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Interdependence between business insurance and entrepreneurship and their impact on the economic growth

―――――――― **Abstract:** ――――――――――――――――――――――――――――――――

Research Question: What type of mutual relations exist between business insurance and entrepreneurship, and how do they impact economic growth? **Motivation:** The primary motive for the research is the identified literature gap in the field of interdependence between business insurance and entrepreneurship and their joint contribution to economic growth. **Idea:** To test whether the interdependence between business insurance and entrepreneurship exists and their combined contribution to economic growth. The following independent variables were used: premium per entrepreneur, solved claims per entrepreneur, total technical reserves, GDP/p.c., a measure of demographic variables in the form of education level, a measure of the impact of banking, and the measure for institutional factors in terms of establishment costs the number of entrepreneurs by years as the dependent variable was considered. **Data**: Data were gathered from various sources (Serbian Statistical Office, National Bank of Serbia, World Bank) in the period from 2008 to 2019. **Tools:** Descriptive statistics, regression analysis, and statistical tests. **Findings:** The presented results show that there is a significant influence of insurance, both through insurance premiums per entrepreneur, which are paid to ensure the safety of the entrepreneur, and through resolved claims per entrepreneur, which present an indicator of insurance compensation in the case of damage to the entrepreneur, and through the impact of insurance on financial market by the amount of technical reserves. The return influence was not confirmed, considering that the number of entrepreneurs per year is a stationary variable, so the effect of the number of entrepreneurs on the development of insurance, measured by the premium per entrepreneur, could not be confirmed. **Contribution:** This research conducted in Serbia, a developing and upper middle-income country, confirmed the positive impact of insurance on entrepreneurship, but the return influence of entrepreneurship on insurance was not proven.

Keywords: economic growth, entrepreneurship, GDP, insurance, risk

JEL Classification: G22, L26

1. Introduction

The research on the interdependence between health insurance, both social and private, and entrepreneurship development is dominant in the literature (DeCicca, 2010; Aggarwal et al., 2013; Knut & Skogstrom, 2014). A lot of authors focused their research on different forms of entrepreneurship in relation to gender, entrepreneurship determinants, entrepreneurial success, etc. (Barringer & Ireland, 2012; Stangler & Spulber, 2013; Wolfe & Patel, 2019; Kwapisz, 2020; Hung & Tuan, 2020; Zhao et al., 2021; Crane, 2022; Blume-Kohout, 2023).

The research's main motive is to test the interdependence between insurance and entrepreneurship and their joint contribution to economic growth (see Figure 1). The idea for research is based on the increasing individual and synthesized influence of insurance and entrepreneurship on economic growth. The implications of the insurance business and especially insurance investments on entrepreneurship are analyzed in particular.

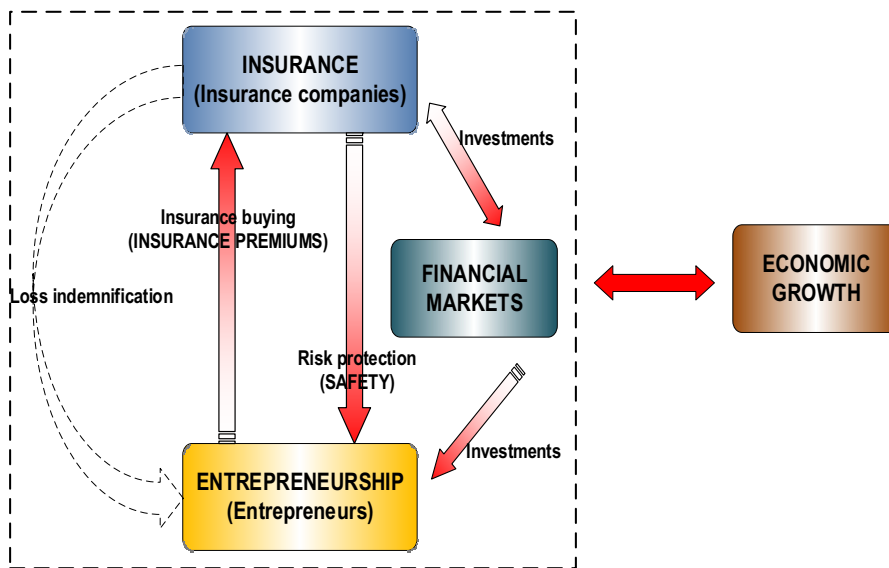* Corresponding author: Jelena Demko-Rihter, e-mail: jciric@uns.ac.rs

Figure 1: Interdependence between insurance and entrepreneurship and economic growth

Figure 1 indicates the research goals and the content of the research, as well as the interdependence between insurance and entrepreneurship. Theoretical considerations and practical experiences of the developed countries verify that insurance and entrepreneurship development, as well as the development of the financial market (Kondovski, 2021; Xin et al., 2022; Andries et al., 2023), contribute to economic growth. Also, insurance, the financial market, and development are mutually positively related (Ward & Zurbruegg, 2002; Raeva & Nikolaev, 2022), as entrepreneurship and the financial market (Beck & Kunt, 2006). On the other hand, economic growth enables preconditions for faster development of insurance (Lee et al., 2013) and entrepreneurship (Wennekers et al., 2005).

Based on the previous paragraph, we state the following hypothesis:

H0: There exists the interdependence between business insurance and entrepreneurship, and their joint contribution to the economic growth

The article is organized as follows. The second section reviews the relevant literature. The third section presents the research methodology, while the fourth section presents the empirical results and discussion. The conclusion is in the last section of the paper.

2. Literature review

Previous research on the issues of the implications of insurance on entrepreneurship development is not present in the explicit same form as this research. Our research relies on previous research in three different aspects.

First, the research of the basic insurance function, which is risk protection, mainly focuses on the analysis of individual types of insurance, as well as the issues of risk and capital management (Njegomir & Maksimovic, 2012; Njegomir & Demko-Rihter, 2017).

Empirical experience from developed countries indicates that insurance companies are the largest employers, investors, and taxpayers in the United States (III, 2016), the U.K. (ABI, 2015), and E.U. member countries. Great attention is paid to the issues of growth and development of insurance through the size of the premium per capita and the premium in the gross domestic product – GDP.

Research on the role of the insurance companies as institutional investors, or the function of accumulation and efficient allocation that insurance provides, is usually carried out in a broader context, such as the research of the impact of insurance on economic growth (Ward & Zurbruegg, 2000; Kugler & Ofoghi, 2005; Arena, 2008; Munyo & Veiga, 2022), but also in a specifically narrow context for information-based decision making, such as research to analyze the formation and management of insurance reserves, management of investment portfolios (Njegomir & Stojic, 2010; Marovic et al., 2016). Considering the direct or indirect

impact of investments of institutional investors on entrepreneurship, research on the impact of insurance companies' investments on economic growth can be found in the literature.

Secondly, entrepreneurship research is usually focused on available forms of entrepreneurship, such as family (Aldrich & Cliff, 2003), individual, social, and technical. The differences in entrepreneurship development based on gender, race, and other parameters are examined. The determinants of entrepreneurship, such as personal characteristics of entrepreneurs (Barringer & Ireland, 2012), managerial roles of entrepreneurs, differences between managers and entrepreneurs, demographic factors of entrepreneurship (Stangler & Spulber, 2013), geographical factors of entrepreneurship, cultural factors of entrepreneurship, entrepreneurial education as a factor of entrepreneurship and motives and restrictions on entrepreneurship were being explored in particular.

The third and most important aspect is related to the relationship between insurance and entrepreneurship. In the literature, in the field of research on the insurance impact on entrepreneurship, the different aspects of social insurance and their alternatives in private insurance are in focus. The research of interdependence between health insurance, both social and private, and entrepreneurship development was the focus.

For example, DeCicca (2010) considered the relationship between the availability of health insurance and entrepreneurship. This paper examined the impact of the individual health insurance plan in New Jersey on self-employment. The research of Fossen et al. (2021) also suggested that lower health insurance costs in the HIX (Health Insurance Exchange) would have the additional effect of stimulating entrepreneurship.

Aggarwal et al. (2013) analyzed the impact of health insurance on entrepreneurship using data on entrepreneurs' characteristics and socio-economic origin. Their research confirmed that the lack of health insurance significantly negatively impacts entrepreneurship. Leopold et al. (2020) conducted a study in Vietnam. They pointed out that health insurance has a strong relation to self-employment (S.E.). Those insureds covered by compulsory health insurance are less likely to enter S.E. than those insureds covered by voluntary health insurance. Kwapisz (2020) investigated the decision of self-employed to purchase health insurance and the source of financial information for making such a decision. Self-employed women whose family and friends are the main source of financial information hesitate to purchase health insurance, unlike self-employed men. The research results by Wolfe and Patel (2019) pointed out that individuals with health insurance policies are less likely to exit self-employment.

Knut and Skogstrom (2014) studied how unemployment insurance, an element of social insurance, affects the labor market and entrepreneurship. Their research indicated that entrepreneurial activities are strengthening with the reduction or exhaustion of unemployment insurance. Xu (2022) researched the impact of social insurance on the decisions of unemployed persons to start businesses and found that higher unemployment insurance (U.I.) benefits both lower the probability that an unemployed person will become self-employed and also extend the length of time that passes before they make such a transition.

Deloitte (2022) surveyed 5,300 SMEs (defined as companies with 5 to 75 full-time employees), including 400 in Switzerland, to gain deeper insight into their views on insurance and translate them into specific recommendations for insurers. The sample consisted of SMEs from 14 countries. The next conclusions based on the survey were presented: 1) SMEs increasingly see the value of insurance; 2) SMEs want a trusted advisor and digital engagement; 3) SMEs want advice and a holistic service offering more than just insurance. In addition, COVID has strengthened trust in insurers, which was unexpected. In total, 99% of Swiss SMEs trust their insurer or intermediary as much or more than before the pandemic.

Masci (2013) explored the impact of the availability of private insurance on entrepreneurship development. In the research, the author pointed to the interdependence of the availability of insurance and entrepreneurship and the relationship between social security and entrepreneurship in Brazil and the countries of South America.

3. Variables

The literature provides various measures for the quantification of entrepreneurship. Based on a review of 284 studies in which entrepreneurship appears as a dependent variable, Thornhill and Celly (2006) found that in 49% of papers, management, and performance issues are analyzed, 17% of papers focus on strategy and ownership, 11% of papers focus on questions of entry and exit from the market, and the other 25% of the papers examined the individual characteristics of entrepreneurs. Therefore, most often, performances are tested. In this research, it was not possible to use performance measures because they were not available

in secondary data for entrepreneurs. In the context of the influence of various factors on entrepreneurship development, as a measure of entrepreneurship development, Burney and Davis (2015) used the number of entrepreneurs in the state of Kentucky (USA). As the factors that impact the number of entrepreneurs, they indicated gender, race, education, employment, and disposable income. By adopting different approaches and starting from the available data, the number of entrepreneurs by years (ENTRP) as the dependent variable was considered in the period from 2008 to 2019.

The research used different determinants for entrepreneurship, entrepreneurship development, or performance in entrepreneurship: demographic factors of entrepreneurship (Stangler & Spulber, 2013), geographical factors of entrepreneurship, cultural factors of entrepreneurship, entrepreneurial education as a factor of entrepreneurship (Reddy et al., 2023). In the survey, were used the following independent variables: premium per entrepreneur, solved claims per entrepreneur, total technical reserves, GDP/p.c., a measure of demographic variables in the form of education level, a measure of the impact of banking, and the measure for institutional factors in terms of establishment costs.

The insurance premium is a key independent variable whose impact on entrepreneurship is examined. From an entrepreneurial point of view, an insurance premium is an essential price for transferring risk to the insurance company and consequently ensuring the security provided by the insurance. In some studies, the total or gross insurance premium is used (Ward & Zurbruegg, 2000); in many other studies, the premiums for life and non-life insurance are used (Arena, 2008). Previous research has suggested that insurance positively affects entrepreneurship. Based on the results of the empirical research in the paper of Browne and Kim (1993), which indicated that the use of the total market premium instead of especially life and especially non-life insurance neglected the effects of various market forces, the focus of this research was on those types of insurance related to entrepreneurship, or those types which are in the function of protecting the business and not the owner as an individual. The focus was on commercial property insurance and commercial liability insurance from 2008 to 2019, and the premium per entrepreneur (PREM) was used as an independent variable. The positive influence of the premium per entrepreneur on entrepreneurship development measured by the number of entrepreneurs was expected.

The basic motive for obtaining insurance coverage is the promise of a future payment or financial compensation if the damage provided in the insurance contract is incurred. Starting from the importance of paying claims, as a supplementary variable for checking the impact of the protection function insurance provides for entrepreneurship, the resolved damages in commercial insurance per entrepreneur (RESDAM) were used. The positive impact of the solved damages per entrepreneur on entrepreneurship development, measured by the number of entrepreneurs per year, was expected.

Empirical studies indicate that the financial market positively impacts entrepreneurship, innovation, and the promotion of economic growth (Beck & Kunt, 2006; Chakraborty, 2020). On the other hand, insurance, through institutional investment, and the financial market are mutually positive (Ward & Zurbruegg, 2002). The financial intermediation provided by insurance positively affects economic growth (Dorfman, 2008), as it contributes to the increase in total capital reserves, the efficiency of investment in the economy, the increase in total investment volume, and liquidity creation. These relations indicate that insurance indirectly, through the impact on economic growth and through the impact on the financial market, positively influences entrepreneurship through the function of institutional investment. Starting from previous research and research on the interdependence of the availability of insurance and entrepreneurship development (Masci, 2013), the investment function is approximated by the total technical reserves (TECHRES) of insurance companies in the period from 2008 to 2019. It was expected the positive influence of the investment function of insurance companies on entrepreneurship.

Numerous studies indicate that entrepreneurship affects the improvement of economic growth (Carree & Thurik, 2006), or there is a strong positive correlation between the development of entrepreneurship and economic growth (Acs, 2006; Ivanovic-Dukic et al., 2022). On the other hand, numerous studies confirm the positive impact of insurance on economic growth (Ward & Zurbruegg, 2000; Kugler & Ofoghi, 2005; Arena, 2008). However, there is also the backward impact of economic growth on insurance development and the development of entrepreneurship. Many studies empirically confirm that economic growth promotes entrepreneurship (Wennekers et al., 2005). Starting from the previous research as an independent variable, we use economic growth, and as the usual measure describing economic growth, we use the size of the real gross domestic product per capita (GDP per cap). The positive impact of GDP on entrepreneurship was expected.

The relation between the population's education level is usually associated with entrepreneurship. Numerous empirical studies confirm the positive impact of higher education on self-employment (Davidsson & Honig, 2003; Aidis et al., 2012; Robinson & Sexton, 2002). Based on previous research, a summarized measure of

education level and human capital measured by the Human Capital Index (HCI) based on the United Nations Conference on Trade and Development methodology was used (UNCTAD, 2005, p. 113).

As an additional variable, we also use the influence of banking, considering that the studies in Serbia emphasize that bank loans are used as the most common source of financing entrepreneurial ventures. As a measure of access to formal sources of financing, we use the World Bank data on the volume of domestic bank loans to the private sector as a percentage of GDP (DOMCRED). Given that Serbia, according to the World Bank classification (World Bank, 2020a), belongs to a middle-income country and that the importance of banking as a form of formal entrepreneurship financing grows with economic development, a positive impact of bank loans on the development of entrepreneurship in Serbia has been expected.

Institutional factors represent the conditions in which entrepreneurs operate. As a summary measure of the influence of government policies on entrepreneurship development, we used the World Bank data on the costs necessary for starting a business. These costs include the official costs of each establishment process and are expressed in the indicator of start-up costs as a percentage of gross national income per capita (STARTCOST) (Doing Business, 2020). According to previous studies, a negative link between start-up costs and entrepreneurship has been expected.

4. Research methodology

Data were gathered from various sources. Table 1 shows the initial data and sources.

Table 1: Initial data and sources

Data	Unit	Source
GDP per cap (variable GDP)	€	World Bank 2020b
Domestic credit to the private sector (% of GDP) (variable DOMCRED)	%	World Bank 2020b
% of the age group enrolled in primary education		World Bank 2020b
% of the age group enrolled in secondary education		World Bank 2020b
% of the age group enrolled in tertiary education		World Bank 2020b
Costs of establishing the business (as % of income per cap)		World Bank, Doing Business 2020
Human capital index – an average of the previous three variables with weights 1, 2, and 3 (variable HCI)	%	
Total number of entrepreneurs (ENTRP) – dependent variable		Serbian Statistical Office yearbooks
Total premium per entrepreneur (variable PREM)	€	National Bank of Serbia, data on insurance companies' operations
Total claims in commercial insurance per entrepreneur (variable RESDAM)	€	National Bank of Serbia, data on insurance companies' operations
Total technical reserves of insurance companies (variable TECHRES)	€	National Bank of Serbia, data on insurance companies' operations
Costs of establishing an enterprise (in % of GDP per cap) (variable STARTCOST)	%	
GDP per cap (variable GDP)	€	World Bank 2020b

All monetary values were converted in eur 2019 and adjusted for inflation. Time series regression on the dependent variable ENTRP (y) and explanatory variables: PREM, RESDAM, TECHRES, GDP, HCI, DOMCRED, and STARTCOST were applied. The form of regression is given by:

$$f(y) = c + \sum_{i=1}^{n} \alpha_i f_i(x_i)$$

(1)

Where f and f_i, i = 1, 2,...n denote the identity function, or the difference function, depending on the (non)stationarity of the time series in question. We performed a unit root test on all variables to decide the form of variables to be included in the equation. The results of the Augmented Dickey-Fuller test are presented in Table 2.

Table 2: Results of Augmented Dickey-Fuller test. H_0: Observed variable has a unit root

Variable	ADF test statistic/prob	Variable	ADF test statistic/prob
ENTRP	-7.2065/0.0004*	------------	-------------------------------
PREM	-1.4440/0.5226	D(PREM)	-4.5696/0.0068*
RESDAM	-2.9755/0.0683*	------------	-------------------------------
TECHRES	-1.6410/0.7014	D(TECHRES)	-3.3368/0.0462*
HCI	-2.0077/0.5285	D(HCI)	-3.5087/0.0352*
DOMCRED	-0.8655/0.9215	D(DOMCRED)	-2.8791/0.0822*
STARTCOST	-1.2999/0.8299	D(STARTCOST)	-3.0327/0.0527*
GDP	-1.3277/0.8220	D(GDP)	-2.9209/0.0721*

*The Hypothesis is rejected. The observed variable is stationary.

The hypothesis that the variable ENTRP possesses a unit root in levels was rejected. Hence, this stationary variable can not share a common trend with the explanatory variables, which have either deterministic or stochastic trends. Furthermore, this variable is not cointegrated with either of the explanatory variables. The equation to be estimated is, therefore:

$$\log(PREDUZETt) \\ = C + \alpha_1 d(\log(PREMt)) + \alpha_2 \log(RESSTETEt) + \alpha_3 d(\log(TECHRESt)) \\ + \alpha_4 d(HCIt) + \alpha_5 d(\log(GDPt)) + \alpha_6 d(DOMCREDt) + \alpha_7 d(TROSKOSNt) \tag{2}$$

5. Results and discussion

Descriptive statistics for each variable making an impact on entrepreneurship are presented in Table 3.

Table 3: Descriptive statistics

	GDP	DOMCRED	HCI	ENTRP	PREM	RESDAM	TECHRES	STARTCOST
Mean	5843.27	0.39	0.721	215803.60	97623.09	66565.17	73750357	0.098
Median	6126.17	0.42	0.713	216129.00	92016.32	37387.13	82258015	0.079
Maximum	7519.79	0.50	0.773	243002.00	146633.90	327995.80	1.10E+08	0.159
Minimum	4138.89	0.22	0.668	183352.00	73946.88	31218.47	25901896	0.071
HCI	-2.0077/0.5285	D(HCI)	-3.5087/0.0352*					
Skewness	-0.404	-0.490	0.187	-0.537	0.677	2.786	-0.530	1.044
Kurtosis	2.276	1.909	2.117	4.671	2.217	8.892	2.319	2.556

Source: Authors' calculations

Data on the number of entrepreneurs, the premium per entrepreneur, total claims per entrepreneur, technical reserves, and GDP were taken in log form in order to decrease the discrepancies between original values. The results of the regression equation are presented in Table 4.

Table 4: Estimation of regression coefficients

Dependent Variable	LOG(ENTRP)			
Method Sample (adjusted)	Least Squares 2008-2019			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C***	12.277	0.4169	29.446	0.0012
D(LOG(PREM))**	0.638	0.142	4.493	0.0469
LOG(RESDAM)*	0.111	0.038	2.920	0.0981
D(LOG(TECHRES))**	0.315	0.0531	5.930	0.0272
D(HCI)*	1.078	0.3278	3.288	0.0814
D(LOG(GDP))*	0.551	0.153	3.603	0.0694
D(DOMCRED)*	0.331	0.0908	3.645	0.0677
D(STARTCOST)***	-2.915	0.294	-9.925	0.0057
R-squared	0.767			
Adjusted R-squared	0.521			
F-statistic	52.329			
Mean dependent var	12.279			
S.D. dependent var	0.070			
Durbin-Watson stat	2.019			

Note: *.**.*** denote the coefficients significantly different from zero at 10%. 5% and 1% levels, respectively

The constant term shows the base number of entrepreneurs when all other explanatory variables are set to zero. The initial number is 214,700 (e^c).

The application of the regression model on secondary data to examine the interdependence of entrepreneurship and insurance presents the most important analysis. A subsequent survey was conducted in order to obtain additional confirmation of the existence of interdependence.

The presented results show that there is a significant influence of insurance, both through insurance premiums per entrepreneur, which are paid in order to ensure the safety of the entrepreneur, through resolved claims per entrepreneur, which present an indicator of insurance compensation in the case of damage to the entrepreneur, and through the impact of insurance on the financial market through the amount of technical reserves. The return influence was not confirmed, considering that the number of entrepreneurs per year is a stationary variable, so the effect of the number of entrepreneurs on the development of insurance, measured by the premium per entrepreneur, could not be confirmed.

When it comes to the insurance premium, based on previous literature (Masci, 2013), a positive impact on the number of entrepreneurs was expected, and it was confirmed. The regression coefficient measuring the impact of the variable *PREM* is positive and significantly different from zero at the 5% level. The value of the coefficient is somewhat difficult to interpret due to the form of both dependent and explanatory variables. If the relative change in premium is further increased by 1%, the number of entrepreneurs is likely to increase by 0,64%. A positive impact on the number of entrepreneurs was expected, and it is confirmed. Namely, the long-term position in the theory of insurance was confirmed (Rejda, 2005; Dorfman, 2008) that insurance promotes entrepreneurial activities, making them safer and more certain. By ensuring financial compensation for entrepreneurs, where the insurance premium per entrepreneur is exactly the measure of the amount paid for financial protection, the insurance affects the development of entrepreneurship in Serbia.

The same situation is in the case of resolved damages per entrepreneur and technical reserves. Based on the previous literature, the positive impact of resolved damages per entrepreneur on the development of entrepreneurship, measured by the number of entrepreneurs by age, was expected. The results confirmed the positive impact of solved claims on the entrepreneur as a measure of insurance compensation. Total claims per entrepreneur (RESDAM) positively affects the number of entrepreneurs. The regression coefficient is positive and statistically different from zero at the 10% level. Since this variable has entered a regression equation in a logarithmic form, the coefficient has a simple economic interpretation: it is a coefficient of

elasticity of the number of entrepreneurs in relation to the number of settled damages. The number of entrepreneurs is inelastic in relation to the damage done, as with the increase in salaries, 1% was expected to increase the number of entrepreneurs by about 0,11%.

In analogy to the coefficient associated with the variable PREM, the coefficients of the variables TECHRES and GDP in a similar fashion were interpreted. Both coefficients are statistically significantly different from zero (with 5% and 10% confidence levels, respectively). When the relative change in technical reserves is increased by 1%, the number of entrepreneurs increases by 0,31%, *ceteris paribus*. If the successive increase in GDP is further increased by 1%, the number of entrepreneurs is expected to increase by 0,55%. In theoretical considerations, as well as previous empirical studies, it was indicated that insurance has a significant positive impact on financial markets (Dorfman, 2008) and that financial markets contribute to the development of entrepreneurship (Beck & Kunt, 2006). Based on the abovementioned, an indirect positive influence of financial intermediation, i.e., institutional investment in entrepreneurship, was expected. Also, previous empirical studies (Masci, 2013) confirm the positive impact of financial intermediation on entrepreneurship. The results obtained using regression analysis confirmed the positive influence of the institutional investment of insurance companies, measured by the amount of total technical reserves of insurance companies, on the development of entrepreneurship in Serbia.

Influence of insurance and entrepreneurship on GDP

The relation between the population's education level is usually associated with entrepreneurship. Numerous empirical studies confirm the positive impact of higher education on self-employment (Davidsson & Honig, 2003; Aidis et al., 2012). In the regression analysis, we examined the influence of banking on the development of entrepreneurship. We approximated banking by the volume of domestic bank loans to the private sector as a percentage of GDP. Based on previous research that indicates that bank loans are the key sources of financing for entrepreneurs and previous research that indicates that access to finance has a positive effect on entrepreneurial activities (Aidis et al., 2012), we assumed positive impact of the volume of domestic bank loans to the private sector on the number of entrepreneurs. Regression analysis confirmed expectations and previous research. The data obtained indicate that when domestic bank loans to the private sector increase by 1%, the number of entrepreneurs increases by 0,33%.

Human capital and domestic credit to the private sector are variables that enter the regression equation in a differentiated form. Both regression coefficients are positive and statistically significant at the 10% level. When increasing each of the explanatory variables by 0,01 unit (in the case of domestic banks' loans to the private sector, this is an exact increase in share in GDP by 1%), the number of entrepreneurs is increased from the previous level y to the level 0,01 * 0,331, which represents an increase in the number of entrepreneurs by about 0,33%. Aidis et al. (2012) have empirically confirmed that access to finance is very significant for entrepreneurial activities. Wennekers et al. (2005) found that at the lower levels of economic development, the impact of credit on the private sector on entrepreneurship is negative. This anomaly is explained by the use of informal sources of funding. Wennekers et al. (2005) found that with the growth of GDP, the impact of loans on the private sector is becoming positive. In the case of human capital, the increase in the value of 0,01, keeping the share of elementary and secondary education constant, an increase in the share of the highly educated population by 2% is implied, which further implies an increase in the number of entrepreneurs by approximately ($ye^{0,01*1,078}$) 1,1%. The link between the level of education of the population is usually associated with entrepreneurship. A number of empirical studies confirm the positive impact of higher education on the establishment of entrepreneurial firms (Aidis et al., 2012).

Finally, as a measure of institutional conditions for the development of entrepreneurship, the costs of establishing the business were used as a percentage of gross national income per capita. Wennekers et al. (2005) listed the costs of entering or establishing a business as 'administrative restrictions on the development of entrepreneurship.' It was expected that the costs of start-ups would negatively affect the number of entrepreneurs in Serbia. It was anticipated in accordance to existing literature with the results of the regression analysis, which indicates that if start-up costs increase by 1%, the number of entrepreneurs falls by 2,3%.

In order to test for possible causalities between insurance, entrepreneurship, and impact on economic growth, we shall apply the VAR (vector autoregressive) methodology to the set of variables ENTRP, GDP, DOMCRED, and PREM. We have proven that the first variable is stationary in levels, while the last three variables are stationary in differences.

$$X_t = c_1 + \sum_{i=1}^{n} \alpha_{1,i} X_{t-i} + \sum_{i=1}^{n} \beta_{1,i} Y_{t-i} + \sum_{i=1}^{n} \gamma_{1,i} Z_{t-i} + \sum_{i=1}^{n} \delta_{1,i} V_{t-i} + \epsilon_{x,t} \tag{3}$$

Where Xt is the number of entrepreneurs (in log form), Yt, Zt, and Vt are the first differences of the GDP (in log form), premia (in log form), and domestic credit, respectively. The number of lags is n, and it will be determined using log-likelihood method and information criteria.

We first test the stability of the suggested VAR model (Table 5).

Table 5: The stability of VAR model

Root	Modulus
0,3761 - 0,7961i	0,8805
0,3761 + 0,7961i	0,8805
-0,1406 - 0,7878i	0,8003
-0,1406 + 0,7878i	0,8003
0,4811 - 0,6109i	0,7776
0,4811 + 0,6109i	0,7776
-0.5946 - 0.3955i	0.7142
-0.5946 + 0.3955i	0.7142
0,5207 - 0,4182i	0,6679
0,5207 + 0,4182i	0,6679
-0,5592 - 0,3502i	0,6598
-0,5592 + 0,3502i	0,6598
-0,3357 - 0,5602i	0,6531
-0,3357 + 0,5602i	0,6531
0,6381	0,6381
0,2426	0,2426

Source: Authors' calculations

No unit root lies outside the unit circle, hence VAR satisfies the stability condition. Lag structure, i.e., optimal lag length, is calculated using information criteria.

Table 6: VAR Lag Order Selection Criteria

Endogenous variables: D(LOG(PREM)) D(LOG(GDP)) D(DOMCRED) LOG(ENTRP)				
Exogenous variables: C				
Sample: 2008 2019				
Included observations: 10				
Lag	LogL	AIC	SC	HQ
0	470.048	-8.4420	-8.0789	-8.9005*
1	542.102	-8.8009*	-8.7101*	-8.8404
2	553.324	-8.4628	-8.4104	-8.6116
3	563.387	-8.5441	-8.3886	-8.4987
4	589.623	-8.6986	-8.6195	-8.7754

Source: Authors' calculations

We see that the optimal lag is one based on Akaike information criterion (AIC) and confirmed with Schwartz criterion (S.C.). Now we can simplify our VAR model:

$$Xt = c1 + \alpha_1 X_{t-1} + \beta_1 Y_{t-1} + \gamma_1 Z + \delta_1 V_{t-1} + \epsilon x, t \qquad (4)$$

and regress each of the variables (number of entrepreneurs, domestic credit, GDP, and premiums collected) in their stationary forms on their lagged counterparts. The results are given in the following table:

Table 7: VAR model

	D(LOG(PREM))	D(LOG(GDP))	D(DOMCRED)	LOG(ENTRP)
D(LOG(PREM(-1)))	0,8698	0,3619	0,8977	0,2361
	[2,1277]*	[0,9473]	[1,7622]	[1,0721]
D(LOG(GDP(-1)))	0,5441	0,2458	-0,4987	0,7712
	[1,3663]	[0,6224]	[-12351]	[2,1277*]
D(DOMCRED(-1))	0,6040	-0,0561	-0,5866	0,6454
	[1,6280]	[-0,2456]	[-1,9097]	[1,1283]
LOG(ENTRP(-1))	1,4731	2,1192	-3,2332	0,4321
	[1.0405]	[1.2463]	[-1.0981]	[0,4439]
C	0,2398	0,0448	0,2022	-0,0238
	[2,312*]	[1,6293]	[0,7182]	[-0,8774]

Source: Authors' calculations

Now, we can apply Granger (Granger, 1969) causality test to check possible mutual causalities of observed variables to economic growth.

Table 8: Granger causality test

Null hypothesis	Chi-sq	Prob.	Decision	Direction
Causal relationship between ENTREP and GDP				
GDP does not Granger cause ENTREP	5,7265	0,7669	Not rejected	Unidirectional
ENTREP does not Granger cause GDP	18,3404	**0,0314***	Rejected at 5%	
Causal relationship between GDP and PREM				
PREM does not Granger cause GDP	2,2180	0,9875	Not rejected	Unidirectional
GDP does not Granger cause PREM	9,7338	**0,0452***	Rejected at 5%	
Causal relationship between GDP and DOMCRED				
GDP does not Granger cause DOMCRED	6,0345	0,7364	Not rejected	None
DOMCRED does not Granger cause GDP	8,1746	0,5166	Not rejected	

Source: Authors' calculations

The test results show that we reject the null hypothesis that a change in the number of entrepreneurs does not cause GDP growth. However, the opposite does not hold. We see from the test that the lag of 1 year of GDP growth improves the possibility of estimating the number of entrepreneurs. This is in line with some of the previous research from the region of ex-Yugoslavia (e.g., Gricar et al., 2019)

We have also found that the increase in GDP may have an influence on premiums collected in the following year. Ward and Zurbruegg (2000) found that Granger causality is detected in either direction, hence it was heavily country-dependent.

However, the test shows that non of the lagged variables of premiums collected, number of entrepreneurs, or the change in credit to GDP could improve our knowledge of the GDP change in the next year. This is also in line with various studies. Mushtaq (2016) proved that domestic credit did not Granger cause the GDP in Pakistan during the entire time length 1961-2013. Also, according to Wanat et al. (2019), in most transient European countries included in their study, relations between the development of the insurance market and economic growth have not been found.

Conclusion

The conducted research confirmed the hypothesis about the positive impact of insurance on entrepreneurship. However, the return influence of entrepreneurship on insurance was not proven. The main findings are important for further research of the relationship between insurance and entrepreneurship, for public authorities in making decisions related to insurance and the development of entrepreneurship, as well as for society as a whole, since the development of insurance and entrepreneurship stimulates economic progress. The results show that the development of insurance could fertilize the development of entrepreneurship.

The sectoral statistics on the business of entrepreneurs lack more detailed data. Thus, the main limitation of this research paper is that we didn't include the possible sectoral differences among the entrepreneurs.

Further research should include research of premiums by sectors, as well as the interdependence between insurance and entrepreneurship premiums by sectors, whereby entrepreneurship should be measured by the currently lacking statistics on income from entrepreneurs. Finally, future research should include monthly and quarterly monitoring of income trends for entrepreneurs, as well as the trend in the number of new entrepreneurs in relation to the number of extinguished, in relation to the monthly or quarterly data on the amount of the insurance premium from the point of view of developing country

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