)	0.219 (0.173)
Observations	52	52	52
R^2	0.823	0.870	0.874
Adjusted R^2	0.799	0.853	0.857
AIC	-303.1	-319.2	-320.8
BIC	-297.3	-313.4	-315.0

Estimated regressions with FE and robust standard errors; Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: STATA 14, own calculations

Models were also used to study the role of traditional determinants of entrepreneurship. According to the obtained results, higher entrepreneurial activity was associated with the higher shares of tertiary educated population. This observation is in favor of the resource based view on entrepreneurship (RBV) stating that individuals equipped with more resources (in this case by human and social capital) tend to more likely engage in entrepreneurial activity (e. g. Wennekers et al., 2005 or Coleman, 1988). Unfortunately, no statistically significant influence was obtained for the variable representing population density, having mainly function of control variable in the models. The same set of econometric models was used to investigate the role of barriers of entrepreneurship and business environment discussed in Visegrad region recently by Polok et al. (2016). Obtained coefficients confirmed statistically significant positive impact of higher business freedom on entrepreneurship. Estimated coefficients for the variable representing the amount of days required to set up business supported negative influence on entrepreneurial activity. It has been confirmed that business environment and administrative procedures may have influence on the decisions of potential and current entrepreneurs to engage into business. This is also in accordance with the findings of other scholars in the field (e. g. Dvouletý, 2017; Aparacio et al., 2016 or Freytag and Thurik, 2007).

5. Conclusion

The original purpose of this article was to investigate the entrepreneurial activity and its driving factors in four Central and Eastern European countries, namely in the Czech Republic, Hungary, Poland and Slovakia over the period of years 1998-2015. These four countries are historically united in the organization named the Visegrad Group, existing now more than 25 years. Entrepreneurship is considered as an important driver of economies and therefore it is relevant to study its determinants, especially in Central and Eastern Europe, where such studies are still very rare (e. g. Polok et al., 2016; Dvouletý and Mareš, 2016b; Munk et al., 2014 or Cieślik, and Van Stel, 2012). According to the Global Entrepreneurship Monitor (2017), on average, 5.9% of economically active inhabitants in the whole Visegrad Region were active in owning, managing and running business, receiving payments for more than 42 months and at the same time 8.5% were either a founder or owner of nascent business activity during the years 2001-2015.

It has been found that the data from population surveys, such as Global Entrepreneurship Monitor, still do not provide sufficiently long time series needed for the research in the Visegrad countries and therefore entrepreneurial activity was substituted in the empirical analysis by the registered business activity. The purpose of the study was to analyze whether, during the periods of higher unemployment rate, individuals more likely engage into entrepreneurial activity. Data were collected from the national statistical offices of the Visegrad Countries, World Bank, Eurostat and Heritage Foundation. Collected variables covered besides the unemployment rate also the traditional determinants of entrepreneurship (share of tertiary educated population, population density, days required to start business and business freedom index). Relationships among variables were econometrically tested with the usage of regression models.

Results of estimated econometric models show that a higher unemployment rate was associated with higher level of entrepreneurship in Visegrad region during the analyzed period of years 1998-2015. Estimated coefficients for unemployment rate were also

positive with up to two years' lag. Obtained results have crucial implications for policy makers in the Visegrad region. Policy makers should therefore engage unemployed individuals to join entrepreneurship, especially during the times of higher unemployment rates, and to support their efforts. The reasoning behind this recommendation may be explained by the fact that participation in any economic activity helps unemployed to maintain their working habits, skills and to increase their work experience. Concretely, public support may have a form of non-repayable capital grants, guarantees, counselling and entrepreneurship education (Dvouletý and Lukeš, 2016). Especially entrepreneurial trainings might be considered by policy makers as a way to support necessity entrepreneurs during the early stages of the process of starting a new venture (Frese et al, 2016). Another way of support of entrepreneurship by the public sector may be through the reduction of administrative barriers in Visegrad countries, since the negative impact of the amount of days required to set up business was empirically observed, despite the fact that significant changes have already been made so far (Polok et al., 2016).

Presented findings might also have value for business owners and entrepreneurs, demonstrating to them that during the periods of economic decline, (unemployed) people see entrepreneurship as a viable option to improve their living conditions and therefore overall competition may even increase. However, to provide more concrete recommendations for business practitioners, it would be important to provide an empirical analysis on the level of new businesses and to explore what kind of business are founded during the times of higher unemployment/economic crises

Continuous monitoring of entrepreneurial activity through population surveys is, for upcoming research studies, essential since more indicators measuring entrepreneurial activity should be empirically tested to validate the obtained findings (e. g. Koellinger and Thurik, 2012 or Dvouletý and Mareš, 2016a). Future research should also address the different forms of entrepreneurship, since different patterns may be observed for the determinants of self-employed or business companies (e. g. Brekke, 2015 or Dvouletý, 2017b, 2017c). Forthcoming research in Central and Eastern Europe should also investigate the impact and efficiency of the various entrepreneurship policies, because not many studies in the region have been published so far and their findings may serve as an important tool for entrepreneurship policy makers (e. g. Meager, 1996 or Dvouletý and Lukeš, 2016).

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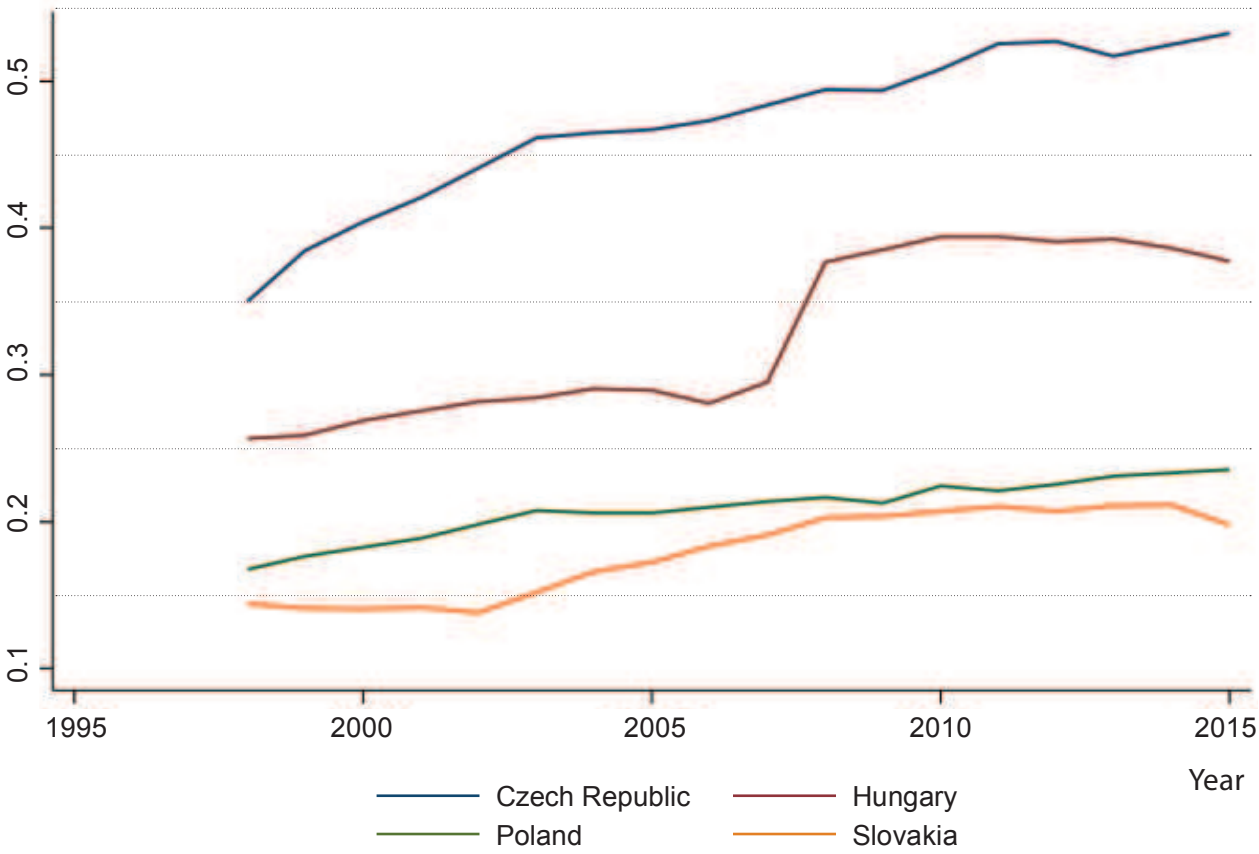
Appendix

Appendix 1 | Average Registered Business Activity over Years 1998-2015



Source: Own calculations based on the data from the national statistical offices of Visegrad countries (2017)

Appendix 2 | Results of the Levin, Lin & Chu (2002) Unit Root Test for the Panel data

Variable	Stat. significance	P-value	Result
Entrepreneurial Activity	10%	0.00	Stationary
Unemployment Rate	10%	0.02	Stationary
Tertiary Educated Population	10%	0.06	Stationary
Population Density	10%	0.08	Stationary
Days to Start Business	10%	0.00	Stationary
Business Freedom Index	10%	0.06	Stationary

Note: By rejecting H_0, on given level of stat. significance, variable is stationary (Levin et al., 2002).

Source: STATA 14, own calculations

Appendix 3 | Results of the Variance Inflation Factors (VIF) Test

Variable	VIF (Model 1)	VIF (Model 2)	VIF (Model 3)
Unemployment Rate	1.51		
Unemployment Rate (-1)		1.54	
Unemployment Rate (-2)			1.56
Tertiary Educated Population	1.35	1.34	1.38
Population Density	1.71	1.79	1.89
Days to Start Business	1.71	1.63	1.60
Business Freedom Index	1.64	1.67	1.79
Economic Crisis 2008-2010	1.18	1.28	1.28

Note: Values above 10 indicate collinearity problem (Verbeek, 2012).

Source: STATA 14, own calculations

Appendix 4 | Jarque Bera Residuals Normality Test

Variable	Model 1	Model 2	Model 3
P-value (1% stat. significance)	0.03	0.03	0.04
Results of the test (1% stat. significance)	Normal distr.	Normal distr.	Normal distr.

Note: Note: By rejecting H0, on given level of stat. significance, residuals are non-normally distributed (Verbeek, 2012).

Source: STATA 14, own calculations