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Dijana Močnik

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DETERMINANTS OF FIRM ENTRIES: EMPIRICAL EVIDENCE FOR SLOVENIA

DIJANA MOČNIK*

ABSTRACT: *We empirically investigate the determinants of new firm formations on Slovenian data set for the 6-year period across statistical regions. Analyzed are the relationships of the determinants classified into five groups: demand, unemployment, industrial restructuring, local financial capital, and knowledge concentration. We find a positive and significant impact of GDP p.c., unemployment rate, productivity growth and a negative relationship for employment density. Results show that some regions have significantly worse conditions for start-up firms than others. Practical implications of this study would allow policy makers to better understand the dynamics in new firm formations.*

Keywords: *firm entry, small business, entrepreneurship, regression, Slovenia*
JEL classification: L26

1. INTRODUCTION

Since the 1970s, researchers have sought to empirically demonstrate that small and medium-sized enterprises increasingly contribute to development. The entrepreneur serves as a catalyst for economic growth and development (Braunerhjelm 2007). Entries of enterprises are in fact related to the processes of innovation and change in the industry (Dosi et al. 1995, Callejón & Segara 1999). New businesses are, compared to old companies, more readily able to develop, use, and introduce radical innovations and changes, as reflected in the rising revenues and productivity rates (Casson 2002a, 2002b, Baumol 2007, in Braunerhjelm 2007). The more small firms (which start-ups typically are) that exist, the more impact they have on deregulation, increased competition, and better exploitation of new technologies and knowledge (Jovanovic & Rousseau 2005, in Braunerhjelm 2007, Močnik 2009). According to Audretsch (1995a, 1995b, 1997) and Callejón and Segara (1999), an individual who wishes to realize innovation may do so by establishing a company.

* University of Maribor, Faculty of Electrical Engineering and Computer Science, Smetanova 17, 2000 Maribor; Slovenia, e-mail: dijana.mocnik@uni-mb.si

Empirical research has shown that promoting entries can create long-term benefit to society as small, innovative firms start their businesses in the relatively uninvestigated areas of technology (Almeida & Kogut 1997, Almeida 1999, in Braunerhjelm 2007). Moreover, they are often willing to introduce radical innovations (Rothwell & Zegveld 1982, Baumol 2004, in Braunerhjelm 2007), resulting in greater efficiency, productivity, and growth (Durnev et al. 2004, Aghion et al. 2004, Aghion & Griffith 2005, Acemoglu et al. 2006, Chun et al. 2007, in Braunerhjelm 2007). Because of just described perceived benefits that new firms may bring to the society, we aim to expose the determinants that have been found as important for the firm entries. We study the relationship between the gross rate of entry and ten determinants across twelve Slovenian statistical regions. The gross rate of entry represents the ratio between the number of new established companies and existing companies. Thus, it represents the percentage share of new established companies in existing companies.

As many authors suggest that locations with more knowledge become attractive to entrepreneurs (Waltz 1996, Baldwin & Johnson 1999, Black & Henderson 1999, Fujita et al. 1999, Martin & Ottaviano 1999, 2001, Baldwin & Forslid 2000, Fujita & Thisse 2002, Hendersson & Thisse 2004, in Braunerhjelm 2007), our estimation is made in a way that we are able to assess the impact of various determinants controlled for the region effect. The study is organized as follows. In the Section 2 we give an overview of the previous research and present the study's hypotheses. Section 3 presents the model and estimation technique. Section 4 deals with the results. In the final section we present the conclusions.

2. PREVIOUS RESEARCH AND HYPOTHESES

2.1 Theoretical Background

Many researchers have already studied the effects of entries. For example, Sutaria and Hicks (2004) conducted the research of different factors on the creation of new businesses in manufacturing regionally for all Texas metropolitan statistical areas. Brixy and Grotz (2007) studied the correlation between the intensity of new-firm formation and the survival rates of young businesses in West Germany. There are the determinants of the spatial differences in the rates of firm formation that have already been the subject of many studies (e.g. Audretsch & Fritsch 1994; Sutaria/Hicks 2004). In our study, we selected the independent variables that largely following the studies cited above. Firstly this guarantees the comparability of the results obtained, and secondly the choice of new or alternative characteristics is considerably restricted due to the availability of data.

Despite the efforts of various researchers to explain the different effects of entries and exits through empirical research, conclusions are not uniform and many questions remain unanswered. It is not possible to establish uniform and clear tools, assumptions, and findings of this vital economic process. Naturally, research results also differ be-

cause they are derived from different conceptual models and data that cannot be directly compared; these models and data are used in the analysis of the different industries for different countries and periods of time or rely on different methodologies for data collection and processing, etc. Thus, it is not surprising that studies bring conflicting results. For example, Highfield and Smiley (1987, in Sutaria & Hicks 2004) and Audretsch and Fritsch (1994, in Sutaria & Hicks 2004) note that the unemployment rate is positively related to entries (i.e., the increased number of unemployed impacts the increase in entries), whereas Guesnier (1994, in Sutaria & Hicks 2004) and Garofoli (1994, in Sutaria & Hicks 2004) note that this link is very negative (i.e., the less the unemployment, the more the entries). These results not only created confusion among scholars about the true nature of impacts of contextual factors on new firm formations, but also made it more difficult for policy makers to implement them.

Conflicting research results may be evidence that establishing new businesses is undoubtedly a very complex process that depends on various unrelated as well as correlated factors and specific characteristics of local conditions. To capture as many factors, our estimation takes into account various determinants of the newly established firms over the period 2000-2005 in Slovenia.

The determinants are selected according to previous research (e.g. Audretsch & Fritsch 1994; Sutaria/Hicks 2004). Such selection enables the comparability of the results obtained, and secondly the choice of new or alternative characteristics is considerably restricted due to the availability of data. Hypotheses are represented in Section 2.3.

2.2 Firm Entry mechanisms

The conceptual framework within which the hypotheses about regional factors influencing new firm formation will be derived and tested for five firm entry mechanisms: demand, unemployment, industrial restructuring, local financial capital, and knowledge concentration. Below is the discussion of each group.

Group 1 **Demand:** Expanding demand for goods and services increases entries. It is reasonable to hypothesize that new firms emerge to satisfy rising new demands for goods and services. We have developed two indicators representing change in local demand: the annual rate of revenue growth change and the GDP p.c. An increase in both can be expected to drive rising demand for goods and services (Reynolds 1994, Sutaria & Hicks 2004), which in turn can led to rising rates of entries.

Group 2 **Unemployment:** When a person loses his/her job and fails to find another one that is comparable, he/she may well seek to choose to create a new one for himself/herself by starting his/her own business. The formation of new firms, in turn, may reduce unemployment rate as the person starting a new firm employees not only himself/herself but also others. At the same time, a higher level of unemployment may reduce aggregate disposable income, effectively reducing local demand for goods and services,

thereby putting downward pressure on its rate of new firm formation (Reynolds et al. 1994). These two opposite influences combined with a reverse causation effect – new firms reducing unemployment rate – create uncertainty about the net impact of unemployment on entries (Sutaria & Hicks 2004). Ultimately, the net impact of unemployment depends on which of the two influences, unemployment push or demand pull, dominates for a region, as well as the way in which the essential relationship is specified by other factors.

One indicator of unemployment was developed for this study: the unemployment rate as the share of the number of unemployed persons to a region's total labor force. The indicator reflects the existing status of an economy at a particular point in time in terms of number of people unemployed.

Group 3 **Industrial restructuring:** In this paper, we have assumed that five predictors can be used as measures of industrial restructuring.

A first predictor is mean establishment size (MES), defined as the mean number of employees per business. Empirically has been found that new businesses emerge on a larger scale in industries, which are characterized by smaller firms (Audretsch 1995a, in Braunerhjelm 2007). It is hypothesized that the smaller a region's MES the greater the number of newly established companies (Sutaria & Hicks 2004). Thus, we expect a negative association between MES and the gross rate of entry.

A second predictor is productivity growth, defined as the change of the annual rate of revenues per employee. We hypothesize, as Nivin (1998) does, that the growth of the productivity creates new demand for the development and manufacture of new products, which means that there will be more newly established companies if productivity growth rises. Thus, we expect a positive relationship between the productivity growth and the gross rate of entry.

A third predictor is index of diversification, by which we measure in how many different industries a region creates its revenues. It was suggested that new companies more likely occur in more diversified regions (Glaeser et al. 1992, Feldman & Audretsch 1999, Henderson & Thisse 2004, in Braunerhjelm 2007). Across regions we calculate the shares of created revenues across 13 industries. Then we square these shares and calculate the sums. Finally, we calculate a diversification index by dividing one with the sums of the squares across the regions. The diversification index may lie between one and 13. The greater the index, the more diversified is a region and consequently the greater the chance of establishing new firms as smaller index might imply more concentrated markets in a region. We apply the method used by Albarran (2002) who calculate the diversification index for a firm's revenues created in different markets. Thus, a positive relationship is expected between this predictor and the gross rate of entry.

A fourth predictor is investment in fixed assets represented by the logarithm of annual gross investment in fixed assets. With this variable we indirectly assess the optimistic

expectations of the future (e.i. favorable taxation policy) (Murphy et al. 1991, in Braunerhjelm 2007). Each entrance leads to a certain fixed costs, so each start-up company depends on the investment (Braunerhjelm 2007). The bigger the investment, the more start-ups may occur. The larger an investment in fixed assets, the greater the gross rate of entry, which means that we expect a positive association.

A fifth predictor is a gross rate of exit, calculated as a ratio of the absolute number of a region's companies that end their activity to the region's total number of companies. The greater/smaller the number of businesses that ceased to operate (exit), the greater/smaller is the chance for starting new businesses. The expected connection between entries and exits is positive when the impact of competition is considered, while a negative when a multiplier effect is implied. The ambiguity in sign may be because of two opposite effects, competition and multiplier effects, which seem to work at the same time when an entry or exit occurs (Sutaria & Hicks 2004). For example, more entries may cause more exits in subsequent periods due to enhanced competition (a competition effect), or may cause fewer exits because the demand for all businesses' products has increased (a multiplier effect). So, the expected relationship between entries and exits is indeterminate. We emphasize that despite the fact that there might be strong barriers to exit, companies are sometimes forced to exit markets (Karakaya 2000). Thus, our proposition is that firms exit when current losses exceed the present value of expected profits.[1]

Group 4 **Local Financial Capital:** Regions endowed with relatively high levels of per capita financial assets such as local bank deposits are more likely to be areas where access to capital is comparatively easy (Garofoli 1994, Sutaria & Hicks 2004). Such pools of capital are available not only for new startups but also for the expansion of existing businesses (Sutaria & Hicks 2004) and represent business expansion capital, which usually represents an amount larger than what is likely to be financed through borrowing from friends or by using personal credit. This supposition has its roots in the resource based theory, which argues that the entrepreneur will start a business when he has sufficient resources for doing this (Cooper et al. 1994, Cooper 1995, Penrose 1959, in Braunerhjelm 2007). Financial capital is one of the five most important sources of companies (in addition to human, management, sector-specific and access to markets and resources). In the paper, logarithm of a region's per capita bank deposits, calculated by dividing the total bank deposits by the total population of a region, is introduced as an indicator of the availability of local financial capital.

Group 5 **Knowledge Concentration:** We have developed one indicator called employment density, which is used as an indirect measure of knowledge concentration. We emphasized the impact of networks and social capital found within a geographic region. Relational networks exist at multiple levels of analysis because they can link together individuals, groups, firms, industries, geographic regions, and nation-states (Audretsch

[1] Interested readers are invited to identify six major exit barriers (cost of divestment, operating fit, marketing fit, forward vertical integration, backward vertical integration, and number of years' association of the business unit with the firm) in Nargundkar, Karakaya, and Stahl 1996 (in Karakaya 2000).

& Feldman 2003). The density of employment is calculated as the percentage of a region's employed persons in the number of the region's inhabitants. We base our expectation on the importance of geographical proximity for knowledge spillovers in innovativeness. This means that the transfer of knowledge requires proximity. Technological and entrepreneurial skills and innovation do not occur in a particular region simply because someone has the necessary skills and initial production resources; rather, this region has available all the necessary resources, which are developed in its local environment. Innovation processes are, in the opinion of many authors, subject to the processes in the local environment because innovation requires a complex exchange of knowledge, which can be obtained only in a specific regional environment (Lundvall 1992, Antonelli 1995, 1997, in Braunerhjelm 2007). There are numerous studies that examine the determinants and extent of spatially concentrated production (Krugman 1991a, 1991b, Glaeser et al. 1992, Ellison & Glaeser 1997, Feldman & Audretsch 1999, Maurel & Sedillot 1999, Acs et al. 2002, Braunerhjelm & Johansson 2003, Braunerhjelm & Borgman 2004). We hypothesize a positive relationship between the employment density and the gross rate of entry. In this way we inter-relate knowledge and entrepreneurship: a decision to start a new business is a result of created and diffused knowledge. We argue that Slovenian entries are related to entrepreneurs' innovative skills that are the result of knowledge spillover.

2.3 Hypotheses

Hypotheses arising out of the group factors discussed in the previous section are the following:

(1) A region's rate of revenue growth change is positively related to its gross rate of entry.
(2) A region's rate of per capita GDP is positively related to its gross rate of entry.
(3) A region's rate of unemployment and its gross rate of entry are related, although the direction of this relationship is indeterminate.
(4) A region's mean establishment size is negatively related to its gross rate of entry.
(5) The rate of a region's change in the productivity growth is positively related to a region's gross rate of entry.
(6) An index of region's diversification is positively related to a region's gross rate of entry.
(7) A region's investment in fixed assets is positively related to a region's gross rate of entry.
(8) A region's gross rate of exit is related to its gross rate of entry; but the direction of this relationship is indeterminate.
(9) The level of the per capita bank deposits in a region is positively related to its gross rate of entry.
(10) A region's employment density is positively related to a region's gross rate of entry.

Ten predictors judged to exert independent influences on the gross rate of entry are presented in *Table 1*.

TABLE 1: *Determinants of the gross rate of entry*

Panel data

	Variable name	Code	Operational definition
Dependent variable	Gross rate of entry	Y	The ratio of the absolute number of a region's companies that begin their activity to the region's total number of companies.1

Independent variables	Variable name	Expected effect	Code	Operational definition
Group	Independent variables			
Demand	1. Rate of revenue growth	+	X_1	Annual rate of revenues change
	2. GDP p.c.	+	X_2	LOG of the GDP p.c.
Unemployment	3. Unemployment rate	+/-	X_3	The number of a region's unemployed to the region's total labor force
Industrial restructuring	4. Mean establishment size	-	X_4	Average number of employees per company
	5. Productivity growth change	+	X_5	Annual rate change of a region's revenues per employee
	6. Diversification index	+	X_6	One divided by the region's sum of squares of the shares of created revenues across industries
	7. Investment in fixed assets	+	X_7	LOG of annual region's gross investment in fixed assets
	8. Gross rate of exit	+/-	X_8	The rate of the absolute number of a region's companies that end their activity to the region's total number of companies
Local financial capital	9. Bank deposits per capita	+	X_9	LOG of a region's per capita bank deposits
Knowledge concentration	10. Employment density	+	X_{10}	The percentage of a region's employed persons in the number of the region's inhabitants

Source: SURS

3. MODEL AND ESTIMATION

Data for the estimation were obtained from the Statistical Office of the Republic of Slovenia (SURS). Most data were available on the Internet. The main source of information for SURS is the Statistical Business Register (SPR), maintained by the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). All the data were acquired across twelve statistical regions for the period from 2000 to 2005

[2] The analysis covers companies included in the Standard Classification of Activities (SKD) in C - K activities: C - Mining and quarrying, D - Manufacturing, E - Electricity, gas and water; F - Construction; G - Trade, repair of motor vehicles and household goods, H - Hotels and restaurants; I - Transport, storage and communication; J - Financial intermediation; and K - Real estate, renting and business activities. These are the SKD before January 1 2008, the initiation of new regulations on the standard classification of economic activities.

and refers to the firms of all NACE (SKD) activities (census data). Thus, the calculations are made with the use of the panel data (12 regions multiplied by 6 years = 72 observations).

Given the cross-sectional and time-series nature of the data developed for this study, the stepwise least square dummy variable (LSDV) (also named fixed-effects) regression model is used (Gujarati 2004). The space (regional) dimension of the data is incorporated into the model through the use of eleven dummy variables for twelve regions. Region dummies are used to control for unmeasured region-specific influences on the dependent variable, which may be related to the primary predictors in the model. To our knowledge, only the study of Sutaria and Hicks (2004) used the LSDV regression for studying the phenomenon of new firm formations regionally in manufacturing. The LSDV regression is able to specify relationships between dependent and independent variables in a more precise manner, and therefore it should be considered as a significant improvement over the techniques used by previous empirical studies (Sutaria & Hicks 2004).

The basic regression model analyzed is given as follows.

$$Y_i = a + b_j X_{ji} + c_{ki} D_{ki} + e_i \qquad (1)$$

$$i = 1, 2, \ldots, 72,\ j = 1, 2, \ldots, 10;\ k = 1, 2, \ldots, 11$$

where Y_i is gross rate of entry of the *i-th* observation; *i* index of observations; *a* is model constant; b_j are regression coefficients of the X_j variables (see *Table 1*); *j* index of independent variables; c_k is differential coefficient of the model constant *a* for the *k-th* region; *k* index of regions; D_k is the *k-th* dummy variable for the *k-th* region (*k=1*, Podravska; *k=2*, Koroška; *k=3*, Savinjska; *k=4*, Zasavska; *k=5*, Spodnjeposavska; *k=6*, Jugovzhodna; *k=7*, Osrednjeslovenska; *k=8*, Gorenjska; *k=9*, Notranjsko-Kraška; *k=10*, Goriška; *k=11*, Obalno-Kraška region).

Each dummy variable for a particular region has a value of *1* for the observations (cases) that refer to that region and *0* otherwise. The base regression refers to the Pomurska region. Thus, the constant *a* is the average gross rate of entry of the Pomurska region when all the model's predictors would be zero. The model constant changes for the significant c_k values. The c_k values take into account the specific characteristics of the *k-th* region.

4. RESULTS

4.1 The Analysis of Zero-Order Correlations

We begin the quest for evidence of possible relationships between the gross rate of entry and key independent variables by examining the degree to which correlations among the variables marked for inclusion in the *model (1)* to be tested actually covary with one another.

TABLE 2: *Zero-order Correlation Matrix for Pooled Model*

Independent variables[1]	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	-,062	1									
X_2	,381**	-,043	1								
X_3	,009	-,140	-,606**	1							
X_4	-,127	,060	-,196	,415**	1						
X_5	,042	,833**	-,079	-,106	,003	1					
X_6	,347**	-,061	,397**	,020	-,578**	-,038	1				
X_7	,288*	-,040	,818**	-,392**	-,187	-,065	,406**	1			
X_8	-,071	,002	-,320**	,348**	,129	,021	,076	-,294*	1		
X_9	,231	-,005	,630**	-,088	,199	-,131	,308**	,599**	-,142	1	
X_{10}	,133	,175	,816**	-,501**	,160	,067	,216	,618**	-,167	,736**	1
Mean	6,98	9,88	4,03	11,13	6,45	10,04	6,70	5,53	6,39	5,76	27,31
Standard deviation	1,30	5,82	0,09	3,54	0,97	5,19	1,35	0,20	1,16	0,31	4,97

N = 72; [1] see *X* variables in *Table 1*, **significant at the 0.01 level (2-tailed), *significant at the 0.05 level (2-tailed)

Table 2 presents zero-order correlations, means, and standard deviations of the variables (except dummy variables) included in the pooled model (the overall sample - regions all together). Correlation coefficients for three variables, GDP p.c., diversification index, and investment in fixed assets are found statistically significant and have their directions consistent with the relevant hypotheses in this study.

4.2 The Analysis of Regression Coefficients

The results of the *model (1)* are presented in *Table 3*. The GDP p.c., unemployment rate, employment density, productivity growth, and 6 dummy variables: Jugovzhodna, Spodnjeposavska, Gorenjska, Zasavska, Podravska, and Goriška regions explain 72.3 percent of the variability of the gross rate of entry. Three hypotheses out of ten (the second, third, and fifth) are confirmed, whereas the tenth hypothesis has the opposite direction than it was expected. Six hypotheses are not confirmed, which means that they are irrelevant in explaining the process of new firm formations. These unimportant variables seem to be the following: the revenues growth change (the first hypothesis), mean establishment size (the fourth hypothesis), diversification index (the sixth hypothesis), investment in fixed assets (the seventh hypothesis), gross rate of exit (the eighth hypothesis), and the per capita bank deposits (the ninth hypothesis).

The regression coefficient b_2 of the GDP p.c. (X_2) is positive and statistically significant (19.266, t = 9.15, sig. 0.000) which is in accordance with the expectation. This means that an increase of the GDP p.c. by 0.01 (or 1 percent), changes Y (the gross rate of entry) by

0.19 (0.19 = 0.01 × 19.266) units.[3] As the average gross rate of entry of the pooled model is 7 (see *Table 2*, second column), this represents the 3-percentage increase of the average gross rate of entry. This variable can be regarded as the demand pull determinant of firm entries. This means that people with the higher standard of living demand more goods, which in turn enables more firm formations, as there is enough demand for already established companies and the new ones. Sutaria and Hicks (2004) have found no evidence of an impact on firm formations of per capita personal income growth.

The rate of unemployment (X_3) has a positive and significant regression coefficient (b_3 = 0.093, t = 2.065, sig. 0.043). Thus, in Slovenia an increase of unemployment rate for a unit (that is 1 percent) increases the rate of entry by 0.093 units, which means that unemployed persons in Slovenia (in a period 2000 to 2005) start their own businesses from the necessity to secure their jobs and income necessary to survive. Thus, we can say that in Slovenia, in the observed period, unemployment push was a determinant of new firm formations. Similar results for change in unemployment rate are calculated in studies by Highfield and Smiley (1987) and Audretsch and Fritsch (1994) who found significant and positive impact on new firm formations. However, Guesnier (1994) and Garofoli (1994) found that this relationship is significant and negative. The study of Sutaria and Hicks (2004) found no relation between unemployment and new firm formations.

The regression coefficient b_5 is positive and significant (0.039, t = 2.312, sig. 0.024), which means that an increase of the productivity growth (X_5) for 1 unit (this is annual rate change of revenues per employee for 1 percent) increases the gross rate of entry by 0.039 units. The result confirms the fifth hypothesis stating that growth in productivity creates new demand for the development and manufacture of new products. This eventually impacts the decisions to start new businesses.

The regression coefficient b_{10} is negative and significant (-0.233, t = -7.099, sig. 0.000), which means that an increase of employment density (X_{10}) by a unit (this is a one percentage increase of a region's employed persons in the region's population) decreases the gross rate of entry by 0.233 units. This means that concentration of knowledge inactivates the formation of new companies, or it can be said that in Slovenia, there are a lot of me-too entrepreneurs. We propose a positive coefficient of the employment density. The results confirm that Slovenian entries do not represent innovative but me-too start-up companies. Such a result for this predictor was expected when we get a positive and significant regression coefficient for unemployment rate, which implies that new entrepreneurs are not innovators but rather people who seek to secure their jobs. This is additionally confirmed also by diminishing contribution of entries to the GDP growth that was estimated in the study by Močnik (2009). All the other six determinants, for which we expected that may impact entries, seem not to be related to

[3] GDP p.c. is expressed in a logarithm form. Thus the change of the predictor X_2 for a unit changes the dependent variable by the regression coefficient b_2 multiplied by the change of X_2. The algebra is as follows: b_2 = change in Y/change in $ln\ X_2$ = change in Y/relative change in X_2 = $\Delta Y/(\Delta X/X)$; $\Delta Y = b_2 \times (\Delta X/X)$ (Gujarati 2004).

the gross rate of entry. Thus, rate of revenue growth, mean establishment size, diversification index, investment in fixed assets, gross rate of exit, and bank deposits have no significant impact on the decision to start a business in Slovenia in the observed period.

As estimation was done by the stepwise regression, we are able to assess the portion of the explained variance by each variable, included in the model. The most variability, 12.5 percent is explained by the unemployment rate (X_3). This is followed by the GDP p.c. (X_2) with 11.7 percent. The third variable is the employment density (X_{10}) with 7.1 percent, while productivity growth (X_5) explains 4.9 percent of the variability of the gross rate of entry (Y). All together this accounts to 36.2 percent. Another 36 percent is explained by dummy variables for regions. The most variability of the dependent variable is explained by the dummy variable of Spodnjeposavska region (D_5), namely 11.9 percent (see R^2 *change* in *Table 3*, step 5). This is followed by Gorenjska (D_8) (8.7 percent, see step 6 in *Table 3*), Jugovzhodna (D_6) (6.8 percent, see step 3), Zasavska (D_4) (3.3 percent, see step 8), Goriška (D_{10}) (2.7 percent, see step 10), and finally Podravska (D_1) (2.6 percent, see step 9 in *Table 3*) regions.

The model constant that represents the average gross rate of entry that would be achieved when all independent or predictor variables would be zero has no meaning as its value is negative. Would the constant be positive, its value should be decreased for negative and significant coefficients of the dummy variables of Jugovzhodna, Spodnjeposavska, and Goriška regions. The biggest decline of -1.428 has Spodnjeposavska region, followed by Jugovzhodna region with -1.149 and -0.862 of the Goriška region. However, positive and significant coefficients are for Gorenjska (1.192), Zasavska (1.039), and Podravska regions (0.976) (see *Table 3*, the last column). Thus, in Jugovzhodna, Spodnjeposavska and Goriška regions have worse conditions in comparison to the Pomurska region, whereas Gorenjska, Zasavska and Podravska regions have better conditions than Pomurska region. In other regions, the average gross rate of entry is the same as the model's constant, i.e. they have pretty the same conditions as Pomurska region.

The health of the model is tested by the variance inflation factors (VIFs) for multicollinearity, Koenker-Bassett (KB) test for heteroscedasticity, and autocorrelation by Durbin-Watson (DW) statistic (Gujarati 2004) (see *Table 3*). The highest VIF amounts to 5.465 for GDP p.c., otherwise these values are less than 10, which means that in the model multicollinearity is not a problem (variables are not correlated so much that this will cause a problem of getting best, linear, unbiased estimates - BLUE) (Gujarati 2004). In the KB test, squared residuals of the model are regressed on the squared predicted values of the regressand. The regression coefficient is not significant, which shows that there is no heteroscedasticity. DW amounts to 2.195, which is greater than the critical value of 1.792 (that is DW_U) and smaller than 2.838, which represents $4 - DW_L$ (DW_L is 1.162), so that we can accept the hypothesis of no autocorrelation. The inspection of residuals suggests normal distributions. Graphs and some output are not included in the paper due to space limitations but can be accessed with the author.

TABLE 3: *Regression results of the stepwise LSDV regression*

Dependent variable: Gross rate of entry	**Stepwise LSDV regression (10 steps)**									
Independent variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a	-11,383	-27,068	-25,752**	-43,300**	-54,322**	-64,479**	-73,436**	-74,327**	-70,576**	-65,844**
Constant	(-1,884)	(-3,691)	(-3,645)	(-4,674)	(-6,144)	(-7,534)	(-8,486)	(-8,924)	(-8,577)	(-8,068)
b_2	4,536**	8,028**	7,776**	12,873**	16,042**	18,610**	20,819**	21,041**	20,205**	19,266**
X_2 [1]	(3,028)	(4,601)	(4,630)	(5,266)	(6,812)	(8,207)	(9,157)	(9,616)	(9,399)	(9,150)
Variance inflation factor (VIF)	1,000	1,557	1,562	3,637	4,118	4,551	5,116	5,124	5,279	5,465
b_3		0,143**	0,125**	0,122**	0,143**	0,189**	0,214**	0,200**	0,154**	0,093**
X_3 [1]		(3,346)	((2,989)	(3,054)	(3,911)	(5,287)	(6,141)	(5,878)	(3,998)	(2,065)
VIF		1,557	1,604	1,605	1,640	1,871	1,993	2,051	2,815	4,133
c_6			-1,093*	-1,156**	-1,294**	-1,114**	-1,002**	-0,949**	-0,932**	-1,149**
D_6 [2]			(-2,579)	(-2,856)	(-3,516)	(-3,268)	(-3,088)	(-3,034)	(-3,077)	(-3,766)
VIF			1,034	1,037	1,046	1,069	1,084	1,089	1,089	1,194
b_{10}				-0,109**	-0,176**	-0,207**	-0,235**	-0,233**	-0,230**	-0,233**
X_{10} [1]				(-2,761)	(-4,454)	(-5,563)	(-6,449)	(-6,620)	(-6,775)	(-7,099)
VIF				3,131	3,853	4,058	4,368	4,373	4,376	4,379
c_5					-1,605**	-1,669**	-1,733**	-1,594**	-1,413**	-1,428**
D_5 [2]					(-3,939)	(-4,467	(-4,896)	(-4,619)	(-4,116)	(-4,321)
VIF					1,281	1,284	1,289	1,324	1,399	1,400
c_8						1,332**	1,465**	1,506**	1,464**	1,192**
D_8 [2]						(3,671)	(4,232)	(4,519)	(4,532)	(3,606)
VIF						1,211	1,232	1,235	1,239	1,401
b_5							0,053**	0,051**	0,049**	0,039**
X_5 [1]							(2,926)	(2,976)	(2,937)	(2,312)
VIF							1,152	1,153	1,156	1,242
c_4								0,796*	0,997**	1,039**
D_4 [2]								(2,475)	(3,082)	(3,330)
VIF								1,150	1,242	1,246
c_1									0,801*	0,976**
D_1 [2]									(2,276)	(2,816)
VIF									1,472	1,539
c_{10}										-0,862*
D_{10} [2]										(-2,413)
VIF										1,636
R^2	0,117	0,242	0,311	0,382	0,501	0,588	0,637	0,670	0,696	0,723
R^2 Change	0,117	0,125	0,068	0,071	0,119	0,087	0,049	0,033	0,026	0,027
R^2 Adjusted	0,104	0,220	0,280	0,344	0,463	0,549	0,597	0,627	0,651	0,676
F statistic	9,168**	10,860**	10,059**	10,196**	13,053**	15,211**	15,801**	15,717**	15,488**	15,623**
F Change	9,168**	11,197**	6,652*	7,623**	15,514**	13,475**	8,560**	6,126*	5,180*	5,820*
N [3]	70	70	70	70	70	70	70	70	70	70
Durbin-Watson statistic (DW)										2,195

Notes: [1] X_2 – GDP p.c., X_3 – unemployment rate, X_5 – Productivity growth, X_{10} – employment density (see Table 1); [2]dummy variables: D_1 – Podravska, D_4 – Zasavska, D_5 – Spodnjeposavska, D_6 – Jugovzhodna, D_8 – Gorenjska, D_{10} – Goriška regions; Notes: *t-statistics* are given in parentheses; [3] two observations were omitted because of outliers; ** Significant at the 0.01 level, * at the 0.05 level (both 2-tailed).

5. CONCLUSIONS

We investigated the relationship between the new firm formations and some certain factors, which are considered as relevant in previous research. With the stepwise least square dummy variable regression we estimated the links between the gross rate of entry as the dependent variable and ten independent variables, classified into five groups: demand, unemployment, industrial restructuring, local financial capital, and knowledge concentration.

According to the new geographical theory that argues that location is an important factor of firm entries, we decided to study the relationships between the dependent and independent variables across Slovenian twelve statistical regions.

The gross rate of entry is calculated as the ratio of newly established companies to the region's total number of companies. Such gross rate of entry standardizes the number of new companies according to the existing number of companies and measures the ability of the region's population of enterprises to adapt to changing environmental conditions.

Out of the ten hypotheses only three are confirmed. We confirm the positive association between the GDP p.c. and the gross rate of entry (second hypothesis). We estimate that an increase of the GDP p.c. for one percent increases the gross rate of entry by 3 percents.

The hypothesis of a relationship between the rate of unemployment and the gross rate of entry (third hypothesis) is negative, which means that the increase of the unemployment rate for one percent increases the gross rate of entry by 1.3 percent. This result suggests that in Slovenia, unemployed people seek to find a new job by starting a new business. This can also be interpreted that in Slovenia some unemployed persons become entrepreneurs from necessity. Such an observation has already ascertained the study by Duh et al. (2009), as well as the GEM study by Rebernik et al. (2009).

Confirmed is also the fifth hypothesis of the positive association between the productivity growth and the gross rate of entry. The one percentage increase of the productivity growth increases the gross rate of entry by 0.6 percent, which indicates the favorable market conditions for new firm formations.

The proposed positive relationship between the employment density of the region and its gross rate of entry (hypothesis ten) is partially confirmed. The coefficient is significant, but has an opposite direction than was expected. This means that an increase of the share of a region's employed people in total population of the region decreases the gross rate of entry by 3.3 percents. This may indicate that new Slovenian firms are not established by entrepreneurs who start businesses to realize their innovation, but rather that new companies in general imitate existing businesses. The result suggests that new firms may represent speculative businesses, with their shorter time horizons. However, to support such an argument, further research is needed that will analyze the operations of new

firms. In fact, such a result of this hypothesis complements the third hypothesis. Namely, the more the jobs are available (which means the higher employment density), the less start-up firms there are.

As we did not confirm the eighth hypothesis which predicted the association (positive or negative) between the region's gross rate of exit and its gross rate of entry, we can conclude that the increasing number of entries did not lead to increased exits, which means that despite the increased entries incumbents are not forced to close down the business because there is enough work for new and old businesses (Sutaria & Hicks 2004, Močnik 2009).

Thus, for the Slovenian government it is important to preserve a healthy competitive market structure with institutional arrangements of equal conditions for both new and old businesses. When new companies start their operations to just take a current favorable opportunity, soon after the start of operation the firm exit is expected, which creates unnecessary social costs (Braunerhjelm 2007).

Regarding the apparently imitative nature of new businesses, it is therefore hardly expected that new companies will survive, let alone grow. Thus, it is very important for new businesses to survive the first few years, since the likelihood of their growth depends on the age of the company and its initial size (Brixy & Grotz 2007). However, key decisions about the future of the businesses depend on entrepreneurs' expectations of the future success. Therefore, the more the future is predictable, the more reliable and realistic revenue/cost estimates can be, and on this basis the better entrepreneurs' aspirations on the enlargement of the business operations and employment. According to our previous work that has shown that a marginal contribution of Slovenian new firms to the Slovenian GDP growth has been declining since 2000 at an increased rate (Močnik 2009), the message to the Slovenian government is to provide a favorable business climate that will not only encourage the establishment of a significant number of new businesses, but also secure the long-term growth of companies with higher added value of their products and services.

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