sciendo

The impact of entrepreneurship on regional disparities in Romania: A spatial analysis at NUTS3 level

Mihai ANTONIA
Bucharest University of Economic Studies, Bucharest, Romania
mihai.antonia@gmail.com

Horia TIGAU
Bucharest University of Economic Studies, Bucharest, Romania
tigauh@gmail.com

Abstract. *Our study contributes to bridging the empirical gap between regional disparities and entrepreneurship, using a spatial panel framework. Regional disparities in Romania increased after the communist period and even more after the EU accession. Using NUTS3 level data provided by The Romanian National Institute of Statistics, for the period 2008-2018, we investigate the impact of entrepreneurship on regional disparities. We have found new details regarding the link between entrepreneurial activity and inequality. Entrepreneurship matters but, most importantly, it matters differently in developed, emerging and low-income countries. The results suggest that entrepreneurship does not have a significant impact on regional disparities in Romania.*

Keywords: entrepreneurship, regional disparities, spatial panel, inequalities, economic growth.

Introduction

There is an ongoing separation between the societal portions – the advanced portion, that has access to new information, know-how, proficiency, financial and other types of resources, and the excluded portion – in the developed European countries (Nahtigal, 2013) and the phrase "Two speeds Europe" has been heard very often in the last 10 years.

In 2010, the European Union launched a document entitled Europe2020, which is the European strategy for smart, sustainable and socio-economic growth (ec.europa.eu). Regional policy is the EU's main investment policy. In the period 2014-2020, € 355.1 billion, about a third of the EU total budget, has been allocated to cohesion policy to reduce disparities and meet the various needs of all EU regions (ec.europa.eu). For Romania, the most expected benefit following the accession to the European Union was the decrease of regional inequalities, generated by the absorption of European funds. The EU accession not only failed to do that, it could even have contributed to the increasing of territorial disparities.

Romania has begun the transition to the market economy from a relatively low level of regional disparities compared to Western European economies. Economical inequalities, infrastructure and FDI attraction capacity have rapidly grown as a result of higher economical growth in Bucharest and in some other major urban areas, which were the main beneficiaries of capital inflows (especially FDI) and human resources (Goschin, 2014; Zaman, et al., 2013).

At the time of EU accession, our country had all the NUTS2 regions below the EU-27 average in terms of GDP/capita, with the NE region as the poorest region in the EU (www.statistici.insse.ro). There are old gaps between the East and the West of the country, and about 45% of the population lives in rural areas (Fig. 1).

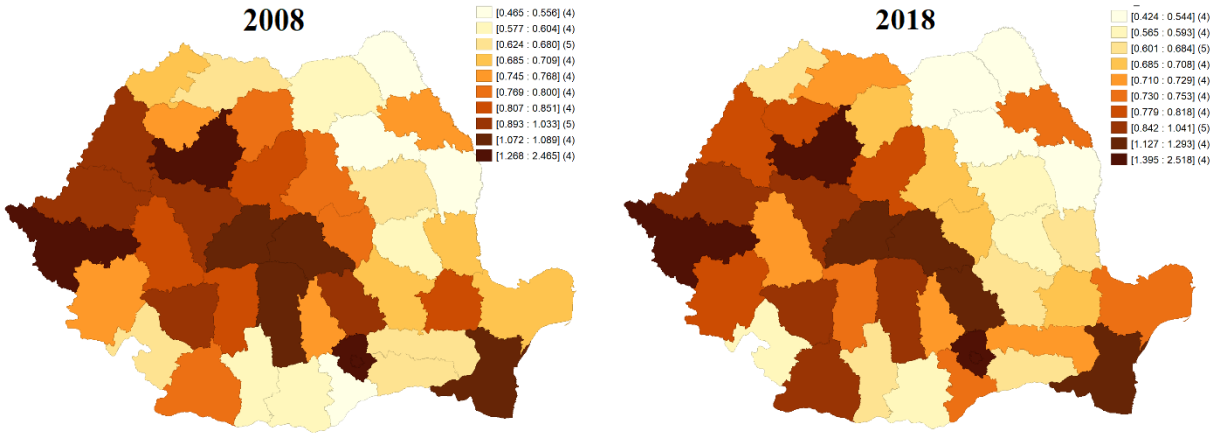


Fig. 1 Regional disparities estimated by ratio between each region's GDP and the mean GDP at national level in 2008 vs 2018

*Source: Authors' own research results

Economic growth is highly desirable in any country around the world, because it enables the population to consume and at the same time contribute to the providing of larger quantities of goods and services, thus increasing the standard of living. The literature has identified four factors that contribute to economic evolution - natural resources, human resources, technological factors, capital formation. Countries, regions, cities that have the same natural resources, can register different values in terms of human resources, technology and capital, generating disproportionate economic developments.

Economic development means more than only economic growth, economic disparities also influence or may be influenced by literacy rates, health and education services, motivations and expectations on a regional level. Many articles suggest that the growth of inequality can play a negative role throughout the population, causing social indignation, populist and protectionist views, and political uncertainty (Cingano, 2014). However, some articles show that economic enterprise can be dynamized by some levels of inequality (Atkinson, et al., 2011).

Entrepreneurship is still in its early stages in Romania, but in a continuous expansion. Like economic disparities, there are serious gaps between regions in number of active firms (Fig.2). The political factors see the opportunity in entrepreneurship development and therefore, consistent with the EU's agenda, Romanian's Government developed in 2014 the Government Strategy for Developing SMEs and improving the business environment in Romania – "Orizont 2020" (H.G. 859/2014). A series of measures have been proposed for the development of entrepreneurship in Romania so that to reach 35 SMEs per thousand inhabitants, with an increase of 3 million employees. Romania launched in 2017 a governmental program named Start-Up Nation (OUG-3, 2017) inspired by the successful program Israel Start-Up Nation. The program has brought credits of up to 200,000 RON

(almost 40,000 Euros) to 8,600 new firms. The budget for the second year of implementation, 2018, had shrank and only 4.684 new businesses received funding.

The present study wants to empirically describe the link between economic growth (GDP) and entrepreneurship, using spatial regression. The novelty element of the study is the empirical description of the connection between entrepreneurship and the evolution of the economy in Romania at county and regional level, with a methodology for estimating regional disparities. Most of the factors that influence the regional inequalities in the study, are the subject of economic and social policy decisions, the effects of which are often more visible in the long run. The study aims to provide relevant information to decision makers in Romania on the effects and the impact that entrepreneurship has on regional disparities and on long-term economic developments.

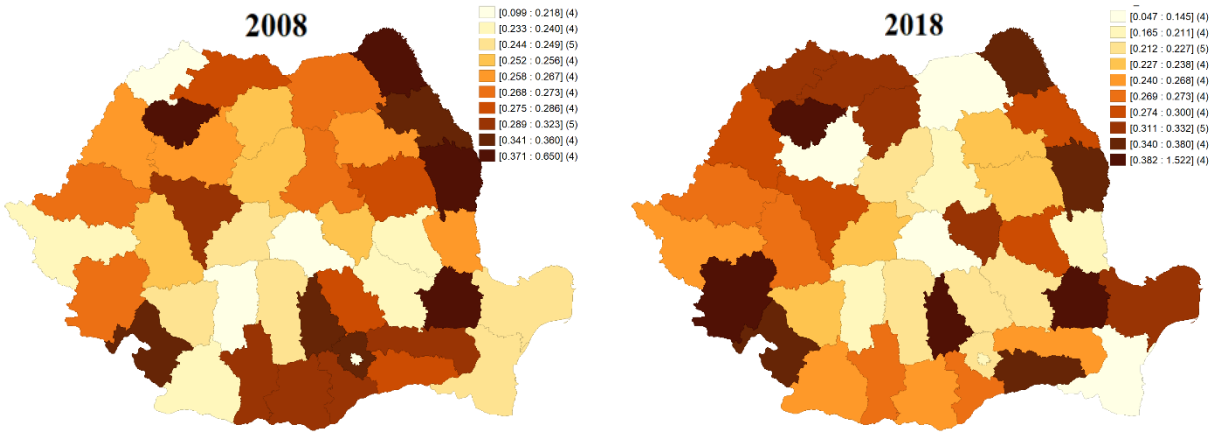


Fig. 2. New firms reported to active firms in 2008 and 2018
*Source: Authors' own research results

Literature review

The problem of reducing the regional inequalities and, in general, of supporting regional development processes, has reappeared lately, as a major concern both in specialized studies and in analyses aimed at substantiating economic and social policy measures. The reasearch in this field is rich. International and national economic analyses and studies have explained territorial inequalities based on the differences between regions, in terms of endowments with natural resources, factors of production, infrastructure and technology (Ailenei & Dachin, 2007 ; Goschin, et al., 2008 ; Constantinescu & Constantin, 2010 ; Boboc, et al., 2012). The evolution of regional disparities in Romania in the context of 2008 economic crisis, was studied with a series of indices that express the differences of territorial structure and their variation in time (Zaman, et al., 2013).

Regarding the analysis of the factors that influence economic growth and regional disparities in Romania, we have identified several studies that use various research methodologies: Regional growth in Romania after EU integration using the SSA method (Goschin, 2014) ; scientific analyses and explanations on the endogenous aspects and processes underlying economic development at national and regional level have been the subject of a 2015 study (Zaman, et al., 2015) ; the influence of some factors on GDP (Anghelache, et al., 2015) ; Anghelache and Manole (2012) present a study on international trade ; Anghelache, Anghel, Prodan Sacală and Popovici (2014), Bardsen et. al. (2005).

Blonigen, Davies, Waddell, and Naughton (2007) perform a spatial analysis of FDI ; Dobrescu (2013) presents a macromodel for the Romanian economy ; Ludoșean (Stoiciu) (2012) analyzes the correlation between FDI and economic growth ; similar concerns are found in the works of Pecican (2007), Stancu and Constantin (2011).

Entrepreneurship and economic growth

GDP growth may be driven by different independent variables in emerging and developed countries, and economic growth can depend on local conditions at national and regional levels and on the levels of entrepreneurial activity in the national economy. Entrepreneurship is expected to influence economic growth in a positive way, by investments, innovation and by creating new job opportunities and to reduce regional disparities. Because of that, great interest was accorded by researchers in entrepreneurship and its contribution to economic development. Economic growth is stimulated by entreprenurship and much of the research uses entrepreneurship as a production factor in the macroeconomic production function (Audretsch & Keilbach, 2004). Another study reveals that high levels of new growing firms are strongly related with economic growth (Stam, 2008).

Entrepreneurship matters but, importantly, it matters differently in emerging and developed countries, depending by the type of entrepreneurial activity: High-expectation Entrepreneurship Activity (HEA), Opportunity Entrepreneurial Activity (OEA) or Necessity Entrepreneurial Activity (NEA) (Vallierea & Petersonb, 2009). In developed countries, high-expectation entrepreneurs exploit the elevated levels of national knowledge development to generate economic output and growth, while OEA and NEA entrepreneurs do not. In developing countries entrepreneurs are necessity-based, and therefore their contribution to economic growth is not significant, but job creation is. (Vallierea & Petersonb, 2009). Entrepreneurship doesn't play a major role in the economic development of low-income countries, as opposed to developing and developed countries, where entrepreneurship has a major impact on macroeconomic growth (Stam, 2011).

Entrepreneurship and income inequalities

The link between entrepreneurial enterprise and economic inequality is very complex - causality is not clearly defined and entrepreneurship could be endogenous because of how inequality may also alter the degree of entrepreneurial activity (Halvarsson, et al., 2018). The concentration of wealth can affect the competitive dynamics in the industry and inequality can affect the nature of entrepreneurship in society. Rich people engage in entrepreneurship forming large corporations and getting more returns of capital. The poor have fewer resources and engage in necessity entrepreneurship and tend to build small scale or medium firms (Lippmann, et al., 2005).

The concentration of wealth around entrepreneurs occurs because people born in rich families tend to follow an entrepreneurial career, as well as the entrepreneurs' tendency to earn and save more of their income (Lecuna, 2020). However, this fact does not interfere with the common societal opinion that entrepreneurship is a well-viewed occupation (Lippmann, et al., 2005). The entrepreneur's incentive to start a business can be sepparated into two categories: opportunity entrepreneurship and necessity entrepreneurship (Aceytuno, et al., 2020). As a result, survival rates may be higher in oportunity entrepreneurship and the effect on economic growth and job creation may be more significant (Vallierea & Petersonb, 2009).

The expectation of entrepreneurship increasing income inequality and income inequality decreasing economic growth poses the question of how can entrepreneurship contribute to economic growth (Lecuna, 2020)? Lecuna's research discovered that total entrepreneurial activity is related to bettering the Gini coefficient.

Methodology

Our study's main purpose is to verify how does entrepreneurship influence disparities at a regional level, based on a spatial panel regression model. Along with entrepreneurship, other macroeconomic variables are used to explain the variability in the disparities. All computations are done in the statistical software R.

The data used for the model spans over the period 2008-2018, at the NUTS 3 level – the 41 Romanian counties and the Municipality of Bucharest. Before constructing and running the model, we considered testing the explanatory variables for non-stationarity – this is an important step to take when performing a time-series analysis, as the inclusion of such variables can lead to fabricated results, based on spurious relations between variables, especially when considering macroeconomic factors, such as GDP (Mushtaq, 2011).

In order to verify the stationarity of variables, unit root tests are used – however, most of these tests require the assumption that the cross-sections are independent, assumption which is violated in a spatial setting (Baltagi et al., 2007 ; Beenstock & Felsenstein, 2019). Therefore, the authors of the aforementioned papers suggest using the Im-Pesaran-Shin (or IPS) test (Im et al., 2003) or the improved cross-section dependent Im-Pesaran-Shin (or CIPS) test (Pesaran, 2007). These tests were recommended for heterogenous cross-sections and for sample sizes similar to this study. From the two tests, we have chosen to use the IPS, as the CIPS test was not available in the R software. We found that four of the independent variables were non-stationary – the active population, the unemployment rate, the mean salary and the population density. In order to render non-stationary data stationary, several options arise, out of which the most common is first-differencing, but not necessarily the best one (van Greunen et al., 2014). As suggested by Luetkepohl & Xu (2009), a logarithmic transformation of the non-stationary variables was employed in order to render them stationary.

When testing for multicollinearity, we used the standard cutoff value for correlations of 0.8 (Berry WD, 1985). The variables used in the model are described in table no 1:

Table no 1. Variables used in the model

No.	Name	Description	Source
1	GDP Disparity	This is the dependent variable used in the study. It represents the ratio between each region's GDP and the mean GDP at national level.	Authors own computation using data from NIS (National Institute of Statistics)
2	New firms to active firms Ratio	Ratio between the number of new firms and the number of active firms.	Authors own computation using data from NIS
3	GDP Growth Index	Ratio between current year's GDP and previous year's GDP.	Authors own computation using data from NIS
4	Logarithm of Active Population	The logarithmic transformation of the 15-64 year-old population.	Authors own computation using data from NIS

No.	Name	Description	Source
5	Employees Number Growth Index	Ratio between the number of employees of the current year and of the previous year.	Authors own computation using data from NIS
6	Logarithm of Unemployment Rate	The logarithmic transformation of the unemployment rate – the ratio between the number of unemployed and the active population.	NIS
7	Poverty Rate	The percentage of persons in the active population that are deemed 'poor' – by a relative method of estimation.	NIS
8	Logarithm of Mean Salary	The logarithmic transformation of the mean salary.	NIS
9	Logarithm of Population Density	The logarithmic transformation of the population density.	NIS

Source: Authors' own computations.

A spatial weight matrix was constructed in order to define the magnitude of the spatial effects between counties – as they are further away from each other; the effects are significantly smaller (Elhorst, 2014). A common choice for building the matrix is binary contiguity, i.e. if $\boldsymbol{W} = (w_{ij}) \in \mathbb{R}^{n\times n}$ is the weight matrix, with n being the number of counties (42, in our case), then $w_{ij} = 1$ if the regions i and j are neighboring, and $w_{ij} = 0$ otherwise. Each spatial weight (magnitude of the effect) is obtained by row-standardizing this matrix.

Several tests were carried out to accurately describe the regression's equation. The SLM1 marginal test (Baltagi et al., 2003) suggested that the regression presents random effects (p-value < 0.001), while the SLM2 marginal test suggests there exists spatial autocorrelation (Pace & LeSage, 2008). After employing the spatial dependence Lagrange multiplier test (Anselin, Bera, Florax, & J., 1996), we initially discovered the absence of spatial lag dependence (p-value = 0.2335) and spatial error dependence (p-value = 0.3498). After removing one variable from the model – the logarithm of population density – these results changed to indicate that there exist spatial dependencies in both lag and error (p-value < 0.01). The model is described by the following equations:

$$\boldsymbol{y} = \lambda(I_T \otimes W)\boldsymbol{y} + X\boldsymbol{\beta} + \boldsymbol{u} \qquad (\mathbf{1})$$

$$\boldsymbol{u} = \rho(I_T \otimes W)\boldsymbol{u} + \boldsymbol{\varepsilon} \qquad (\mathbf{2})$$

$$\boldsymbol{\varepsilon} = (\boldsymbol{\iota_T} \otimes I_N)\mu + \boldsymbol{\nu} \qquad (\mathbf{3})$$

where **y** is the NT×1 vector of observations for the dependent variable, I_T is the T×T identity matrix, W is the spatial weight matrix illustrated before, λ is the spatial dependence parameter, X is the NT×k matrix of explanatory variables, **u** is the disturbance term, composed of an autoregressive error part whose effects are described by ρ, and an error part $\boldsymbol{\varepsilon}$, which is also split in a specific effects part **μ** with $\mu_i \sim IID(0, \sigma_\mu^2)$ related to each region and a novelty part $\boldsymbol{\nu}$ with $\nu_{it} \sim IID(0, \sigma_\nu^2)$ that accounts for both changes in time and regions; $\boldsymbol{\iota_T}$ is a vector of T ones. In this study, N=42, T=11 and k is 7.

The direct (equation 4) and indirect (equation 5) impacts of every variable in each region are estimated as follows:

$$S_k(W)_{ii} = \frac{\partial y_i}{\partial x_{ki}} \qquad (\mathbf{4})$$

$$S_k(W)_{ij} = \frac{\partial y_i}{\partial x_{kj}} \qquad (5)$$

Taking the mean of these impacts across all regions give the mean direct and indirect impacts for each explanatory variable (LeSage & Pace, 2009).

Results and discussions

The following table presents the estimated coefficients for each variable in the regression, as well as the spatial parameter coefficients:

Table no 2. Regression results

Name	Estimates
Intercept	-0.9068 (0.0046) **
New firms to active firms Ratio	-0.0025 (0.9067)
GDP Growth Index	0.3179 (<0.001) ***
Logarithm of Active Population	0.2407 (<0.001) ***
Employees Number Growth Index	-0.2750 (<0.001) ***
Logarithm of Unemployment Rate	0.020 (0.0495) *
Poverty Rate	-0.0139 (0.8472)
Logarithm of Mean Salary	0.0315 (0.0404) *
λ	0.3417 (<0.001) ***
ρ	-0.5385 (<0.001) ***
ϕ	28.6991 (<0.001) ***

Source: Authors' own computations. N.B.: p-values are in parentheses. The ϕ parameter is equal to $\sigma_\mu^2/\sigma_\varepsilon^2$. If ϕ=0 at a significant level, then we can reject the hypothesis that random effects describe the data better than fixed effects. Since ϕ is significantly different from 0, we receive another confirmation that the model does not employ fixed effects.

The results show us that entrepreneurship does not have a significant impact on regional disparities. Based on some of the results from the literature, we would expect to remark a significant, positive relation between the two variables – as the ratio of new firms to active firms increases, so would the GDP in the specific county would be higher than average (Audretsch & Keilbach, 2004 ; Stam, 2008). However, one study suggests that in low-income countries, the effect of entrepreneurship on economical performance is insignificant (Stam, 2011), result also replicated in our study. This result also suggests that regional disparities are not driven by the birth of new firms, but rather by the activities of older or foreign companies (e.q., Cucculelli & Storai, 2015), confirming the ideea of survival entrepreneurship in Romania (Goschin, et al., 2020).

The other insignificant variable in the model is the poverty rate, which is surprising, as one would expect a clear dependence between poor counties and a below-average GDP. However, this might be explained by the construction of the poverty rate – the percentage of poor people (based on a relative estimate) from the active population. It could be the case that there is a larger population of poor people in the specific county, but also there are rich people with more money on average than in other counties. Although, other studies concluded that a certain degree of inequality can have a positive effect on economic activity (Atkinson, et al., 2011) in developing countries.

As expected, the GDP Growth Index and the active population variable present a positive and significant relation to the disparities – meaning that counties that have a steady growth rate and a larger workforce tend to have an above average GDP.

The less evident results are linked to employment – the growth index of employment is negatively related to the disparities, while unemployment is positively related. This means that a higher increase in employment from one year to the next indicates a county with a GDP lower than average. In the same time, a higher increase in employment corresponds to a decrease in unemployment, hence the second result is closely tied to the first one. Unemployment is the inability of an economy to use all labor force available and has strong effects on economic growth (Anghel, et al., 2017), likewise on regional disparities.

The following table shows the mean impacts for each explanatory variable:

Table no 2. Direct and indirect impacts of the explanatory variables

Name	Direct impact	Indirect impact
New firms to active firms Ratio	-0.0025 (0.8359)	-0.0012 (0.8707)
GDP Growth Index	0.3229 (<0.001) ***	0.1601 (0.0600) .
Logarithm of Active Population	0.2445 (<0.001) ***	0.1212 (0.0726) .
Employees Number Growth Index	-0.2793 (<0.001) ***	-0.1384 (0.0680) .
Logarithm of Unemployment Rate	0.0203 (0.0716) .	0.0101 (0.2082)
Poverty Rate	-0.0142 (0.8711)	-0.0070 (0.8705)
Logarithm of Mean Salary	0.0320 (0.0491) *	0.0158 (0.1695)

Source: Authors' own computations. N.B.: p-values are in parentheses.

The table above shows significant impacts for four explanatory variables discussed earlier (with the fifth one being close to the 0.05 significance levels). Direct impacts are similar to the regression coefficients and offer similar explanations. The indirect impacts, which are not significant (at a 0.05 level), suggest that the explanatory variables for counties do not have a meaningful impact on the GDP indices of their neighbors. The magnitude of

indirect impacts, being smaller than that of the direct ones might suggest that there is a decay due to distance.

Conclusion

In Romania, a former communist country, the concentration of wealth did not occur in such a way to affect the competitive dynamics in the industry, or to affect the nature of entrepreneurship in society. An important part of entrepreneurs tend to have fewer resources or engage in necessity entrepreneurship and build small scale or medium firms, with low impact on economic growth, but this situation is not necessarily shaped by location.

Entrepreneurship matters but, most importantly, it matters differently in developed, emerging and low-income countries. The results suggest that entrepreneurship does not have a significant impact on regional disparities in Romania and entrepreneurs contribution to economic growth is not significant, but job creation. Regional disparities are not driven by the birth of new firms, but rather by the activities of older or foreign companies. The study also suggests that the lack of start-up capital in new firm formation in Romania substantially limits the contribution on economic growth.

A major limitation in the present research is the estimation of regional disparities, the dependent variable used in the study. It represents the ratio between each region's GDP and the mean GDP at national level, and not an index like sigma convergence or Gini coefficient witch describes better the disparities or inequality in the society. Another limitation is about dealing with the stationarity of the data – there are far more specialised methods of transforming the data to exclude stationarity than using the log transformation. Specific tests should be employed to verify which transformations would perform better.

For further directions, we suggest replicating this study using data from a developed country to compare the significance of entrpreneurship's impact on disparities. Moreover, treating entrepreneurship as a dependent variable could offer different results, as county-level inequalities might actually influence new-firm formation. Also, FDIs can play as an instrumental variable in the study as foreign capital has a positive impact on entrpreneurship at a regional level. Finally, better variables can be added or replace the existing variables – entrepreneurship can be better represented by looking at initial capital resources, survival rates, capital growth, investments in R&D, and so on.

References

Aceytuno, M.-T., Sánchez-López, C. & Paz-Báñez, M., 2020. Rising Inequality and Entrepreneurship during Economic Downturn: An Analysis of Opportunity and Necessity Entrepreneurship in Spain. *Sustainability 2020, 12, 4540,* 12(4540).

Ailenei, D. & Dachin, A., 2007. Diminuarea inegalităţilor-condiţie esenţială a coeziunii economice şi sociale. *Cercetare Ştiinţifică în Academia de Studii Economice Bucureşti,* Volume Editura A.S.E..

Albulescu, C. & Tamasila, M., 2014. The impact of FDI on entrepreneurship in the European Countries. *Procedia - Social and Behavioral Sciences 124,* pp. 219-228.

Anghelache, C., Manole, A. & Anghel, M., 2015. Analysis of fi nal consumption and gross investment infliuence on GDP – multiple linear regression model. *Theoretical and Applied Economics,* Volume No. 3/2015 (604), Autumn, pp. 137-142.

Anghel, M., Anghelache, C. & Manole, A., 2017. THE EFFECT OF UNEMPLOYMENT ON ECONOMIC GROWTH. *Romanian Statistical Review,* Volume 7.

Anghel, M., Lilea, F. P. & Mirea, M., 2017. Analiza interdependenţei dintre PIB şi inflaţie. *Romanian Statistical Review,* Volume Supplement nr. 3.

Anon., n.d. [Online]
Available at: ec.europa.eu
Anselin, L., Bera, A. K., Florax, R. & J., Y. M., 1996. Simple diagnostic tests for spatial dependence. *Regional Science and Urban Economics,* pp. 77-104.
Atkinson, A., Piketty, T. & Saez, E., 2011. Top Incomes in the Long Run of History. *J. Econ. Lit,* Volume 49, pp. 3-71.
Audretsch, D. & Keilbach, M., 2004. Entrepreneurship Capital and Economic Performance. *Regional Studies,* 38(8), pp. 949-959.
Baltagi, B., Bresson, G. & Pirotte, A., 2007. Panel Unit Root Tests and Spatial Dependence. *Journal of Applied Econometrics,* pp. 339-360.
Baltagi, B. H., Song, S. H. & Koh, W., 2003. Testing panel data regression models with spatial error correlation. *Journal of Econometrics,* pp. 123-150.
Beenstock, M. & Felsenstein, D., 2019. *The Econometric Analysis of Non-Stationary Spatial Panel Data.* Basel: Springer Nature Switzerland AG.
Berry WD, F. S., 1985. Multiple Regression in Practice (Quantitative Applications in the Social Sciences). *SAGE Publications.*
Boboc, C., Ţiţan, E. & Ghiţă, S., 2012. Labour Market Inequalities and Economic Development. *Economic Computation and Economic Cybernetics Studies and Research,* Volume 4.
Cingano, F., 2014. Trends in Income Inequality and its Impact on Economic Growth. In. *OECD Social, Employmentand Migration Working Papers,* Volume 163, pp. Paris, France.
Constantinescu, M. & Constantin, D., 2010. Dinamica dezechilibrelor regionale în procesul de integrare europeană: modelare, strategii, politici. *Editura A.S.E., Bucureşti..*
Cucculelli, M. & Storai, D., 2015. Family firms and industrial districts. Evidence from the Italian manufacturing industry. *Journal of Family Business Strategy,* Volume 6(4), p. 234–246.
Elhorst, J. P., 2014. *Spatial Econometrics - From Cross-Sectional Data to Spatial Panels.* s.l.:Springer.
Erik, S. A. v. S., 2011. Types of Entrepreneurship and Economic Growth. In: *Entrepreneurship, Innovation, and Economic Development.* s.l.:Oxford Scholarship Online.
Fischer, S. S. R. a. V. S., 2002. Modern hyper and high inflations. *Journal of Economic.*
Goschin, Z., 2014. Regional growth in Romania after its accession to EU: a shiftshare analysis approach,. *Procedia Economics and Finance,* Volume 15, pp. 169-175.
Goschin, Z., 2014. Regional inequalities and sigma divergence în Romania. *Procedia Economics and Finance,* Volume 10, pp. 45-53.
Goschin, Z., Constantin, D., Roman, M. & Ileanu, B., 2008. Regional Specialisation and Geographic Concentration of Industries in Romania. *South-Eastern Europe Journal of Economics,* 7. no. 1(University of Macedonia Press, Thessaloniki), pp. 61-76.
Goschin, Z., Druica, E. & Vâlsan, C., 2020. Shaped by location? A spatial panel analysis of Romanian family businesses. *Regional Science Policy and Practice,* Volume 1–19.
Halvarsson, D., Korpi, M. & Wennberg, K., 2018. Entrepreneurship and income inequality. *Journal of Economic Behavavoir,* Volume 145, p. 275–293..
Im, K., Pesaran, M. & Shin, Y., 2003. Testing for unit roots in heterogenous panels. *Journal of Econometrics,* pp. 53-74.
Lecuna, A., 2020. Income inequality and entrepreneurship. *Economic Research-Ekonomska Istraživanja,* 33(1), pp. 2269-2285.
LeSage, J. & Pace, R., 2009. *Introduction to Spatial Econometrics.* s.l.:Taylor & Francis Group, LLC.
Lippmann, S. D. A. &. A. H., 2005. Entrepreneurship and inequality. *Research in the Sociology of Work,* Volume 15, pp. 3-31.
Lippmann, S., Davis, A. & Aldrich, H., 2005. Entrepreneurship and Inequality. *Res. Sociol. Work.,* Volume 15, pp. 3-31.

Luetkepohl, H. & Xu, F., 2009. The Role of Log Transformation in Forecasting Economic Variables. *European University Institute Max Weber Programme Working Paper No. MWP 2009/6*, 14 November.
Mushtaq, R., 2011. *Augmented Dickey Fuller Test.* [Online] Available at: https://ssrn.com/abstract=1911068
Nahtigal, M., 2013. European Regional Disparities: The Crucial Source of European Un-Sustainability. *Lex localis,* Volume 11, no. 3, pp. 601 - 614.
Nexhat, K. & Esat, D., 2019. The Impact of Inflation on Economic Growth: The Case of Eurozone. *Journal of Finance & Banking Studies,* Volume 8, No. 1.
Pace, R. k. & LeSage, J. P., 2008. A spatial Hausman test. *Economics Letters,* pp. 282-284.
Pesaran, M., 2007. A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics,* pp. 265-312.
Sipos-Gug, S. & Badulescu, A., 2015. Macroeconomic factors of entrepreneurship in European Union. *Annals of Faculty of Economics,* pp. 601-611.
Stam, E., 2008. Entrepreneurship and Innovation Policy. *Jena Economic Research Paper,* No. 2008(006).
Vallierea, D. & Petersonb, R., 2009. Entrepreneurship and economic growth: Evidence from emerging and developed countries. *Entrepreneurship & Regional Development,* 21(5-6), p. 459–480.
van Greunen, J., Heymans, A., van Heerden, C. & van Vuuren, G., 2014. The Prominence of Stationarity in Time Series Forecasting. *Journal for Studies in Economics and Econometrics,* pp. 1-16.
Zaman, G. et al., 2015. *Dezvoltarea economică endogenă la nivel regional. Cazul României.* Bucharest: Expert.
Zaman, G., Goschin, Z. & Vasile, V., 2013. Evoluţia dezechilibrelor teritoriale din România în contextul crizei economice. *Romanian Journal of Economics, RePEc, EBSCO, DOAJ, IndexCopernicus,* Volume 2(46), pp. 20-39.
Zaman, G. G. Z. V. V., 2013. Evoluţia dezechilibrelor teritoriale din România în contextul crizei economice. *Romanian Journal of Economics, RePEc, EBSCO, DOA,* Volume IndexCopernicus, 2(46), pp. 20-39.