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Marjan Nikolov
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THE RELATION BETWEEN HUMAN CAPITAL AND ECONOMIC GROWTH IN THE COUNTRIES ATTAINED THEIR INDEPENDENCE WITH THE COLLAPSE OF THE USSR

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DEDICATE THIS ARTICLE TO PROF.DR. CAFER NECAT BERBEROĞLU

Abstract

In this study, the relationship between human capital and economic growth is tested by second generation panel data analysis for the countries gained independence after the collapse of the USSR with the help of four different models by using 1995-2014 period data. Cross-section dependence among these countries was tested by means of Breusch and Pagan (1980) LM test, Pesaran (2004) scaled LM test, Baltagi, Feng, and Kao (2012) bias-corrected scaled LM test and Pesaran (2004) CD methods. Result of this analysis show that there are cross-sectional dependence among these countries. Stationarity of the series is investigated by Hadri and Kuruzomi (2012) panel unit root test and reached that all series are $I(1)$. Westerlund (2008) Durbin-Hausman panel cointegration test is separately conducted for four models and seen that the series are cointegrated. Cointegration coefficients are estimated by Breitung (2005) Two Step Least Squares method. The results indicate that 1% increase in human capital, average life expectancy, health expenditure per capita and education expenditure per capita improves per capita national income by 3.066, 8.186, 0.541 and 0.307 percent, respectively. Moreover, 1% increase in capital stock per capita affects national income per capita between 0.548% and 1.07% with respect to other independent variable in the models

Key words: Economic Growth, Human Capital, Eastern Europe, The Baltic, The Caucasus, Central Asian Countries.

Jel Codes: F43, E24, J24, O15.

Introduction

Economic growth, described as the increase in real national income in time (Lipsey et al. 1984), may be affected by many factors like GDP per capita, capital stock and human capital, technology, population, natural resources, cultural and institutional structure, regime and stability of the country (TEK, 2003).

In a world such that economic growth competition among countries accelerates, one of the major factors providing advantage to countries is the increase in productivity (OECD, 2015). To increase productivity, human capital has to be grown or developed. When the quality indicators of labor like health, education and experience are better off, not only personal efficiency increases but also the productivity of the machinery equipment and capital in use will rise. On the other hand, well-educated labor force will create new ideas and production technologies, which is increasing the level of technology and accelerating economic growth of the country (UNIDO, 2016).

In this study, the relationship between human capital and economic growth is investigated for 10 countries¹⁰ which gains independency after the collapse of USSR for 1995-2014 period by second generation panel data analysis method. Second part of this study covers the theoretical background of the issue. In third part indicates the situation in these countries, literature review is given in the fourth part and in fifth part, econometric analysis is presented. The paper is completed with conclusions and policy implications part.

In this study, human capital, average life expectancy, health expenditure per capita, education expenditure per capita and fixed capital stock per capita variables are used as the determinants of economic growth. To analyze, new generation panel data analysis methods, taking cross-sectional dependence into account, employed. Countries drawing attention as being transition economies among the emerging countries are selected. By this aspect, this study is supposed to make a contribution to the literature as its content, data set and analyzing methods. It is also thought that researchers' interests will be directed to this topic again.

Obtained results and policy advices will be a reminder of the importance of human capital and its subcomponents in economic growth for the policymakers of related countries and other developing countries, leading them to a better economic growth.

2. Theoretical Background

Economic growth implies increase in real GDP in time (Lipsey et al. 1984). Economic growth may occur in two ways. One of them is the short run economic growth based on expected fluctuations arising in a situation which an underemployed economy increases its production to get rid of underemployment. Other is the long run economic growth faced by fully employed economies. It happens with the help of new production factors or increasing efficiency and productivity of labor or capital with contemporary technology (TEK, 2013).

Many theories have been developed about economic growth. These theories generally investigate closely the factors that have significant impact on growth. Growth theories are mainly focus on capital accumulation, technologic improvement and population growth. There exist two basic, widely-accepted approaches about speed of growth: Harrod-Domar and Neo-classic models. Harrod-Domar model claims that speed of growth is determined by capital accumulation. Neo-classic model, on the other hand, examines the response of saving, investment and growth to population increase and technological change. In Neo-classic approach, because the technologic improvement is seen exogenous, it is not explained sufficiently. Therefore, Solow (1956) did try to make technology an endogenous variable and to explain the exogeneity which arises depending on technologic growth (Barro and Sala-i-Martin, 1995).

Economic growth can be investigated through Cobb-Douglas production function as;

$$Y = AF(K, L) \quad (1)$$

$$Y = AK^\alpha L^\beta \quad (2)$$

By taking logarithm of both sides, the equation becomes linearized;

$$\begin{aligned} \text{Log}Y \\ &= \text{Log}A + \text{Log}K^\alpha \\ &+ \text{Log}K^\beta \end{aligned} \quad (3)$$

$$\begin{aligned} \text{Log}Y \\ &= \text{Log}A + \alpha \text{Log}K \\ &+ \beta \text{Log}L \end{aligned} \quad (4)$$

Finally, by derivating both sides with respect to time, the relationship between output growth rate and input growth rate is obtained.

$$\begin{aligned} \frac{\dot{Y}}{Y} \\ &= \frac{\dot{A}}{A} + \frac{\dot{K}}{K} \\ &+ \frac{\dot{L}}{L} \end{aligned} \quad (5)$$

Here; Y is total production, A is technology level, K is capital stock, L is amount of labor, α and β are the shares of capital and labor in production. Equation (5) implies that the output growth rate is the sum of weighted average of the change in technology, in capital and in labor force. According to the equation, major determinants of economic growth are technologic improvement and increase in capital stock and employment (Levin and Renelt, 1992).

Capital stock, which is important for countries to increase economic growth by creating employment and productivity, is obtained by subtracting the depreciation of machinery, equipment, building and infrastructure from the accumulated amount of investment on those production factors. In Solow (1956) model, which is the base of Neo-classic growth theories, economic growth is considered as a function of fixed capital stock per worker. Moreover, increase in capital stock is the most important determinant of economic growth in Keynesian and Post-Keynesian theories (Jones and Vollrath, 2013). According to Post-Keynesian approach, increases in demand boost productivity and economic growth by increasing investment (Blomstrom, et al. 1996). Here, investments stimulate new technology and helps new technology to deploy (Barro ve Salai-Martin, 1995).

Labor force is the sum of all efforts on production including both muscle and brain activity. While labor force is dependent on population growth and immigration, productivity of labor force is closely related to education level, capability and health condition of workers (Krugman, 1994). Especially investment on education and human capital accelerates economic growth by creating qualified labor force. Investment on human brings qualified labor force and qualified labor force boosts improvement in technology and productivity (Mathur, 1999). Thus, in this study; human capital, average life expectancy, education and health expenditure per capita are evaluated as part of technologic progress. That is, they are not included in L but in A in this study.

In endogenous growth theory, developed in mid-1980's, human capital and foreign trade is seen as an important source of economic growth (Lucas, 1998; Romer, 1994). In this theory; quality, productivity and creative ideas of labor force is highly critical. By transforming the creative ideas into new products, functional designs and scientific inventions, countries obtain more competitive power in export, leading the country to have a higher share of technology-intensive good in export. By this way, export will add more value for the country and it is expected that the economic growth of the country will significantly improve. (UNCTAD, 2008).

3. Situation In These Countries

Countries separated from the USSR are also referred to as transition economies. These countries have started to meet the free market economy since the mid-1990s. In Table 1, Human Development Index (Human Capital) data is presented for above-mentioned countries.

Table 1. Human Development Index

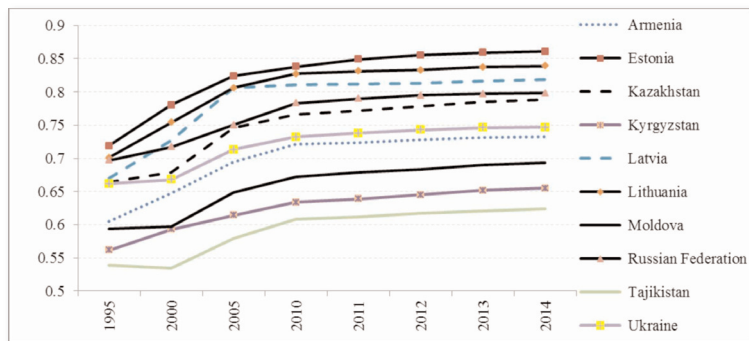
	1995	2000	2005	2010	2011	2012	2013	2014	Ranking in the World 2014
Armenia	0.605	0.648	0.695	0.721	0.723	0.728	0.731	0.733	85
Estonia	0.719	0.78	0.82	0.838	0.849	0.855	0.859	0.861	30
Kazakhstan	0.664	0.679	0.746	0.766	0.772	0.778	0.785	0.788	56
Kyrgyzstan	0.562	0.593	0.614	0.634	0.639	0.645	0.652	0.655	120
Latvia	0.67	0.727	0.806	0.811	0.812	0.813	0.816	0.819	46
Lithuania	0.701	0.754	0.806	0.827	0.831	0.833	0.837	0.839	37
Moldova	0.594	0.597	0.649	0.672	0.679	0.683	0.69	0.693	107
Russian Federation	0.697	0.717	0.75	0.783	0.79	0.795	0.797	0.798	50
Tajikistan	0.539	0.535	0.579	0.608	0.612	0.617	0.621	0.624	129
Ukraine	0.662	0.668	0.713	0.732	0.738	0.743	0.746	0.747	81

Source: Human Development Reports (2016).

According to Table 1, countries having the highest human capital are Estonia, Lithuania and Latvia in order. Other countries need to make more efforts to improve their human capital. These data is given as graph in Graph 1.

Graph 1.
Human Development
Index

Source:
Human Development Reports
(2016).



In Graph 1, it is seen that all included countries' human capital get better off after the collapse of USSR. The reason behind it is thought to be the increase in investment in order to enhance human capital in these countries obtaining stability and independency. Furthermore, decentralization improves the efficiency of these economies. In Estonia, Latvia and Lithuania, higher values are observed and it is due to the fact that these three countries have joined in European Union in 2004. On the other hand, high growth rate of human capital in Armenia deserves attention. In Table 2, subcomponents of human capital and real GDP per capita for these countries are presented as of 2014.

Table 2. Subcomponents of Human Capital and Real GDP Per Capita (2014)

	HDI	Ranking to HDI	LE	Ranking to LE	HE	Ranking to HE	EE	Ranking to EE	SY	Ranking to SY	G	Ranking to Growth
Estonia	0.861	1	77.2	1	1668.3	3	8552.0	1	12	2	3.7	4
Lithuania	0.839	2	74.0	4	1718.0	2	2452.7	5	12.4	1	2.6	6
Latvia	0.819	3	74.2	3	940.3	5	6752.4	2	11.5	4	2.3	7
Russian F.	0.798	4	70.4	9	1835.7	1	4431.9	3	11.7	3	-2.6	10
Kazakhstan	0.788	5	71.6	5	1068.1	4	3515.4	4	10.4	7	7.8	1
Ukraine	0.747	6	71.2	7	584.2	6	1900.1	6	11.3	5	0.3	9
Armenia	0.733	7	74.7	2	362.1	8	852.3	8	10.8	6	1.4	8
Moldova	0.693	8	71.5	6	514.2	7	1316.6	7	9.8	9	2.9	5
Kyrgyzstan	0.655	9	70.4	8	215.1	9	781.1	9	9.3	10	4.3	3
Tajikistan	0.624	10	69.6	10	185.1	10	403.5	10	9.9	8	5.0	2

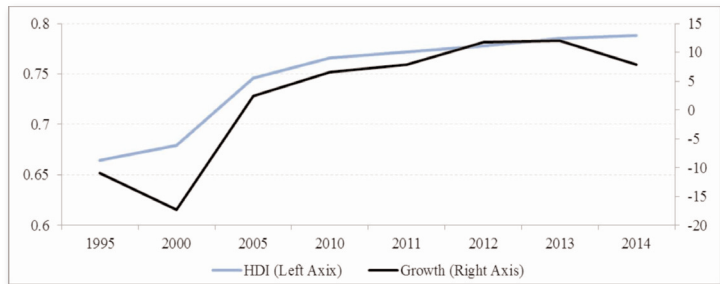
Source: Human Development Reports (2016), World Bank (2016) and Feenstra et al. (2015).

Note: HDI: Human Development Index, LE: Life Expectation, HE: Health Expenditure Per Capita, EE: Education Expenditure Per Capita, SY: Average Schooling Year, Growth: G: National Income Per Capita (annual % growth)

It is clearly seen in Table 2 that countries which are having higher human capital also have greater economic growth rate. For instance, when the relationship between human capital and economic growth for Kazakhstan is investigated, Graph 2 is obtained.²

Graph 2.
The Relationship between
Human Capital and Economic
Growth for Kazakhstan

Source:
Human Development Reports
(2016) and World Bank (2016).



A simultaneous relationship can be mentioned between human capital and economic growth as it is in Graph 2. Only in recent years there seems to be a divergence between these variables. It is evaluated that these diverge originated from non-HDI variables.

4. Literature Review

There are many studies in the literature that examine the relationship between human capital and economic growth. A comprehensive summary of the literature about the relationship between human capital and economic growth is presented here by date.

Frances and Ramirez (2000) examined the relationship between economic growth and human development. Cross country regressions showed a significant relationship between public expenditures on health and education. Wolff (2000) investigated the effects of human capital on the economic growth for 24 OECD coun-

2) Similar graphs are obtained for other countries. Kazakhstan is chosen because the relationship is more clear.

tries over 1950-1990 periods. He found that the convergence in labor productivity levels related to convergence in education levels. Econometric results showed a positive and significant effect of formal education on productivity growth. Kalemli-Ozcan, et al. (2000) investigated the impact of higher life expectancy of human capital on economic growth with a continuous time overlapping generations model. They found that declined mortality and schooling affect the economic growth.

Asteriou and Agiomirgianakis (2001) examined the relationship between human capital and economic growth in Greece. They investigate the relationship and causality between educational variables and GDP, based on the assumption that principal institutional process on developing human capital is formal education. They found that cointegration relation between education level (measured by participation in primary, secondary and higher education) and GDP per capita exists and the way of causality is from education to growth. Only higher education and GDP per capita has a reverse causality.

Boucekkine, et al. (2002) investigated the relationship between economic growth and human capital by OLG model and they reached an ambiguous effect longer schooling on the per-capita growth.

Wang and Yao (2003) created a measure to compute China's human capital stock for 1952-1999 periods and used it to find its relationship between China's growth. According to the study, accumulation of human capital has been very quick and its impact on growth and welfare was significant. Besides, the role of growth of total factor productivity was positive in the reform period, while it was negative in pre reform period.

Chakraborty (2004) investigated the relationship between endogenous lifetime and economic growth by two-period overlapping generations model and reached that when human capital drives economic growth, countries differing in health capital doesn't converge to similar living standards. Gyimah-Brempong and Wilson (2004) examine the relationship between human capital health and growth of income per capita in Sub-Saharan African and OECD countries. According to results, health of human capital strongly and positively affects the growth of income per capita in a quadratic way: when the health stock is relatively large, its impact on economic growth gets small. In conclusion, the higher the human capital health is, the better the steady state income is.

Arndt (2006) examined relationship among HIV/AIDS, human capital, and economic growth in Mozambique by using a dynamic computable general equilibrium approach and reached that HIV/AIDS assumed to slow the rate of human capital accumulation and in the human and physical capital accumulation are shown to interact strongly with technical change and economic growth.

Dinda (2008) analyzed the effects of social capital and human capital on economic growth. At the end of this study, it was found that human capital accumulation is led by productive consumption and the existence of human capital is essential to improve social capital. Moreover, both human capital and social capital accumulation affect the equilibrium growth rate.

Fleisher, et al. (2010) investigated the relations among human capital, economic growth, and regional inequality in China. They found that human capital positively affects output and productivity growth. Moreover, there are both direct and indirect effects of human capital on total factor productivity growth.

Lee and Mason (2010) analyzed the links between human capital investment and economic growth over the demographic transition by using overlapping generations model. Simulation analysis was employed to show that low fertility leads to higher per capita consumption through human capital accumulation, given plausible model parameters.

Goldin (2014) investigated the relationship between human capital and economic growth by theoretically. In the paper, main components of human capital are listed as education, training, and health. Moreover, the institutions encouraging human capital investment and the human capital's impact on economic growth are discussed. Queirós and Teixeira (2014) analyzed the relationship between human capital and economic growth in OECD countries for 1960-2011 periods. It is found that one of the most critical factors for growth is the country-specific production dynamics. Furthermore, human capital and structural change towards high knowledge-intensive industries affects economic growth.

Pelinescu (2015) investigated the impact of human capital on economic growth for European Union countries by panel data methods. The study revealed the functions of human capital in growth and found that sustainable development is influenced by low human capital investment in these countries. Study of Shahzad (2015) observes the role of human capital formation on economic growth in Pakistan by utilized the secondary data form the period of 1990 to 2013. The study clearly revealed that human capital, health and physical capital are keys to boost the economic growth of Pakistan. As a result of this study human capital has a positive and significant impact on GDP. Gross fix capital formation has positive significant impact on GDP. There is negative but significant relationship between Infant Mortality Rate and GDP of Pakistan.

Boztosun, et al. (2016) researched the relationships between human capital and economic growth were analyzed by using Hatemi-J (2008) cointegration and Hacker and Hatemi-J (2006) causality tests in Turkey for the 1961-2011 period data. They found that a dual causality relationship between human capital and economic growth variables. In addition a 1% increase in human capital yielded about a 3.2% increase in GDP. Wang and Liu (2016) investigated the effect of educated human capital on economic growth by using paned data methods for 1960-2009 period data of 55 countries. In the study, education level of human capital is categorized as primary, secondary and higher education to analyze the effect of different education levels on growth. It is concluded that higher education has a positive and significant impact on economic growth while the impact of primary and secondary education is not significant. Moreover, per capita GDP growth is positively correlated with human capital and life expectancy.

5. Econometric Analysis

5.1. Motivation

General result of the literature concludes that human capital affects economic growth. To measure human capital, Human Development Index, Health Expenditures, Education Expenditures and Life Expectancy data is employed mostly. It is realized that there exists limited study on the countries established after the collapse of the USSR. This study will contribute the literature because the number of studies on those countries is limited.

5.2. Model

In this study, based on Solow (1956; 1957), Swan (1956) and Bernanke and Gurkaynak (2002), the following models were created by using the Equation (2):

$$Y = AK^{\alpha} L^{\beta} \quad (6)$$

Dividing both sides by L, income per worker will become a function of technology and capital stock per worker.

$$\frac{Y}{L} = \frac{AK^{\alpha} L^{\beta}}{L} \quad (7)$$

$$\frac{Y}{L} = \frac{K^{\alpha}}{L^{1-\beta}} \quad (8)$$

Under the assumption of constant return to scale, $\alpha + \beta = 1$ and thus, $\alpha = 1 - \beta$.

$$\begin{aligned} \frac{Y}{L} &= A \frac{K^\alpha}{L^\alpha} \end{aligned} \quad (9)$$

$$\begin{aligned} \frac{Y}{L} &= A \left(\frac{K}{L} \right)^\alpha \end{aligned} \quad (10)$$

It can be rewritten as:

$$y = Ak^\alpha \quad (11)$$

In equation 11; y is output per worker, A is technology (Solow residual) and k is fixed capital stock per worker. Linearizing equation 11, we obtain:

$$\begin{aligned} \text{Log} y &= \text{Log} A \\ &+ \alpha \text{Log} K \end{aligned} \quad (12)$$

Then, econometric form of it will be:

$$\begin{aligned} \text{Log} y_{it} &= \beta_0 + \beta_1 \text{Log} A_{it} + \beta_2 \text{Log} K_{it} \\ &+ \varepsilon_{it} \end{aligned} \quad (13)$$

In this final equation; i stand for countries, t for time. β_0 is constant term (impacts of non-included variables on output per worker), β_1 is elasticity of output per worker for technology and β_2 is elasticity of output per worker for fixed capital stock per worker, while ε is random walk residuals. Technology cannot be obtained as a time series, therefore the following variables is used to proxy it: Human Capital (HC), Life Expectancy at birth as years (LE), and Health Expenditure per capita (HE) and Education Expenditure (EE) and each variable is used in different models.

$$\begin{aligned} \text{Model 1: } \text{Log} y_{it} &= \beta_0 + \beta_1 \text{Log} HC_{it} + \beta_2 \text{Log} K_{it} \\ &+ \varepsilon_{it} \end{aligned} \quad (14)$$

$$\begin{aligned} \text{Model 2: } \text{Log} y_{it} &= \alpha_0 + \alpha_1 \text{Log} LE_{it} + \alpha_2 \text{Log} K_{it} \\ &+ \varepsilon_{it} \end{aligned} \quad (15)$$

$$\begin{aligned} \text{Model 3: } \text{Log} y_{it} &= \gamma_0 + \gamma_1 \text{Log} HE_{it} + \gamma_2 \text{Log} K_{it} \\ &+ \varepsilon_{it} \end{aligned} \quad (16)$$

$$\begin{aligned} \text{Model 4: } \text{Log} y_{it} &= \delta_0 + \delta_1 \text{Log} EE_{it} + \delta_2 \text{Log} K_{it} \\ &+ \vartheta_{it} \end{aligned} \quad (17)$$

Relationship between human capital and economic growth is analyzed by these models (equation 14-17).

5.3. Data Set

In this study, countries attaining their independence after the collapse of the USSR (Eastern Europe: Russia, Belarus, Ukraine, Moldova; Baltic: Estonia, Latvia, Lithuania; the Caucasus: Georgia, Armenia, Azerbaijan; and Central Asian: Turkmenistan, Uzbekistan, Kyrgyzstan, Kazakhstan, Tajikistan) was intended to analyze in order to reveal the impact of human capital on economic growth. However, Azerbaijan, Belarus, Georgia, Turkmenistan and Uzbekistan were excluded from the analysis due to their incomplete data set. For remaining 10 countries, following data covering 1995-2014 periods is used:

Dependent Variable (y): Expenditure-side real GDP at chained PPPs (in 2011US\$) obtained from Penn World Table 9.0 (<http://www.rug.nl/ggdc/productivity/pwt/>) and it divided by population series, which is obtained again Penn World Table 9.0 (<http://www.rug.nl/ggdc/productivity/pwt/>). By this, real GDP per capita series is obtained and logarithm of that series is used.

Independent Variables:

Human Capital (HC): Human capital index, based on years of schooling and returns to education series of Penn World Table 9.0 (<http://www.rug.nl/ggdc/productivity/pwt/>) is employed after transformed into an index having the greatest value 100. Then the logarithmic form of the series is used.

Life Expectation (LE): Life expectancy at birth (years) from World Bank (<http://data.worldbank.org/indicator/SP.DYN.LE00.IN?end=2014&start=1990&view=chart>). The series is used in logarithmic form.

Health Expenditure (HE): Real health expenditure per capita PPP (constant 2011 international \$) obtained from World Bank (<http://data.worldbank.org/indicator/SH.XPD.PCAP.PP.KD>). The series is used in logarithmic form.

Education Expenditure (EE): Education expenditure per capita (PPP, Adjusted savings, constant 2011 international \$) obtained from World Bank (<http://data.worldbank.org/indicator/NY.ADJ.AEDU.CD>). The series is used in logarithmic form.

Capital Stock (k): Capital stock at constant 2011 national prices (in mil. 2011US\$) obtained from Penn World Table 9.0 (<http://www.rug.nl/ggdc/productivity/pwt/>) and population series of the same table is divided to obtain per capita fixed capital stock. The series is in dollar and logarithmic form.

We have thought dividing the GDP, HE, EE and Capital Stock series by labor force instead of population, however considering the close relation of health and education of labor force with health and education of population, studying with per capita data instead of per worker data becomes more meaningful. On the other hand, Human Development Index of United Nations could not be used because of many missing data in it.

5.4. Methodology

In this study, cross section dependence is checked by Breusch-Pagan (1980) LM test, Pesaran (2004) scaled LM test, Baltagi, Feng and Kao (2012) bias-corrected scaled LM test and Pesaran (2004) CD test. Stationarity of the series is analyzed by Hadri and Kuruzomi (2012) panel unit root test, while cointegration is investigated by Durbin-Hausman panel cointegration method developed by Westerlund (2008). Cointegration coefficients are estimated by Two Step Least Square estimator of Breitung (2005).

5.5. Cross-Sectional Dependency Test

Considering cross-sectional dependence in the panel or not is highly affects the results of analysis. When cross-sectional dependence is ignored in estimation, consequences like unaccounting residual dependence

resulting efficiency loss in estimator and invalid test statistics may arise. There are a variety of tests for cross-section dependence in the literature. Cross-section dependence among these countries was tested by means of Breusch-Pagan (1980) LM test, Pesaran (2004) scaled LM test, Baltagi, Feng, and Kao (2012) bias-corrected scaled LM test and Pesaran (2004) CD in this study. These tests can be investigated based on a panel data model in following equation:

$$y_{it} = \beta'_{it}x_{it} + u_{it} \quad (18)$$

Here; β_1 are the corresponding cross-section specific vectors of parameters to be estimated. The general null hypothesis of cross-section dependence may be stated in terms of the correlations between the disturbances in different cross-section units;

$$\rho_{ij} = \text{Corr}(u_{it}, u_{jt}) = 0 \quad \text{for } i \neq j \quad (19)$$

Here; ρ_{ij} is the product-moment correlation coefficient of the residuals. Pagan (1980) Lagrange Multiplier (LM) test statistic is obtained as;

$$LM = \sum_{i=1}^{N-1} \sum_{j=i+1}^N T_i \hat{\rho}_{ij}^2 \sim \chi^2_{\frac{N(N-1)}{2}} \quad (20)$$

Pesaran (2004) extended this test for situations where N is too large and obtained this scaled test statistic;

$$LM_s = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_i \hat{\rho}_{ij}^2 - 1) \sim N(0,1) \quad (21)$$

Pesaran also adjusted the size distortion of LM and LM_s tests obtained CD test as:

$$CD_P = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N T_i \hat{\rho}_{ij}^2 \sim N(0,1) \quad (22)$$

Baltagi, Feng, and Kao (2012) developed a simple asymptotic bias correction for the scaled LM test statistic:

$$LM_{BC} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_i \hat{\rho}_{ij}^2 - 1) - \frac{1}{2(T-1)} \sim N(0,1) \quad (23)$$

Null hypothesis of these tests are no cross-section dependence. Cross-sectional dependence tests were applied with EViews 9.0 and obtained results were shown in Table 3.

Table 3. Cross-sectional Dependence Test Results

	<i>LM</i>	<i>LM_s</i>	<i>LM_{BC}</i>	<i>CD_P</i>
y	715.13***(0.00)	69.58***(0.00)	69.32***(0.00)	26.48***(0.00)
HC	630.53***(0.00)	60.66***(0.00)	60.40***(0.00)	23.36***(0.00)
LE	695.76***(0.00)	67.54***(0.00)	67.27***(0.00)	26.28***(0.00)
HE	839.01***(0.00)	82.64***(0.00)	82.37***(0.00)	28.96***(0.00)
EE	798.71***(0.00)	78.39***(0.00)	78.13***(0.00)	28.23***(0.00)
k	713.64***(0.00)	69.42***(0.00)	69.16***(0.00)	15.70***(0.00)

Note: Values in parentheses are probability values, d.f.=45, ***; indicates the presence of cross-sectional dependence at the 1% significance level.

According to Table 3, null hypothesis is robustly rejected in all series meaning that there exists cross-sectional dependence among these countries. That is, an economic or social shock arising in a country can affect the others. Therefore, in order to determine the policies in one country, policymakers have to closely monitor the developments in other countries. Rest of the analysis is carried on with the second generation panel data method which is regarding cross-sectional dependence.

5.6. Panel Unit Root Test

Stationarity of the series is investigated by Hadri and Kuruzomi (2012) panel unit root test. This test, taking the cross-sectional dependence into account, includes the unit root of common factors that forms the series while allowing common factors exist. Furthermore, it allows autocorrelation in data and eliminates it by AR(p) process based on Seemingly Unrelated Regression (SUR) procedure of SPC method developed by Sul, Phillips and Choi (2005) or by AR(p+1) process, in which 1 is added to lag length, of Lag Augmented (LA) method based on Choi (1993) and Toda and Yamamoto (1995). In a series whose data generating process is like following:

$$y_{it} = z_i' \delta_i + f_t' \gamma_i + e_{it} \quad (24)$$

f_t show common factors. e_{it} has got an $AR(1)$ process and can be written in following way.

$$e_{it} = \phi_1 e_{it-1} + u_{it} \quad (25)$$

In SPC method, y_{it} is assuming as it is $AR(p)$ and modified as it is in following equation:

$$y_{it} = z_i' \delta_i + \hat{\phi}_{i1} y_{it-1} + \dots + \hat{\phi}_{ip} y_{it-p} + \hat{\zeta}_{i0} \bar{y}_t + \dots + \hat{\zeta}_{ip} \bar{y}_{t-p} + \hat{u}_{it} \quad (26)$$

Long term variation of the estimated equation is;

$$\hat{\sigma}_{u_i}^2 = \frac{1}{T} \sum_{t=1}^T \hat{u}_{it}^2 \quad (27)$$

Variation of SPC is calculated by using this variation;

$$\begin{aligned} \hat{\sigma}_{u_i|SPC}^2 \\ = \frac{\hat{\sigma}_{u_i}^2}{(1 - \hat{\phi}_i)^2} \end{aligned} \quad (28)$$

Employing this, Z_A^{SPC} test statistics is obtained as follows;

$$\begin{aligned} Z_A^{SPC} \\ = \frac{1}{\hat{\sigma}_{u_i|SPC}^2 T^2} \sum_{t=1}^T (S_{it}^w)^2 \end{aligned} \quad (29)$$

In LM method, series in equation (18) is written as $AR(\rho+1)$ process.

$$\begin{aligned} y_{it} = \\ x_t' \hat{\delta}_i + \tilde{\phi}_{i1} y_{it-1} + \dots + \tilde{\phi}_{ip+1} y_{it-p-1} + \tilde{\zeta}_{i0} \bar{y}_t + \dots + \tilde{\zeta}_{ip+1} \bar{y}_{t-p-1} + \\ \tilde{u}_{it} \end{aligned} \quad (30)$$

Long run variation of the estimation is;

$$\begin{aligned} \tilde{\sigma}_{u_i}^2 \\ = \frac{1}{T} \sum_{t=1}^T \tilde{u}_{it}^2 \end{aligned} \quad (31)$$

Variance of LA is computed by using $\tilde{\sigma}_{u_i}^2$;

$$\begin{aligned} \hat{\sigma}_{u_i|LA}^2 = \\ \frac{\hat{\sigma}_{u_i}^2}{(1 - \tilde{\phi}_{i1} - \dots - \tilde{\phi}_{ip})^2} \end{aligned} \quad (32)$$

Then, Z_A^{SPC} test statistics is obtained in following form;

$$\begin{aligned} Z_A^{LA} \\ = \frac{1}{\hat{\sigma}_{u_i|LA}^2 T^2} \sum_{t=1}^T (S_{it}^w)^2 \end{aligned} \quad (33)$$

Hypothesis of this test is:

$$H_0: \phi_i(1) \neq 0 \text{ for all } i, \quad \text{no unit root}$$

$$H_1: \phi_i(1) = 0 \text{ for some } i, \text{ has a unit root}$$

In this study, Hadri and Kuruzomi (2012) panel unit root test is conducted and the results are presented in Table 4.

Table 4: Results of Hadri and Kuruzomi (2012) Panel Unit Root Test

Variables	Level		First Difference	
y	4.07 (0.00)	5.90 (0.00)	-1.23*** (0.89)	-1.82*** (0.96)
HC	136.32 (0.00)	84.06 (0.00)	-2.51*** (0.99)	-2.48*** (0.99)
LE	10.09 (0.00)	124.47 (0.00)	1.31*** (0.90)	20.91*** (0.40)
HE	6.14 (0.00)	9.62 (0.00)	-0.15*** (0.56)	-0.55*** (0.71)
EE	150.73 (0.00)	631.00 (0.00)	0.59*** (0.27)	0.09*** (0.46)
k	17.20 (0.00)	108.05 (0.00)	-0.05*** (0.52)	-1.09*** (0.86)

Note: *** implies Stationarity at %1 significance level. Trend and intercept model was used in testing level value of series and intercept model was used in testing differenced value of series. Numbers in parenthesis are probabilities.

According to Table 4, all series are stationary when differenced and not stationary in level values, that is all series are I(1). By this result, it can be said that economic growth, human capital and capital stock in included countries are not stable and show substantial fluctuations. Therefore, in order for these countries to have a stable economic growth, human and physical capital investments has to be stable.

5.7. Panel Cointegration Test

In this study, existence of cointegration relationship within series is investigated by Durbin-Hausman panel cointegration test developed by Westerlund (2008). Main advantages of this method are inclusion of cross-section dependency and common factors. Westerlund (2008) studied on Fisher equation in developing process of the test:

$$\begin{aligned} i_{it} \\ &= \alpha_i + \beta_i \pi_{it} \\ &+ z_{it} \end{aligned} \quad (34)$$

Here,

$$\begin{aligned} \pi_{it} \\ &= \delta_i \pi_{it-1} \\ &+ w_{it} \end{aligned} \quad (35)$$

$$\begin{aligned} z_{it} \\ &= \lambda_i' F_t \\ &+ e_{it} \end{aligned} \quad (36)$$

$$\begin{aligned} F_{jt} \\ &= \rho_j F_{jt-1} \\ &+ u_{jt} \end{aligned} \quad (37)$$

$$\begin{aligned} e_{it} \\ &= \phi_i e_{it-1} \\ &+ v_{it} \end{aligned} \quad (38)$$

Westerlund (2008) developed two different test statistics; Durbin-Hausman group statistics for heterogeneous panel and Durbin-Hausman panel statistics for homogeneous panel. Country-specific intercept and trend variables are used in order to compute Durbin-Hausman group statistics DH_g . On the other hand,

Durbin-Hausman panel statistics is proposed under homogeneity in panel assumption. Computing the test statistics (DH_p), common intercept and trend variables are used.

$$\begin{aligned}
 DH_g &= \sum_{i=1}^n \hat{S}_i (\tilde{\phi}_i - \hat{\phi}_i)^2 \sum_{t=2}^T \hat{e}_{it-1}^2 \\
 &= \sum_{i=1}^n \hat{S}_i (\tilde{\phi}_i - \hat{\phi}_i)^2 \sum_{t=2}^T \hat{e}_{it-1}^2
 \end{aligned} \tag{39}$$

$$\begin{aligned}
 DH_p &= \sum_{i=1}^n \hat{S}_i (\tilde{\phi}_i - \hat{\phi}_i)^2 \sum_{t=2}^T \sum_{t=2}^T \hat{e}_{it-1}^2 \\
 &= \sum_{i=1}^n \hat{S}_i (\tilde{\phi}_i - \hat{\phi}_i)^2 \sum_{t=2}^T \sum_{t=2}^T \hat{e}_{it-1}^2
 \end{aligned} \tag{40}$$

Here,

$$\begin{aligned}
 \hat{S}_i &= \frac{\hat{\omega}_i^2}{\hat{\sigma}_i^4} \\
 &= \frac{\hat{\omega}_i^2}{\hat{\sigma}_i^4}
 \end{aligned} \tag{41}$$

and,

$$\begin{aligned}
 \hat{\omega}_i^2 &= \frac{1}{T-1} \sum_{j=-M_i}^{M_i} (1 - \frac{j}{M_i+1}) \sum_{t=j+1}^T \hat{v}_{it} \hat{v}_{it-j} \\
 &= \frac{1}{T-1} \sum_{j=-M_i}^{M_i} (1 - \frac{j}{M_i+1}) \sum_{t=j+1}^T \hat{v}_{it} \hat{v}_{it-j}
 \end{aligned} \tag{42}$$

where $\hat{v}_{it}$ is the OLS residual, M_i is a bandwidth and $\hat{\sigma}_i^2$ is variance. Hypothesis of Durbin-Hausman group statistics are;

$H_0: \phi_i = 1$ for all i , no cointegration for any cross – section.

$H_1: \phi_i < 1$ for some i , cointegration for some cross – sections.

Hypothesis of Durbin-Hausman panel statistics are;

$H_0: \phi_i = 1$ for all i , no cointegration for all cross – sections.

$H_1: \phi_i = \phi < 1$ for all i , cointegration for all cross – sections.

DH_g and DH_p test statistics have got standard normal distribution.

In this study, Westerlund (2008) Durbin-Hausman panel cointegration test is separately conducted for four models which are represented in Equation (14-17) and the results are given in Table 5.

Table 5: Results of Westerlund (2008) Durbin-Hausman Panel Cointegration Test

	<i>DH_g</i> Test Statistic	<i>DH_p</i> Test Statistic
Model 1	3.41*** (0.00)	4.92*** (0.00)
Model 2	5.31*** (0.00)	2.00** (0.02)
Model 3	2.89*** (0.002)	-1.23 (0.89)
Model 4	3.30*** (0.00)	0.22 (0.41)

Note: ** and *** implies existence of cointegration in model at 5% and 1% respectively. Probability values in parentheses.

According to Table 5; cointegration relationship exists in all countries in Model 1 and Model 2, while in some countries in Model 3 and Model 4. These results reveal that national income per capita (economic growth) is moving together with human capital and fixed capital stock variables in the long run. That is, economic growth is affected by human capital and fixed capital stock. To calculate the magnitude this effect, cointegration coefficients were estimated.

5.8. Estimation of Cointegration Coefficients

Cointegration coefficients are estimated by employing Breitung (2005) Two Step Least Squares (TSLS) method. This method, which is used to estimate cointegration coefficients, is a VAR-based method which generates more effective results than Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) when the time dimension is short (Breitung, 2005). In this study, cointegration coefficients are estimated using TSLS method and results are presented in Table 6.

Table 6: Estimated Cointegration Coefficients

Dependent Variable (y)	HC	LE	HE	EE	k
Model 1	3.066***				
[7.231]	-	-	-	1.07*** [14.147]	
Model 2	-	8.186*** [18.719]	-	-	0.62*** [9.106]
Model 3	-	-	0.541*** [31.402]	-	0.58*** [14.666]
Model 4	-	-	-	0.307*** [25.752]	0.548*** [11.214]

Note: Values in brackets are *t* statistics. *** implies that the parameter is confident at 1% significance level.

All coefficients in Table 6 are statistically significant. That is, the selected variables are the true determinants of economic growth. In Model 1, a 1% rise in human capital and capital stock per capita increase national income per capita by 3.066% and 1.07% respectively. In Model 2, national income per capita increases 8.186% and 0.62% in response to 1% increase in average life expectancy and capital stock per capita, respectively. According to Model 3, per capita national income improves 0.541% and 0.58% as a result of 1% increase respectively in health expenditure and capital per capita. Finally, results of Model 4 show that 1% increase in education expenditure per capita and capital stock per capita increase the national income per capita by 0.307% and 0.548%, respectively. As a general result, the most influential variable on per capita national income is the average life expectancy and this is because of the fact that included countries' production is labor intensive.

Conclusions and Policy Implications

In this study, the relationship between human capital and economic growth was investigated for 10 countries which gained independency after the collapse of USSR for 1995-2014 period by second generation panel data analysis method. Cross-section dependence among these countries was tested by means of Breusch-Pagan (1980) LM test, Pesaran (2004) scaled LM test, Baltagi, Feng, and Kao (2012) bias-corrected scaled LM test and Pesaran (2004) CD methods. The result is the existence of cross-section dependency among countries. That is, an economic or social shock arising in a country can affect the others. Therefore, in order to determine the policies in one country, policymakers have to closely monitor the developments in other countries included in panel.

Stationarity of the series was investigated by Hadri and Kuruzomi (2012) panel unit root test and it is found that all series are stationary when first differenced and not stationary in level values. By this result, it can be said that economic growth, human capital and capital stock in included countries are not stable and show substantial fluctuations. Therefore, in order for these countries to have a stable economic growth, human and physical capital investments has to be stable.

Cointegration relations within series in four different models are analyzed by Westerlund (2008) Durbin-Hausman panel cointegration test and the series were found to be cointegrated. These results reveal that national income per capita (economic growth) is moving together with human capital and fixed capital stock variables in the long run. Furthermore, human capital and fixed capital stock affect economic growth.

Cointegration coefficients were estimated by Breitung (2005) Two Step Least Squares method. The results indicate that 1% increase in human capital, average life expectancy, health expenditure per capita and education expenditure per capita improves per capita national income by 3.066, 8.186, 0.541 and 0.307 percent, respectively. Moreover, 1% increase in capital stock per capita affects national income per capita between 0.548% and 1.07% with respect to other independent variable in the models. As a general result, the variable having the most influence on per capita national income is the average life expectancy and this is because of the fact that included countries' production is labor intensive.

Interpreting the outcomes of this study, it can be said that in order for the countries which gained their independence after the collapse of the USSR to have a stable and greater economic growth, these countries should better off their human capital and improve their capital stock per capita. To better off human capital, policies towards increasing average schooling year, average life expectancy, health and education expenditure per capita will be useful and effective. If national circumstances are not sufficient to increase capital stock per capita, foreign direct investment will be a good solution. Therefore, these countries should incentivize international firms to invest in their country. On the other hand, international firms consider not only the incentives, but also the politic and economic conjuncture of the countries'. Politically and economically stable countries will attract more foreign direct investment. Furthermore, improved capital stock may help transforming into a capital intensive country from a labor intensive one; a process that may bring foreign trade competitive power and more economic growth.

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GOVERNANCE, TRANSPARENCY AND ACCOUNTABILITY AT LOCAL GOVERNMENT LEVEL: BUDGET TRANSPARENCY OF MACEDONIAN MUNICIPALITIES

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Abstract

The transparency strengthens the credibility of the government policies and improves fiscal discipline while at the same time enabling a platform for citizens' satisfaction for the public services it provides, for participation of the citizens in the process of preparation of the public policies and an ultimately increased willingness to pay (more) for the public services. In essence, an effective local governments' transparency is necessary for accountability and these are not an end in itself, but means to support effective and inclusive decision-making in the budgeting (national and local). The bottom-up participatory structures for enhancement of the local government transparency and accountability need to be enwoven in both the legal, political, and administrative tools for active involvement of the civic sector for participation. The legal and budgetary mechanism that enable contribution from the local communities/citizens are especially important for certain local government decisions in order to increase the accessibility to the general public i.e. the citizens at large.

Furthermore, higher budget transparency enables informed public discussion and consensus on the government's priorities, policies and programs while having a positive influence on the corrosive effect of corruption and inadequate accountability at the all government levels. Therefore, local governments' transparency and accountability should not be viewed independently, but as a crucial part of the overall good governance and public management.

This objective of this paper is to analyze the transparency of the local self-government units' budgets and availability of the "main" budget process documents, their accessibility in order to determine whether there has been an improvement between fiscal 2014-2015 and fiscal 2016-2017.¹

1) Monitoring period for the fiscal 2016-2017 information covers the availability of the budget documents which are considered for the period up until 14/2/2017. Any documents published or procured after this date breaching the deadline of the Public information act or other documents that are produced afterwards were not considered as available.

1. Introduction

The transparency strengthens the credibility of the government policies and improves fiscal discipline while at the same time enabling a platform for citizens' satisfaction for the public services it provides, for participation of the citizens in the process of preparation of the public policies and an ultimately increased willingness to pay (more) for the public services. In essence, an effective local governments' transparency is necessary for accountability and these are not an end in itself, but means to support effective and inclusive decision-making in the budgeting (national and local). The bottom-up participatory structures for enhancement of the local government transparency and accountability need to be enwoven in both the legal, political, and administrative tools for active involvement of the civic sector for participation. The legal and budgetary mechanism that enable contribution from the local communities/citizens are especially important for certain local government decisions in order to increase the accessibility to the general public-citizens at large.

Furthermore, higher fiscal transparency enables informed public discussion and consensus on the government's priorities and policies while having a positive influence on the corrosive effect of corruption and inadequate accountability at the all government levels. Therefore, local governments' transparency and accountability should not be viewed independently, but as a crucial part of the overall good governance and public resource management.

Fiscal transparency can serve as an early warning for potential fiscal risks through proper reaction when economic assumptions are changed. And more, fiscal transparency provides accountability toward citizens-taxpayers and can improve creditworthiness of the country toward international capital market.²

Studies published in the past predominantly focus on the national level budget process transparency, while to a smaller extend on the local level government transparency and accountability. Thus there is a gap in the research in this area, where our paper attempts to provide a contribution. This paper examines the degree of transparency of the local level budget documents in the eighty one local government units in R. Macedonia including the City of Skopje as separate local government unit.

The objective of this paper is to determine the transparency of the local self-government units' budgets through the availability of the main budget process documents and to determine whether there has been an improvement between fiscal 2014-2015 and fiscal 2016-2017.³

Budget transparency is defined as "a full disclosure of all relevant fiscal information in a timely and systematic manner."⁴ (OECD, 2003). Therefore, a budget transparency implies that the information in regards to the budget are publicly accessible and are wholesome, relevant, correct, produced and issued timely and presented in understandable manner.

Considering that there are no legally binding obligation for the LSGUs to publish the budget and budget execution documents on the official websites of the LSGUs, however solely within the Official Gazette (which is not electronically published among all LSGUs) there will not be an assessment of the compliance with the legal disclosure. The paper is structured as follows: review of the literatures and theories on budget transparency, next the methodology is elaborated, following the results of the budget transparency measuring are presented and finally the conclusions and recommendations are drawn.

2) Budget process in Macedonia: Recent developments and challenges, Nikolov, Marjan, Center for Economic Analyses, 2009, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1443394

3) Monitoring period for the fiscal 2016-2017 information covers the availability of the budget documents which are considered for the period up until 14/2/2017. Any documents published or procured after this date breaching the deadline of the Public information act or other documents that are produced afterwards were not considered as available.

Literature review

The theoretical model presented in this work is related to the following literature. There are three types of theories that explain the financial accountability. In this study we call upon the two theories (Principal-Agent and Stewardship theory) which give a brief description. In the past, financial accountability researchers have relied on Agency and Stewardship theories explaining the phenomena that may hinder the exchange of financial information in the accountability and transparency processes. Macedonian public sector like other countries with lower level of economic development has accountability mechanism based on an Agency model.

Accountability mechanism following the assumptions of principal – agent theory focus on monitoring procedures in order to reduce information asymmetry. This can enhance the disclosure of information but may result in an information overload problem on the part of the accountors and the accountees (Greiling & Spraul, 2010).⁵ Agency theory describes the strategic interactions between two parties, called the principal and the agent (Halachmi, 2004).⁶ The agent acts on behalf of the principal; with the assumptions that the actors are utility maximizers driven by self-interest who act in situations of bounded rationality and normally differ in their aversion to risk. Principal-agent theory is concerned with the problem of the conflict of goals between the principal and the agent and the difficulty or the inability of the principal to verify what the agent is doing (Eisenhardt, 1989).⁷

The relationship between the actor (accountor) and the forum (accountee) is often interpreted as one between agent and principal (Bovens, 2007b),⁸ this is not only true for economics but also for political science (Greiling & Spraul, 2010).⁹ The theory assumes that the principal's access to information is limited, and that the principal cannot perfectly and without costs monitor the agent's actions (Jacobides & Croson, 2001).¹⁰

On the other hand, transparency is a multifaceted concept that is often conflated with accountability or even corruption, impartiality and rule of law. Hood's analysis illustrates the tendency for transparency to bleed conceptually into other equally compelling normative standards such as rule of law, accountability, public participation, and deliberative democracy. (Hood 2006, 14).¹¹ Moreover, Bellver & Kaufman give a definition of transparency which includes not only making information available and accessible to stakeholders, but also laws and regulations are administered and implemented in an impartial and predictable manner.¹² Principal-

4) OECD Best Practices for Budget Transparency, 2003

<https://www.oecd.org/gov/budgeting/Best%20Practices%20Budget%20Transparency%20-%20complete%20with%20cover%20page.pdf>

5) Greiling, D., & Spraul K. (2010). Accountability and the challenges of information disclosure. *Public Administration Quarterly*, 338-377

6) Halachmi, A. (2004.) Performance measurement, accountability, and improved performance. *Public Performance and Management Review*, 25(4), 370-374.

7) Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *The Academy of Management Review*, 14(1), 57-74.

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10) Jacobides, M., & Croson, D. C. (2001). Information policy and shaping the value of agency relationships. *Academy of Management Review*, 36(2), 202-223.

11) Hood, Christopher (2006) Transparency in historical perspective In: Hood, Christopher and Heald, David, (eds.) *Transparency: the Key to Better Governance?*. Proceedings of the British Academy (135). Oxford University Press, Oxford, UK, 3-23. ISBN 9780197263839

12) Bellver, Ana, and Daniel Kaufmann. 2005. *Transparenting Transparency: Initial Empirics and Policy Applications*. World Bank Policy Research Working Paper.

agent theory is concerned with the problem of the conflict of goals between the principal and the agent and the difficulty or the inability of the principal to verify what the agent is doing (Eisenhardt, 1989).¹³ The main tenets of agency theory focus on information asymmetry,¹⁴ pre-contractual opportunism¹⁵ and moral hazard or post-contractual¹⁶ (Van Slyke 2006).¹⁷

Stewardship theory serves as an alternative to the reasoning of principal-agent theory (Donaldson and Davis 1997, 27).¹⁸ In other words, this theory has been developed as an explicit counterpart to principal-agent theory. Stewardship theory stems from organizational psychology and organizational sociology. (Donaldson & Davis 1991, 51).¹⁹ Instead of shirking away, managers or accountors aim to do a good job and to generate value – not only for themselves but for their organization as a whole. Stewardship behavior can be interpreted as rational behavior: The steward identifies cooperative behavior as being more useful than self-serving behavior. (Davis, Schoorman & Donaldson 1997, 24).²⁰

However, this theory fails to consider the lack of trust within government agencies, the risk-averse dispositions of public managers and the lack of incentives for public officers; the deeply politicized environment and scrutiny for oversight and accountability create pressures for not developing trusting relationships because of external perceptions of corruption (Van Slyke, 2006).²¹ Cribb and Slyke state that steward theory has not been tested particularly in voluntary sector research and public sector.²² Furthermore, it fails to provide any empirical evidence for accountability in the public sector (Greiling and Spraul 2010).²³

As much of the policy literature today focuses on the role of transparency in reducing corruption, we find it compelling to explore what aspects more precisely might be necessary in order for transparency to enhance accountability and contribute to bringing about good government.

Transparency is sometimes more narrowly as “the release of information which is relevant for evaluating institutions” (Bauhr & Nasiritousi forthcoming).²⁴ Using a terminology derived from the principal agent framework, Lindstedt and Naurin make a distinction between agent controlled and non-agent controlled transparency. The release of government information by governments can be seen as a typical instance of agent

13) Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *The Academy of Management Review*, 14(1), 57-74.

14) The information asymmetry sometimes referred to as information failure, that present whenever one party to an economic transaction possesses greater material knowledge than the other party. In other words, one party has information to other group that does not possess.

15) Precontractual opportunism occurs which a party to a contract can exploit hidden information.

16) Moral hazard occurs when a party to the contract uses information and expertise and act in its own self-interest, to the exclusion of the agreed upon goals).

17) Van Slyke, D. M. (2006). Agents or Stewards: Using theory to understand the government-nonprofit social service contracting relationship. *Journal of Public Administration Research and Theory*, 17, 157-187.

18) Donaldson, L., & Davis, J. H. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management*, 16(1), 49-64.

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21) Van Slyke, D. M. (2006). Agents or Stewards: Using theory to understand the government-nonprofit social service contracting relationship. *Journal of Public Administration Research and Theory*, 17, 157-187.

22) Ibid

23) Greiling, D., & Spraul K. (2010). Accountability and the challenges of information disclosure. *Public Administration Quarterly*, 338-377

26 24) Bauhr, Monika and Nagmeh Nasiritousi. Forthcoming. Resisting Transparency. *Global Environmental Politics*

controlled transparency, while the use of that information by external actors, such as the media, NGO or citizens is non-agent controlled.²⁵

Transparency and accountability, as two basic principles of good governance, are crucial in providing information and insight to the public on how public money is collected, allocated and spent. Additionally, transparency and accountability are necessary to show the determination and the intention of the public institutions, as well as to inform and share this information with the public (Trenovski Borche, 2014, 6). Trenovski states that no institutions in Macedonia has taken extra effort to introduce and inform the citizens about their budget in a visually simplified manner (preparation of Citizen's budget).²⁶

Similarly, Popovikj and Misev describe transparency as one of the eight principles of good governance that it is openness and visibility of actions, measures, costs and effects of an activity.²⁷ The Organization of United Nations ESCAP indicates that transparency means that decisions are made and implemented legally and regularly and understood that sufficient information is available and that they are available in an easily understandable forms and mediums.²⁸ This definition shows that it is not enough one information to be reported, but also the citizens to be able to find it easily and understandable.

Research principle/methodology

Considering that the budget transparency refers also to the degree and simplicity with which the citizens can access the budget information and provide view on the planned/executed (central, local) government's revenues, allocations, and expenditures, not only the availability but also the easiness of the access to the documents and their timeliness is also relevant and considered within the paper. The budget documents are key documents since they outline the priorities of the local policies and the local programs. A transparent and open process leads to democratization and inclusiveness of the citizens in the policy creation and the public resource distribution.

Since the budgets are technical and not readily understandable for the wide public, an open process refers to information that are comprehensive, full but also simplified, understandable and provided in timely manner, which is easily accessible to the wide public.

The methodology used in the scoring of the level of availability and transparency of the LSGU budget process in the municipalities in Macedonia, covers scoring of the budget transparency both based on the level and manner (source) of availability of the basic budget and budgeting process documents. For the purposes of this paper, local government budget transparency is measured by the number of key budget documents published and the medium/source where these are published by the local units, as a level of transparency being scored on a scale from 0 to 16 index score points.



The key documents considered in the research and the availability monitored are the following eight documents: *Budget proposal*, *Enacted budget*, *In-Year quarterly budget execution reports*, *Year-end budget execution report*, *Annual report*, *Citizens budget*, *Audit report (by SAO)*²⁹ and the *Statute of the LSGU*. These documents are considered as available and scored if the following criteria are met:

25) Lindstedt, Catharina, and Daniel Naurin. 2010. Transparency is not enough: Making Transparency Effective in Reducing Corruption, *International Political Science Review*, 31: 301-322.

26) Trenovski, B. (2014). Improvement of the transparency and accountability through a performance based budget. Monitoring report on the transparency and accountability of the budget users, 6-7. http://cea.org.mk/documents/cea_idscs_izvestaj%20od%20monitoring_eng.pdf

27) Popovikj, M & Misev, V. (2014). Budget transparency and accountability in Macedonia. Public Policy Paper, 5-7. http://cea.org.mk/documents/CEA_IDSCS_Transparency_paper_MK.pdf

28) United Nations Economic and Social Commission for Asia and the Pacific What is Good Governance? <http://www.unescap.org/sites/default/files/good-governance.pdf>

29) SAO – State Audit Office of R. Macedonia

- *Budget proposal* – considered if a document with this title has been published on the local unit's website separately, as part of the municipal Official Gazette or has been procured through the usage of the Freedom of Information Act.³⁰ If not, the document is not considered to be published. If the budget proposal is not published/available and the reply by the LSGU is that it is the same as the enacted budget this is not considered as available document.
- *Enacted budget* - considered if a document with this title (or Budget) has been published on the local unit's website separately, as part of the municipal Official Gazette or has been procured through the usage of the Freedom of Information Act. If not, the document is not considered to be published.
- *In-Year quarterly budget execution reports* - considered if all quarterly documents with this title (for the concerning period)³¹ have been published on the local unit's website separately, as part of the municipal Official Gazette or has been procured through the usage of the Freedom of Information Act. If not, the document is not considered to be published. If only a conclusion for adoption (by the Municipal Council) has been published or provided the documents are not considered as available.
- *Year-end budget execution report* – considered if a document with this title (or title Final Account) has been published on the local unit's website separately, as part of the Official Gazette or has been procured through the Freedom of Information Act. If not, the document is not considered to be published.
- *Annual report* – considered if a document with this title has been published on the local unit's website separately, as part of the Official Gazette or has been procured through the Freedom of Information Act. If not, the document is not considered to be published. If the annual report is not prepared/published/available and the reply by the LSGU is that it is the same as the Year-end budget execution report this is not considered as available document.
- *Citizens' budget* – considered if any kind of simplified document intended for citizens has been published on the local unit's website, following the principles of citizens' budget as considered by OBI³² for central budgets was considered.
- *Audit report by SAO* – considered if any audit report in the last five years have been conducted and published on the web site of the LSGU. The availability of the Audit report only on the website of SAO is not considered as available document on the website of the municipality, therefore only if any Audit report is published on the website of the LSGUs was scored.
- *Statute of the LSGU* – the Statute is the basic constitution document of the LSGUs and defines openness, participatory level and related issues thus we consider that this is a crucial document for the transparency of the local government.

The easiness of the availability by the citizens' considers the source of availability namely whether it is: *in a designated area on the official website (2 points for each document), within the Official Gazette on the official web site (1 point for each document), requested under the Freedom of Information Act (1 point for each document), No information/no reply/does not exist/SAO has not produced an audit report within the last 5 years (0 points for each document specifically).*

30) Freedom of Information Act, official name Law on free access to public information, Official Gazette of RM (13/2006, 86/2008, 6/10, 42/14, 148/15, 55/16)

31) During the moitong period for fiscal 2016-2017, the availability of the quarterly budget execution reports for the Q1, Q2, and Q3 for the fiscal 2016 are considered if separately published (not cumulative).

32) Guide to transparency in Government Budegt Reports, Why are Budegt Reports Important and What should they include, OBI, <http://www.internationalbudget.org/wp-content/uploads/Guide-to-Transparency-in-Government-Budget-Reports-Why-are-Budget-Reports-Important-and-What-Should-They-Include-English.pdf>
http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1193949504055/4348035-1352736698664/Guidance_Note_Citizen_Budget.pdf

With a potential maximum of 16 index points if all eight monitored documents are available through the “most easily and fastest” accessible manner i.e. through the official website of the LSGU on a specifically designated area for budget and/or local government budget process.

Furthermore, a comparison of whether there is an upgrading, downgrading or status quo of the index has been completed through a comparison between the period of fiscal 2014-2015³³ and fiscal 2016-2017. Depending on the period of publishing of the documents there are two comparison periods providing information and conclusion of whether there are any improvement of the availability of the documents among all eighty LSGUs in Macedonia.

The paper found that there is a considerable scope for improvement of the transparency of the local government budget process, while at the same time there are barriers that weaken the relationship and communication between local governments and the citizens. A very limited number of the local governments in Macedonia, timely and comprehensively publish and disclose the full array of budget related documents. The problem of limited transparency and accountability at a local level are interconnected to the absence or weak participatory decision-making in the budgeting process, weak mechanisms for monitoring and evaluation, low level of human capital, which are at the same time constraints of the local government affecting the quality of the services provided to the citizens.

Citizen participation as a concept that involves the civil society into government decision-making process is an essential component of a healthy democratic society. In Macedonia, not all municipalities convened budget forums where the society can express their needs and priorities of the community where the benefit is mutual. Moreover, not all municipalities also respect the Public Information Act and their awareness of obligatory procuring the requested informations is at low level.

Legally required budget disclosure for the local governments

The Constitution of Republic of Macedonia defines the level of self-governance as a right, and the unit for self-government - the municipality (Article 114). According to the Law on Territorial Organization (55/2004, 12/05, 98/08, 149/14), there are 80 Municipalities (NTES³⁴ level 4) and the City of Skopje (NTES level 5, with covers 10 of these municipalities). The requirements for disclosure of the budget related documents regarding local government budget are specified in the budget legislation and the freedom of information legislation.

The Law on budgets (clean text),³⁵ Official Gazette of RM (no. 64/05, 04/08, 103/08, 156/09, 95/10, 180/11 171/12 192/15, and 167/16) considers budget transparency where article 53³⁶ and 54 respectively state, “*The budget execution report of the municipalities shall be done in accordance with the law*” and “*(2) The municipal budget and its final account shall be published in the Official Gazette of the municipality*”. The Law on local self-governance (Official Gazette of RM (no.5/02) defines the obligations for informing the citizens through ways determined in the Statute “*The organs of the municipality, the council committees, and public agencies established by the municipality shall be obliged to inform the citizens about their work, as well as about the plans and programs which are of importance for the development of the municipality without any compensation, in a way determined by the statute. (2) The municipality shall be obliged to enable access to the basic information about the services that it provides to its citizens, in a way and under conditions determined by the statute of the municipality.*”³⁷

33) The City of Skopje is not monitored in the first round, thus there is no index comparison between the two points in time

34) Nomenclature of Territorial Units - NTES is based on the territorial organization of the local self-government in the Republic of Macedonia and it is harmonized with the classification of the European Union - Nomenclature of Territorial Units for Statistics – NUTS, established by Regulation (EC) No 1059/2003

35) http://www.finance.gov.mk/files/u249/Budget_law_cleared_version_20042010_0.pdf

36) Chapter VII, Budget transparency, Article 53

37) The Law on local self-governance (Official Gazette of RM (no.5/02), Article 8

As well as the transparency of the council's work: "(2) the council sessions shall be public... (4) The presence of the public shall not be excluded at the debate on the municipal budget, annual balance sheet to the budget and the urban plans." ³⁸

While these legal acts deal only with the publicity of budget and year-end report within the Municipal Official Gazette there is no requirement for permanent availability of the key budget documents, neither for disclosure prior their approval, except for the presence on the council meetings. The Regulation does not require publicity of existing documents such as the budget plan or audit report. The legislation does not define disclosure of in-year or quarterly budget reports, but some of the local governments disclose them, mainly through the Municipal Gazette.

Information disclosure and accountability

This paper evaluates the budget transparency among the local self-government units in Macedonia through the degree and manner of availability and disclosure of the budget documents. The disclosure requirements specified in the legislation are limited, i.e. a limited number of budget documents are obligatory to be published and there is no information of whether the noncompliance has lead/leads to any sanctions. Analysis and comparison of the disclosure practice among the 81 LSGUs in Macedonia revealed that LSGUs most often (and most likely) comply with the requirements stipulated in the budgetary laws, however often fail to comply with the requirements of the freedom of information legislation. There is no continuance of practices of disclosure of the budget documents but rather "forced" if demanded or "remained", the decreasing overall level of transparency and the large upward or downward change in the transparency through the availability of the documents indicated that there is no continuous practices among the LSGUs. The reluctance, to disclose relevant information and deliberate information overload (Eppler & Mengis 2004, 326), are two distinct forms of the practice of withholding relevant information. This "leads" to the behavior of the local governments, when the officials believe that they provide precisely the right amount and quality of information and any further request treated as offence (Greiling, Spraul, 2010). When transparency is evaluated in this paper it records which documents or information is available, either free on the Internet (through the websites, Gazette on the website) or upon request (using the Public Information Act). ³⁹

The status of budget transparency through main budget availability in the Macedonia LSGUs

Figure 1 and Figure 2 indicate that not one of the municipalities produced and published all eight documents (as there is no score 16) on the web site of the LSGU in a specifically designated areas. None of the LSGUs has produced and published Citizens' budget.

Request for access to public information (RAPI) through the Public Information Act was sent to all 81 LSGUs for the budget documents that were not published on their web pages during monitoring the availability of budget documents on the official web pages of LSGUs.

The maximum number of documents produced and attainable by any single municipality is seven (in five instances). The maximum number of documents available (in any of the manners used for obtaining documents) is 7, only among five LSGUs: City of Skopje (two out of these seven are obtained only by RAPI⁴⁰ and not readily available of the website), Gjorce Petrov (2 out of seven obtained by RAPI, and 2 within Official Gazette), Bogdanci (7 obtained by RAPI, none published/disclosed on the website), Valandovo (6 out of seven obtained by RAPI), Ohrid (2 out of seven obtained by RAPI, and 1 within Official Gazette).

38) The Law on local self-governance (Official Gazette of RM (no.5/02), Article 42

39) Freedom of Information Act, official name Law on free access to public information, Official Gazette of RM (13/2006, 86/2008, 6/10, 42/14, 148/15, 55/16)

40) RAPI – Request for access to public information, through the Public Information Act

If we consider that the availability on the official websites as the easiest and fastest manner to be accessed, two municipalities can be separated as most transparent with availability of the six (out of seven)⁴¹ budget documents available on the LSGUs' websites in a designated location specific to the budget process, these are the Municipalities of Bitola and Demir Hisar. On the other hand, there are still municipalities that do not have official web pages and those that do not use the official Macedonian language on their web pages.

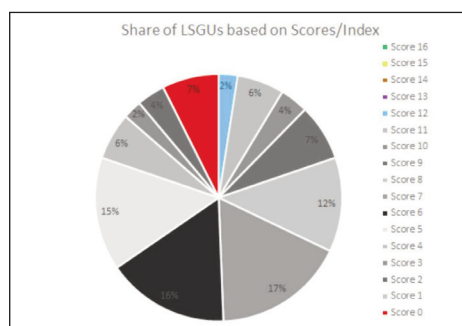
With the worst levels of budget transparency are scored the municipalities of Aracinovo, Saraj, Cair, Novo Selo Vrapciste and Negotino with zero score and no document available neither on the website, nor responded or provided the documents through RAPI. This accounts to over 7% of all LSGUs in the country.

In regards to the municipalities Zelenikovo, Karbinci, Demir Kapija only one of the monitored documents was obtainable and these were disclosed only through the websites i.e. in all three instances the *Year-end budget execution report* was available.⁴²

A good portion of the LSGUs do not have Official Gazette published on the website, which makes it rather impossible for the citizens to access the local budget documents.

Figure 1

Level of LSGU budget transparency, in % share



Documents most often published and document not produced or published at all

Voluntary disclosure of budget documents (or proactive transparency) among the LSGUs in Macedonia is scant. The budget document that is most easily accessed regardless of the method for attaining the document is the Year-end budget execution report, followed by the Statute of the LSGU, the Enacted budget and the In-year quarterly reports. Most often not disclosed are the Budget proposal, as a document that often is "the same" as the Enacted budget, the Annual report and the Audit reports (if) conducted by the State Audit office.

The Annual reports are either not compiled or often "confused" and associated with the Year-end budget execution report, thus the intent of being a "general purpose" report is associated with the detailed legal requirements and mainly delivered to internal stakeholders of the Year-end budget execution report. Moreover, most local governments do not use any alternative tools to communicate their results with substantial information which covers the degree of "realization" of the objective or performance linked with the financial effects on the budget. This raises the questions if any and how the LSGUs give account for their performance to their citizens.

The inability of the LSGUs to provide the information grows if these and their accessibility (web site, official gazette, RAPI) is to be presented in a manner that the general public understands it or is interested in it, which is the case of a preparation of a Citizen's Budget. None of the LSGUs prepared and published such a document.

41) Not including the Citizen's budget as a document

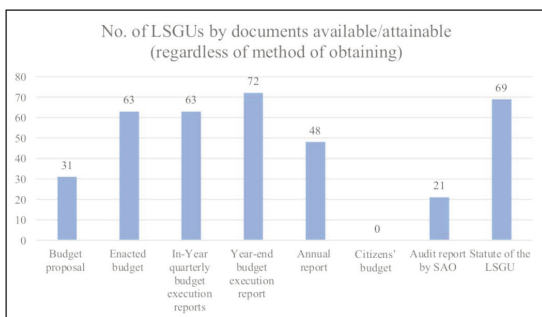
42) In all instances RAPI was requested for all monitored budget documents, there was not response on the RAPI. The Year-end budget execution report is for 2015 fiscal, as the Year-end budget execution report for 2016 were not due

Figure 2 Index of budget document availability by LSGU

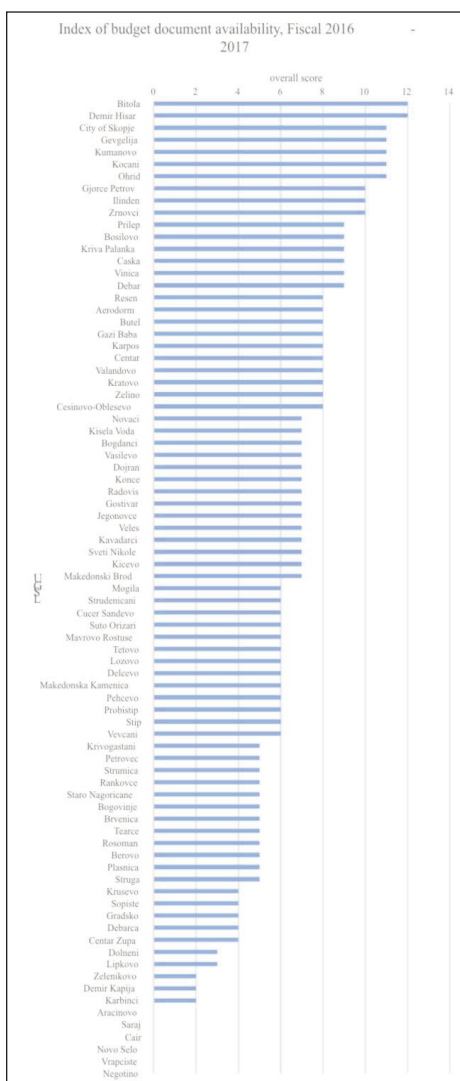
As Rubin states (Rubin, 2000, 9) *"Accountability does not happen by itself; budgets do not wade into crowds and draw around them circles of admiring readers. Budgets need to be interpreted and someone has to tell a good story to get the readers involved"*⁴³

Figure 3

Number of LSGUs with available /attainable budget documents, by document 2016-2017

**Budget transparency through document availability improved or declined?**

Most significant improvements compared with the previous period are the availability of the Year-end budget execution document, and the availability of the Audit reports, the availability of the budget documents has deteriorated, however most significant declining can be noticed for the budget documents, overall decreasing of the LSGUs budget document availability of Annual report, Enacted budget and Budget proposal.

**Factors correlated with budget transparency**

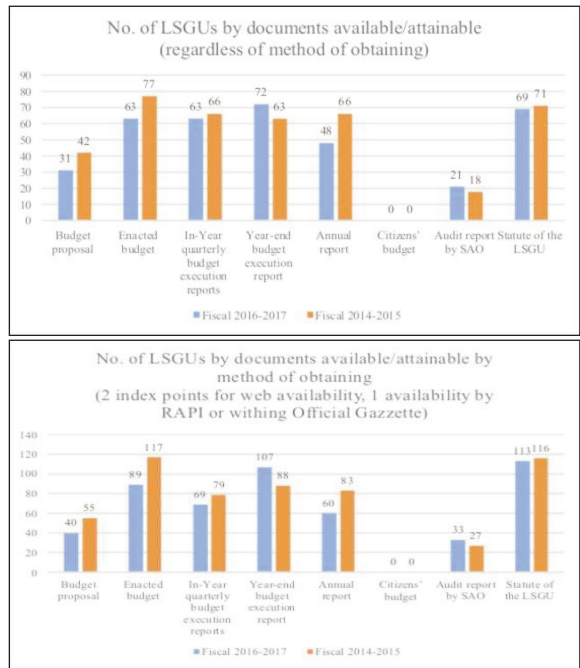
In the attempt to consider if the indexes of budget transparency are correlated with several factors it can be concluded that the availability and manner of availability of the budget associated documents on a local level government are positively associated: although to a limited degree with the size of the budget⁴⁴ (correlation 0.33), urban vs. rural municipalities (correlation 0.33), and the size of the LSGU (population) (correlation 0.28). The larger the LSGU both by population, and budget size in absolute value and an urban LSGU is more likely to be more transparent in terms of disclosing budget related information and documents.

43) Irene S. Rubin, (2010), Sixth Edition, The Politics of Public Budgeting: Getting and Spending, Borrowing and Balancing

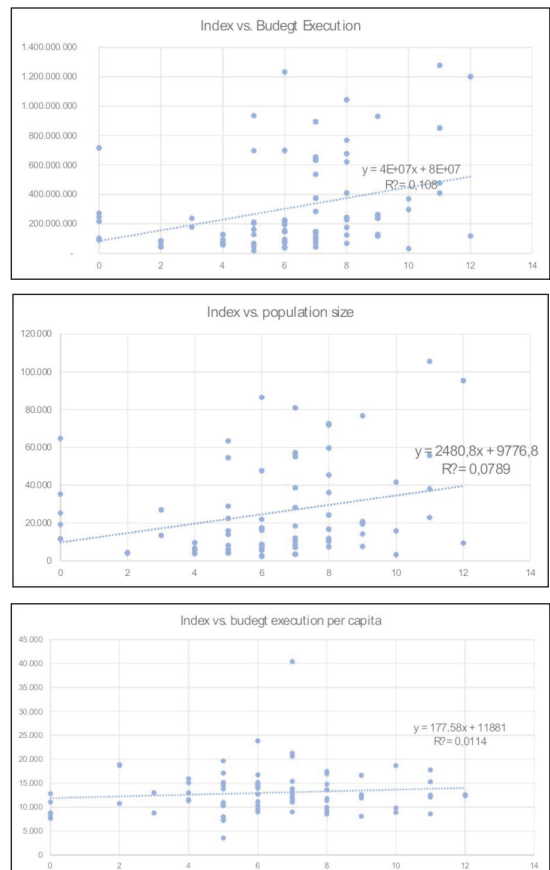
44) Executed budget, in absolute value in MKD for 2015

Figure 4

Number of LSGUs with available /attainable budget documents, by document, comparison 2014- 2015 & 2016-2017

**Figure 5**

Correlation of the transparency index and selected variables



CORRELATION	INDEX
BUDGET EXECUTION	0,3358
BUDGET EXECUTION PER CAPITA	0,1068
URBAN RURAL	0,3251
POPULATION SIZE	0,2832
HOUSEHOLD NUMBER	0,3027

Conclusions & recommendations

The above analysis indicates a relatively low level of budget transparency among the Macedonian local self-governance units. The most transparent as regards the overall average level of openness (in accordance with the above described methodology) is the Municipality of Bitola and Demir Hisar with a score of 12 (out of maximum 16), followed by City of Skopje, Gevgelija, Kumanovo, Kocani and Ohrid with scores of 11. The least open are the Aracinovo, Saraj, Chair, Novo Selo, Vrapcishte, Negotino with scores 0. The average number of published/attainable documents is four. Further more:

- As many as 7% of the municipalities did not publish/provide a single budget related document.
- 28% of the municipalities did not publish a single budget related document on the web site in a specifically designated area for budget documents.
- The number of municipalities that publish the draft budget (budget proposal) for next year on the web-site is small (11%) thereby depriving the possibility of interested citizens to participate in planning the budget of their municipality.
- None of the municipalities in Macedonia prepares and publishes Citizens' budget⁴⁵, suggesting that the current legislation no local government is not trying to make a greater incentive for participation of citizens in the budget of municipalities and monitoring of its implementation.
- 7% of the LSGUs publish their In-year quarterly budget execution reports in a separate location on their website while other (10%) municipalities publish them within the official gazette
- The current legislation leaves a possibility, but does not oblige the municipalities of full disclosure of information and documents related the budgeting process;

Regardless of the fact that without legal change and alteration of the fiscal decentralization process it is too optimistic to expect major improvement in the area of local budget transparency and accountability to be achieved, still there is a space for significant improvement in the area. In these circumstances the improvements are to be expected if:

- The lack of administrative and financial capacity needs is to be addressed
- Political awareness and willingness among the representatives (mayor and councils) is improved
- A demand driven trigger for increased budget transparency among the citizens and the media is achieved
- The legislation needs to put pressure for increased budget transparency
- The central government should apply pressure and create an example through own improvement
- Increased awareness and capacities among the citizens of the benefits of budget transparency

All of these with the aim of improving the local budget transparency as a stepping stone for towards increased accountability (towards the citizens), increased efficient and interest for revenue collection and public expenditure, and decreased corruption for the improved wellbeing of the citizens of the municipalities.

45) After the period that has been designated for monitoring of the availability the LSGU of Strumica and Center, prepared and published Citizens' Budget, never the less these have been prepared with external assistance – donor driven, pioniring the process of preparation of Citizens Budget on a local level in Macedonia

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Annex

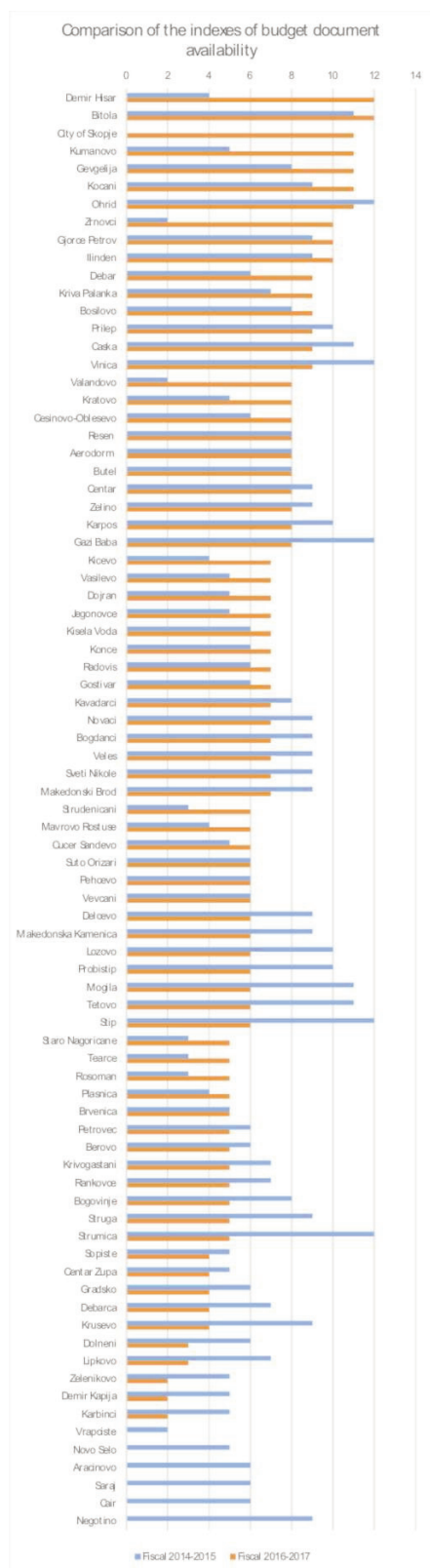
Measured Indexes and difference (+ Improvement, - Decline)

LSGU	Fiscal 2014-2015	Fiscal 2016-2017	Improvement +, Decline -
0 City of Skopje ⁴⁶	N/A ⁴⁷	11	N/A
1 Demir Hisar	4	12	8
2 Zrnovci	2	10	8
3 Valandovo	2	8	6
4 Kumanovo	5	11	6
5 Strudenicani	3	6	3
6 Gevgelija	8	11	3
7 Kratovo	5	8	3
8 Debar	6	9	3
9 Kicevo	4	7	3
10 Vasilevo	5	7	2
11 Dojran	5	7	2
12 Kriva Palanka	7	9	2
13 Staro Nagoricane	3	5	2
14 Jegonovce	5	7	2
15 Mavrovo Rostuse	4	6	2
16 Tearce	3	5	2
17 Rosoman	3	5	2
18 Kocani	9	11	2
19 Ceginovo-Oblesevo	6	8	2
20 Bitola	11	12	1
21 Gjorce Petrov	9	10	1
22 Ilinden	9	10	1
23 Kisela Voda	6	7	1
24 Cucer Sandevo	5	6	1
25 Bosilovo	8	9	1
26 Konce	6	7	1
27 Radovis	6	7	1
28 Gostivar	6	7	1
29 Plasnica	4	5	1
30 Resen	8	8	0
31 Aerodorm	8	8	0
32 Butel	8	8	0
33 Suto Orizari	6	6	0
34 Brvenica	5	5	0
35 Pehcevo	6	6	0
36 Vevcani	6	6	0
37 Prilep	10	9	-1
38 Petrovec	6	5	-1
39 Sopiste	5	4	-1

46) City of Skopje is the only LSGU - city, and incorporates eleven of the LSGUs listed (urban Skopje planning region LSGUs)

47) Not applicable as not monitored at the period, thus there is no possibility for comparison as well

40	Centar	9	8	-1
41	Zelino	9	8	-1
42	Kavadarci	8	7	-1
43	Berovo	6	5	-1
44	Ohrid	12	11	-1
45	Centar Zupa	5	4	-1
46	Krivogastani	7	5	-2
47	Novaci	9	7	-2
48	Karpos	10	8	-2
49	Bogdanci	9	7	-2
50	Rankovce	7	5	-2
51	Vrapciste	2	0	-2
52	Veles	9	7	-2
53	Gradsko	6	4	-2
54	Sveti Nikole	9	7	-2
55	Caska	11	9	-2
56	Makedonski Brod	9	7	-2
57	Dolneni	6	3	-3
58	Zelenikovo	5	2	-3
59	Bogovinje	8	5	-3
60	Demir Kapija	5	2	-3
61	Vinica	12	9	-3
62	Delcevo	9	6	-3
63	Karbinci	5	2	-3
64	Makedonska Kamenica	9	6	-3
65	Debarca	7	4	-3
66	Gazi Baba	12	8	-4
67	Lipkovo	7	3	-4
68	Lozovo	10	6	-4
69	Probistip	10	6	-4
70	Struga	9	5	-4
71	Krusevo	9	4	-5
72	Mogila	11	6	-5
73	Novo Selo	5	0	-5
74	Tetovo	11	6	-5
75	Aracinovo	6	0	-6
76	Saraj	6	0	-6
77	Cair	6	0	-6
78	Stip	12	6	-6
79	Strumica	12	5	-7
80	Negotino	9	0	-9



UDC: 658:001.895-047.44(497.7:497)

COMPARATIVE ANALYSIS OF INNOVATIVENESS OF THE BUSINESS SECTOR IN THE REPUBLIC OF MACEDONIA WITH THE SELECTED COUNTRIES IN THE REGION

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Abstract

In this paper, on the basis of the widely used methodology for measuring of innovations - Oslo Manuel, for the reference period 2012 – 2014, was made comparative analyses of the innovativeness of the business sectors in the Republic of Macedonia and other selected countries in the region such as Republic of Bulgaria, Republic of Serbia and Republic of Slovenia. The results of the analysis indicate the following: the most Innovative is the Slovenian business sector and the lowest results are shown in the Bulgarian business sector; in terms of the four types of innovations, in the region the dominant part falls back on the non-technological innovations; the degree of innovativeness of the businesses is directly connected to the size of the enterprises; besides Slovenia, in the other selected countries in the region, there is no coincidence between the indicator for R&D intensity and the degree of innovativeness of the business sector etc.

Keywords: innovation, business sector, entrepreneurship, R&D, Oslo Manuel, CIS.

Introduction

The research done on this paper concerns the innovative activity of the businesses in the Republic of Macedonia and other preselected countries in the region such as Republic of Bulgaria, Republic of Serbia and Republic of Slovenia. In addition, innovativeness, i.e. innovative business is being treated whilst having in mind its broader sense of the word, in accordance with the already comprehended meaning of innovation

as perceived by scholarly papers on economy and in the area of entrepreneurship and Eurostat methodology for innovative businesses. An enterprise is considered innovative if it has introduced one of four types of innovation: product innovation, process innovation, organizational innovation and marketing innovation. The research is being constructed as it follows: First, a brief theoretical retrospective on relationships between innovation and economic dynamism (economic growth and development) is given; Second, basics on methodology on measurement and interpretation of innovations based on the Oslo Manual – developed jointly by Eurostat and OECD is given; Third, an analysis on the degree of innovativeness of enterprises (businesses) in the four countries: Republic of Macedonia, Republic of Bulgaria, Republic of Serbia and Republic of Slovenia had been conducted; Fourth, a comparative analysis had been made, based on this basis about the innovativeness of the business sector in the selected countries.

Theoretical background

The economic theory and practice have already shown that entrepreneurship, as a separate, fourth development factor (which puts together and coordinates the other factors in the economic process) has a distinguishing role in stimulating economic growth and development (Baumol, 2011). This is understandable, considering the fact that innovation is an essential characteristic and specificity of entrepreneurship, and the implementation of innovations contributes to increasing productivity and accelerating the economic growth of economies. When it comes to the sole meaning of innovation and its basic attributes, there are a number of definitions. Thus, in the word of Christensen & Overdorf (2000) „Innovation is the key to future success of the business“. According to Maryville (1992), innovation often means application of better solutions leading up to fulfillment of demands or, meeting the existing market requirements. The term “innovation” can be defined as something new, original and more efficient, and also as a result of the new “impulses” on the market or in society in general (Frankelius, 2009) etc.

The contribution of innovations and entrepreneurship for the economic dynamism is also in the focus of papers by many prominent theoreticians of entrepreneurship. Even the representatives of the so called canonical literature on entrepreneurship, primarily Joseph Schumpeter and Jean Baptist Say, in their works point to the close bond between innovation and economic dynamism. The most distinguished entrepreneurial theoretician, Schumpeter emphasizes Say's contribution for treatment of the entrepreneur as a person who performs the combination and recombination of production factors, their displacement from less productive towards higher productivity sectors, i.e. as a person who introduces innovations. Still, the correlation between innovations – economic growth is best depicted in Schumpeter's work.

According to Schumpeter's model, entrepreneurs regularly disrupt economic equilibrium i.e., they constantly push the economy out of its permanent circular movement – a movement that implies there are no economic (above average) profits. Entrepreneurs do this by introducing various types of innovations: they supply a new product or an existing product with superior quality; or they introduce a new production method; or they open a new market segment; or they discover new sources of raw materials; or, finally, they introduce a new organization in the sector (Schumpeter, 1934).

According to Schumpeter, innovations are first undertaken by the bravest, the most energetic entrepreneurs, who, as a consequence, achieve above average profits (economic profits), as temporary incomes (for example, as long as they enjoy patent protection). That will motivate other entrepreneurs to follow their example, and the previous equilibrium will be completely destroyed. Hence, according to Schumpeter, innovation itself can best explain the cyclical movement of the market economies. In this sense, Peter Draker stresses out that the entrepreneur maximizes the opportunities through the introduction of innovation and that the entrepreneur manifests dissidence, while at the same time upsets and disorganizes (Draker, 2012, p.36). According to Izrael Kirzner, the entrepreneur is a person who, in an environment of limited knowledge and asymmetric information, is always on alert and is able to discover and use some new opportunities, opportunities which other economic agents have not discovered yet – but, such entrepreneurial actions finally get the economy to an another equilibrium. In this context, Kirzner (1973) points out that where there is equilib-

rium, there is no place for action for the entrepreneur, which is a confirmation that the economic dynamism is directly connected to the activity of the entrepreneur and innovations introduced.

Basically, innovation is the bearer of change, the creator of new opportunities, new products and services, the key to new markets and, in its core, it is a basis for product differentiation and services, and ultimately a movement that enables companies to gain competitive advantage. At the same time, innovation brings economic profit. In standard microeconomics, economic profit appears when the price is higher than the average total costs, including the opportunity costs, which effectively means that the economic profit is an excess profit over some average, normal profit. Certainly, it is the above average profit that provides the basic incentive for action of innovative entrepreneurs and is the driver of economic dynamism and growth. In this sense, Acs (2008) emphasizes that the innovations of the small entrepreneurial firms and the entrepreneurial activity in general, have been the decisive contributing factors of the good performance of the US economy, particularly during the 1980s, and its significantly lower natural rate of unemployment compared to EU member states.

A big part of the innovations (which may be considered as positive externalities) are under patent law protection, they provide the entrepreneurs who introduce them with a temporary monopolistic power, and consequently, with very high rewards (Fiti et al. 2007).

Having in mind that innovation is one of the key determinants in dimensioning economic growth and development, whose main characteristics constitute of the continued dynamism and permanent change, and the process itself i.e. the model of innovations is based on constant change.

Analyses of some prominent entrepreneurship theoreticians (Kirzner, Baumol, Casson and others) tend to conclude that it is difficult for entrepreneurship, considered as a separate production factor, to be incorporated in the framework of the economic process offered by classical microeconomics. As a consequence, the entrepreneurship has been neglected by the mainstream modern economics. All those authors start from the fact that the classical microeconomic model has been designed for an analysis of the static equilibrium (in the case of a profit-maximizing firm, equilibrium being achieved when marginal cost equals marginal revenue), whereas entrepreneurship (or the entrepreneurial process) is essentially related to constantly challenging and upsetting the achieved equilibrium through permanent innovations. (Fiti and Filipovski, 2012)

Probably one of the most significant sources of the power of innovation is the fact that it is not only a technological phenomenon but also, and in many cases, a social, market and demographic phenomenon, which brings it closer to a broader use (Fiti et al., 2007).

In this context, Birch (1987, p. 70) ascertains that innovation can be done even with poor technology, even without technology and that in the USA there are many innovations in the classical sectors (steel and steel products, bicycles, textile, leather, paper, etc.) with the actions of so called animators of trends, i.e., contrarians – entrepreneurs that enter sectors others run from.

Also, according to Draker's opinion, innovation is more of an economic, market, social and demographic phenomenon than it is technological (Draker, 2012). Such an understanding and treatment of innovation, must have greatly contributed in its measurement for it to be treated in a broader sense. So, according to the criteria of Eurostat, a business is considered innovative if it implements one of the four types of innovations: product innovation, process innovation, organizational innovation and marketing innovation (Fiti et al., 2017).

In fact, it is innovation that brings upon changes, creates new opportunities, new products and services, opens new markets, and is a basis for differentiation of products and services, thus enabling enterprises to gain competitive advantages.

In the past few decades, the troublesome question linked to research and development, creating and spreading new information and knowledge, and also the introduction of innovation is becoming a field of special interest, that has been an inspiration for many scholarly studies and empirical analyses. In addition, many literary breakthroughs explicitly state that innovations are not only important to individual enterprises, but to economies in general, because innovations make room for establishing competitive economies based on knowledge, something that is definitely leading towards enabling an accelerated economic growth and

improvement of the competitive abilities of different national economies present on the global market. Hence, it becomes clear that one of the key priorities of every modern market economy that strives to entice the economic growth should be to strengthen the competitiveness in the business sector – through knowledge and innovation. Thus, questions linked to establishing the determinants of innovations and consequential effects of their implementation become massively important and lure the interest of the economic research echelon on a worldly level.

Methodology for measuring and interpretation of data on innovation

Innovation has central role in the process for output and productivity growth, so there is a need innovation to be appropriate followed and measured. Internationally guideline for collecting, measuring and usage of data on innovation is Oslo Manual. Innovation data are widely used by different data users and for different purposes, because of that the Manual is designed to meet the various user needs.

Oslo Manual is developed jointly by Eurostat and OECD. Oslo is the widely used methodology for measuring of innovations. The main goal of the Manual is to be internationally used guideline for collection of data on innovation and proper interpretation of the data. It is used not only in European countries but also among other countries in the world. Oslo Manual is used as a methodological background for conducting of Community Innovation Survey (CIS), which one is conducted among European countries.

The wide usage of this methodology allows international comparison of data on innovation and provides indicators on innovation for benchmarking national performances. Also, with the continued usage of the Manual as methodology for collection of data on innovation, are provided comparable indicators over time.

Innovation is dynamic process, because enterprises are continuously implementing different kinds of changes and innovations in their work. Dynamics processes, including innovations, are more difficult to be followed and measured than the static one.

Oslo Manual refers to collection of data on innovation at enterprise level and it does not cover industry or economy-wide innovations. Estimation of industry or economy innovations and changes it is possible to be measured only by the aggregation of enterprise level data. An enterprise can make a lot of changes and implement innovation in different aspects of its work, such as in the process of production, business practices, inputs used in order to improve its performance.

In the Manual are defined for types of innovation: product innovation, process innovation, marketing innovation and organizational innovation. Product and process innovations are known as technological innovations, marketing and organizational innovations as non-technological innovations.

According to the Manual product innovation is defined as *“...the introduction of a good or service that is a new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Product innovations include both the introduction of new goods and services and significant improvements in the functional or user characteristics of existing goods and services”* (Oslo Manual, 3th edition, pp: 48).

The second type of innovation defined with the Manual is process innovation *“... process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software”* (Oslo Manual, 3th edition, pp: 49).

Innovation on process can be implemented with different aims for example to reduce unit production or delivery costs, to increase the quality of product or production process, or to produce or delivery new or significantly improved products. (Oslo Manual, 3th edition)

Marketing innovation is defined as a *“.....implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing”* (Oslo Manual, 3th edition, pp: 49).

Enterprises may invest big amount of resources for market research. Implementation of marketing innovation can lead to increasing of enterprise performance. Also enterprises implement marketing innovations with aim for better meeting of costumers needs, opening of new markets, research of the market can lead to product or process development through demand-lead innovation, or increasing the enterprise's sales. (Oslo Manual, 3th edition)

The second type of non-technological innovation is organizational innovation, in the Manual organizational innovation is defined as *".....the implementation of a new organizational method in the firm's business practices, workplace organization or external relations"* (Oslo Manual, 3th edition, pp: 51).

Enterprises implement organizational innovations to improve workplace satisfaction, quality and labor productivity, or reduction of supply costs. (Oslo Manual, 3th edition)

One enterprise to be identified as innovative one should *".....had innovation activities during the period under review, including those with ongoing and abandoned activities. In other words, firms that have had innovation activities during the period under review, regardless of whether the activity resulted in the implementation of an innovation, are innovation-active"* (Oslo Manual, 3th edition, pp: 59).

For the implementation of innovation, enterprises take on different innovation activities such as technological, scientific, organizational, finance or commercial which lead or are intended to lead to the implementation of innovation (Oslo Manual, 3th edition).

According to the Manual under innovation activities are included *"...all scientific, technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative, others are not novel activities but are necessary for the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation"* (Oslo Manual, 3th edition, pp: 47).

Because Oslo Manual refers to the data collection on enterprise level the innovative enterprise is defined as enterprise that has implemented an innovation (product, process, organizational or marketing) during the period under review. (Oslo Manual, 3th edition)

All presented data in this paper are collected with the standard Community Innovation Survey (CIS) and as a methodological background it has been used the Oslo Manual. Because the collection instruments and methodology are same for all countries, the data are internationally comparable.

CIS it is conducted every two years and is covering three year period. The survey is designed to provide data by types of innovations, economic activities, size classes, expenditures on innovation, turnover from innovation, public funding, co-operation. It is conducted in industry and service enterprises. The survey is currently carried across the EU, EFTA countries and in EU candidate countries, but also a lot non-European countries are conduction CIS for measuring of innovations.

Innovativeness of the business sectors in Republic of Macedonia, Republic of Bulgaria, Republic of Serbia and Republic of Slovenia

Republic of Macedonia

The analyzed data on innovations, shows that third country in terms of introducing innovations in the region is Macedonia. In business section in Macedonia, in the observed period, 2012 – 2014, 36% of the enterprises reported some form of innovation activity.¹ Hence, the indicator for R&D Intensity (participating in research and development of the GDP) relating to Macedonia is 0.22% (Erawatch, 2013), and the participation of the business sector in investment for research and development turns out to be in the range of 18 to 20%.

1) As a data source for all presented data on innovation for Macedonia is State Statistical Office of Republic of Macedonia and EUROSTAT.

<http://www.stat.gov.mk/pdf/2016/2.1.16.20.pdf>

<http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database>

Only technological innovative are almost 20% of all innovative active enterprises, only non-technological innovative are almost one quarter, 24.8%, of all innovative enterprises and both types of innovations, technological and non-technological are introduced by 55.6% of the innovative enterprises. The data shows that among enterprises in business section in Macedonia as in business section of Slovenia, most of the reporting enterprises have introduced both, technological and non-technological innovations at the same time.

Considering the four types of innovations, the enterprises mostly introduce process innovations, 22.8%, and marketing innovations, 22.3%. The share of those two types of innovations is almost the same, process and marketing innovations simultaneously exist in enterprises. The next most common type is organizational innovations, 20%. Enterprises at least introduce product innovations (innovation that encompasses new or significantly improved goods or services), only 17.1%.

In the business section in Macedonia, the largest enterprises are the most innovative, 65.2%. The lowest share of innovative enterprises is among small enterprises, only 33.2%. Compared to the small enterprises, medium sized enterprises are more innovative. Almost 42% of the medium sized enterprises are innovative. This trend was observed among all four types of innovations. The most common reason for this situation, cited by the enterprises, was the lack of financial resources for innovation, especially in the small one. ²

In the case of Macedonia, industry section is more innovative compared to services sector. More than a half of the enterprises in industry are innovation active, 52% and less than half of the services sector enterprises, 48%. The most common types of innovations which take place in industry as well as in service sector are the process and marketing innovations. ³

Enterprises may introduce innovation on their own or with active co-operation with other enterprises or public research institutions. 22% from the technological innovative enterprises, co-operate during the process of developing innovations. From the number of technological innovative enterprises, mostly of them reported that co-operate with the suppliers of equipment, materials, component or software, 25.4%.

Because enterprises are making different kind of current and capital expenditures for innovation activities, in the business section in Macedonia, 44.1% of all expenditures for innovation activities are intended for training of the staff for innovative activities, research and introduction on the market of innovations, design, preparing of feasibility studies, testing of the innovations etc..

The empirical research for many countries confirms that there are typically positive correlations between innovations and productivity, i.e. that innovations lead to improvement of the overall economic and financial performance of firms.

In this paper, with the help of the most used model for assessment of connections between innovation and their performance (CDM), we confirm such conclusions in the case of the Republic of Macedonia (see Appendix 1).

Republic of Bulgaria

Last innovative country in the region is Bulgaria. According to the latest data in business section in Bulgaria, in the period 2012 – 2014, 26.1% of the enterprises have introduced product, process, marketing or organizational innovation.⁴ The indicator for R&D Intensity (participating in research and development of the GDP) in Bulgaria is 0.57%, and the participation of the business sector in investment for research and development turns is somewhere around 50% (European Union, 2013).

2) Small enterprises: 10 – 49 employees; Medium enterprises: 50 – 249 employees and Large enterprises; 250 and more employees.

3) In the survey are included sections B, C, D, E, H, J, K and divisions 46, 71, 72, 73 belonging to Nacional Classification of activity (NACE Rev.2) and are obligatory according to Regulation No. 995/2012 of European Commission.

4) As a data source for all presented data on innovation for Bulgaria is National Statistical Institute of Republic of Bulgaria and EUROSTAT http://www.nsi.bg/sites/default/files/files/pressreleases/NIRD_Innovation2014_en_R518IJ7.pdf

<http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database>

Bulgaria is the only country in the Region where enterprises are introducing more technological innovations than non-technological innovations. Almost 38% of the innovative enterprises introduce innovation on product or process only. As regard to the non-technological innovations, only marketing or organizational innovations introduce 34.6% of the innovative enterprises in Bulgaria. And at the same time both types of innovations, technological and non-technological are introduced by 27.7% of the innovative enterprises.

Marketing innovations prevail in business section in Bulgaria. 11.7% from the total enterprises has introduced marketing innovation. Product and organizational innovations are equally introduced by the enterprises. Almost 11% of the total enterprises have introduced those two types of innovations. On the other hand, process innovation is the least prominent type of innovation, it is introduced by 9.2% from the total enterprises.

Traditionally as in the other countries in the Region, the innovation activity in business section in Bulgaria depends on the enterprise size. The highest share of innovative enterprises is among large one, 78.3%, followed by the share of innovative enterprises among medium sized, 38.8%. Last innovative are the small enterprises, almost 21%. Because finance is one of the main determining factors for implementation of innovations, the lack of funds in small and medium sized can be stated as a reason for the smaller share of small and medium innovative enterprises compared to the large one.⁵

The data shows that as in the previous country, in Bulgaria, enterprises in industry are more innovative compared with the service section. 29.7% of the enterprises in the industry introduce any kind of innovation, while only 21.9% of the enterprises in service section are innovative. In service section the most innovative are enterprises in "Scientific research and development (R&D) division", in which one all enterprises are innovative as a fact that R&D is a kind of innovation.⁶

Innovative active enterprises in Bulgaria that co-operate with enterprises or public research institutions on the implementation of innovations, identified the co-operation with the suppliers of equipment, materials, component or software as most useful for the implementation of innovation. 31.5% from the technological innovative enterprises, co-operate with the suppliers.

According to the data obtained by national survey on innovation in Bulgaria, a lot of innovation active enterprises are not R&D performers. The evidence shows that enterprises implement innovations without engaging in R&D activities. Data shows that more than a 60% of the total expenditures are done for purchase of machinery, equipment and software.

Republic of Serbia

According to the data obtained by the statistical survey on innovation, for the reference period 2012 – 2014, the share of enterprises that have introduced innovation on product, process, marketing or in organization in business section in Serbia is 40.5%.⁷ In this case, the indicator for R&D Intensity (participating in research and development of the GDP) relating to Serbia is 0.79%, and the participation of the business sector in investment for research and development is only 8% (Vasić et al., 2016).

In the structure of innovative enterprises in Serbia, during the period 2012 – 2014, almost 29% of the enterprises have introduced only technological innovation (innovation on product or process), only non-technological innovation (innovation on marketing or organization) have introduced almost 33% of the innovative enterprises. At the same time technological and non-technological innovations have introduced 21.2% of the inno-

5) Small enterprises: 10 – 49 employees; Medium enterprises: 50 – 249 employees and Large enterprises; 250 and more employees.

6) In the survey are included sections B, C, D, E, H, J, K and divisions 46, 71, 72, 73 belonging to National Classification of activity (NACE Rev.2) and are obligatory according to Regulation No. 995/2012 of European Commission.

7) As a data source for all presented data on innovation for Serbia is Statistical Office of the Republic of Serbia and EUROSTAT

http://www.stat.gov.rs/WebSite/repository/documents/00/01/89/79/IA01_276_eng.pdf

<http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database>

vative enterprises. This means that in business section in Serbia is dominating the introduction of non-technological innovations only.

An analyze based on the four types of innovations shows that in Serbia the most common type of innovation concerned organizational innovation, which take place in almost 25% of all enterprises. The second most common type is marketing innovation. Almost 24% of the enterprises introduce marketing innovations. Those two types are followed by product and process innovations. Those two types of innovation simultaneously exist in enterprises in Serbia. 20% of the enterprises introduce product innovations (innovation that encompasses new or significantly improved goods or services) and also 20% of the enterprises have introduce process innovations.

The data obtained by the statistical survey shows that the size of the enterprises is a key factor for implementing an innovation in business section in Serbia. Regarding the size of the enterprises, more than 68% of the large enterprises are innovative. More than a half of the medium sized enterprises 52.7% and at least innovative are the small enterprises with more than 37% innovative enterprises.⁸

As seen by section of economic activity, Serbia is the only country in the region where the share of innovative enterprises in those two sections is equal. 40% of the enterprises in industry and service section have introduced innovations.⁹

For the reference period 2012 – 2014, from the technological innovative enterprises, 17.5% have reported that collaborate with other enterprises or institution during the process of implementing innovations. As a most useful partner for co-operation, enterprises in Serbia have indicate the collaboration with faculties and other science and education institutions, 23% of the enterprises have reported this kind of partnership.

Regarding the expenditures on innovation activities, as in the previous period in business section in Serbia, enterprises are making highest expenditures for innovation activities for purchase of machinery, equipment and software. Approximately 64% from the total expenditures are intended for this kind of expenditures.

Republic of Slovenia

Most recent data on innovation activity shows that almost 46% of the enterprises in Slovenia, in the reference period 2012 – 2014, introduce new or significantly improved products on the market, introduce new or significantly improved processes, new or improved organizational or marketing methods. Those enterprises are innovative enterprises.¹⁰ The indicator for R&D Intensity (participating in research and development of the GDP) relating to Slovenia is 2.47%, and the participation of the business sector in investment for research and development turns out to be in the range of about 60% (European Union, 2013).

Regarding the type of innovation, only technological innovations (product or process innovation) introduce almost 24% of all innovation active enterprises. Only non-technological (marketing or organizational) innovators are 28% of all innovative enterprises. Both types of innovations, technological and non-technological, are introduced by 48% of the innovative enterprises. Among business section of Slovenia, most innovation active enterprises have introduced at the same time technological and non-technological innovations.

An analyze based on the four types of innovation (product, process, marketing and organizational) shows that the most common type of innovation in business section in Slovenia are product and marketing innova-

8) Small enterprises: 10 – 49 employees; Medium enterprises: 50 – 249 employees and Large enterprises: 250 and more employees.

9) In the survey in Serbia despite the obligatory sections and divisions according to Regulation No. 995/2012 of European Commission, are included additional sections A, F, I, L, N, Q, R and divisions 45, 47, 69, 70, 74, 75, belonging to Nacional Classification of activity (NACE Rev.2), that according to the same Regulation can be included on voluntary base.

10) As a data source for all presented data on innovation for Slovenia is Statistical Office of Republic of Slovenia and EUROSTAT.

<http://www.stat.si/StatWeb/en/News/Index/5899>

<http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database>

tions. Those two types of innovation are equally introduced among enterprises in Slovenia, 25%. Less than one quarter of the enterprises have introduced organizational innovations, 24.4%. The last presented are the process innovations (new or significantly improved production process, distribution method or supporting activity), which one takes place in 22.6% of all enterprises.

In Slovenia the share of innovation enterprises grows with the enterprise size. The highest share is observed among larger enterprises, 87.2%. Small enterprises are the last engaged in innovation activities, almost 40% of the small enterprises are innovative. A higher share compared to the small enterprises is observed among medium-sized enterprises, 63.1%. This observation held consistently among all four types of innovations.¹¹

In the survey are included manufacturing and service enterprises. Manufacturing enterprises are at the forefront of the innovation with almost 50% share of innovative enterprise, whereas services enterprises just over 42% are innovation active.¹²

During the process of implementation of technological innovations, business enterprises may have active cooperation with other enterprises or institutions. The innovative enterprises in Slovenia mostly co-operate with suppliers of equipment, materials, component or software, approximately 31.5% of the technological innovative enterprises.

Regarding the expenditures for innovation activities, enterprises in business section in Slovenia mostly invest in R&D activities. The share of R&D expenditures in total expenditures for innovation activities is more than 58%. Slovenia is leader country in the Region regarding the R&D expenditures of the business section.¹³

Comparative analysis

Analyzed data on innovativeness of the business sector in the Republic of Macedonia and the other three countries in the region, Republic of Bulgaria, Republic of Serbia and the Republic of Slovenia in the reference period 2012-2014, shows that the most innovative is the Slovenian business sector where almost 46% of enterprises are innovative, and the lowest results are shown in the Bulgarian business sector with only 26.1% innovative enterprises. In total, innovative enterprises in Macedonia add up to 36%, and the Serbian entrepreneurs contribute with 40.5%. At the same time, data shows that the business sectors in the four analyzed countries have significantly lower innovation spread compared to most innovative countries in the EU-28, Germany (67%), Luxembourg (65.1%) and Belgium (64.2), but particularly higher innovation compared to the business sectors of the least innovative countries in the EU-28, such as Latvia (25.5%), Poland (21%) and Romania (12.8%).

Regarding the type of innovation, Bulgaria is the only country in the region where enterprises are introducing more technological than non-technological innovations.

Namely, 38% of innovative enterprises in the Bulgarian business sector in the analyzed period have introduced technological innovation (innovation of product or process), and 34.6% non-technological innovation (organizational or marketing innovation)

This situation related with the distribution between technological and non-technological innovations, coincides the EU average, where also in the period 2012-2014 in innovative enterprises, technological domination was as high as 27%, leading the way before the non-technological innovations that participate with 25% in total. In the other three analyzed countries, Macedonia, Serbia and Slovenia, the dominant innovation is the non-technological before the technological innovation.

11) Small enterprises: 10 – 49 employees; Medium enterprises: 50 – 249 employees and Large enterprises: 250 and more employees.

12) In the survey are included sections B, C, D, E, H, J, K and divisions 46, 71, 72, 73 belonging to Nacional Classification of activity (NACE Rev.2) and are obligatory according to Regulation No. 995/2012 of European Commission.

13) In the R&D expenditures are included In-house and External R&D expenditures.

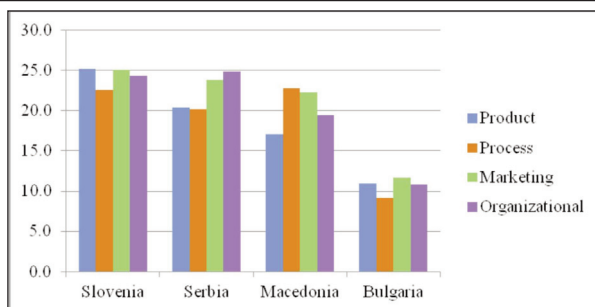
The analysis based on four types of innovation (product, process, marketing and organizational innovation) shows that, in Macedonia dominate process innovations, which contribute with 22.8% of total innovation. After the process innovations follow marketing innovation (22.3%), organizational innovation (20%) and product innovation (17.1%).

In Bulgaria dominate marketing innovations, in Serbia organizational innovations and in Slovenia marketing innovations and product innovations with a share of 11.7%, 25% and 25% in the total innovations, respectively.

Figure 1.

Share of the four types of innovations in the countries in the Region, in the period 2012 – 2014

Source: Web pages of Statistical Offices of the countries



Macedonia, where in the analyzed period were dominant in the process innovations, in the other three analyzed countries, Bulgaria, Serbia and Slovenia, process innovations recorded the smallest share in the total innovations.

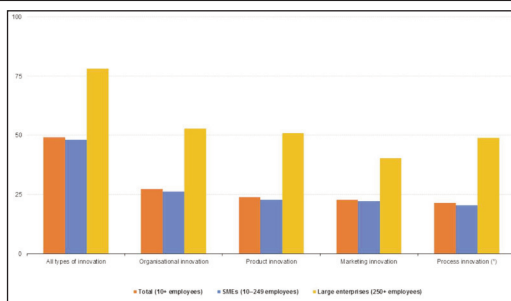
Among the EU-28 during the analyzed period most common type of innovation concerned organizational innovations, which took place in 27% of all enterprises. The second most common type is product innovations, which took about 24% of all enterprises and it is followed by marketing innovations, which are introduced by 23% of the enterprises. The last type is the process innovations, introduced by 22% of the all enterprises among EU countries.

An analysis based on the size of the enterprises, shows that among EU countries as well as in the four analyzed countries, most innovative are large enterprises. At the second place are medium-sized enterprises and lastly, there are the least innovative, small enterprises.

Figure 2.

Share of the innovative enterprises by size of the enterprises among EU Member States

Source: Eurostat Database (data codes: inn_cis9_type and inn_cis9_bas)



This situation is largely understandable especially considering the far more powerful financial position and availability of necessary human resources of large enterprises in terms of the average and particularly in relation to small enterprises.

Analyzed data in Macedonia, Bulgaria and Slovenia shows higher innovativeness of the enterprises located in the industry section, where 52%, 29.7% and 50% of the enterprises are innovative, respectively by countries. In the same time, Serbia is only one of the analyzed countries where the percentage of the innovative enterprises in the both sections is equal (40 %).

In Bulgaria only 21.9% of the enterprises in service sector are innovative. In service sector, the most innovative are enterprises in "Scientific research and development (R&D) division", in which all enterprises are innovative as a fact that R&D is a kind of innovation and an integral part of the process of innovation.

Although enterprises innovations can develop and introduce internally or in collaboration with other enterprises or public research institutions, by building models of open innovation, it is encouraging that enterprises in the region are becoming increasingly aware of the benefits of cooperation with other enterprises and institutions in the processes of the implementation of innovations.

In Macedonia, 22% of technologically innovative enterprises in the analyzed period established cooperation with other enterprises and institutions in the process of innovation.

From the total number of technologically innovative enterprises of Macedonian, Bulgarian and Slovenian business sector in innovation processes in most, or 25.4%, 31.5% and 31.5% respectively, cooperated with its suppliers.

In Serbia in the reference period 2012-2014, 17.5% of the enterprises that have introduced technological innovations have established cooperation with other enterprises or institutions in the process of implementation of innovation. In the Serbian business sector, cooperation of innovative enterprises with universities and other scientific and educational institutions is dominant and it contributes with 23% of the total external cooperation with other companies and institutions.

In terms of expenditures made for innovative activities, between the enterprises from the countries in the region, in the period 2012-2014, the costs for purchase of machinery, equipment and software are dominant.

Specifically, in the business sector in Macedonia, 44.1% of all expenditures for innovation activities are intended for training of the staff for innovative activities, research and introduction on the market of innovations, design, preparing of feasibility studies, testing of the innovations etc.

According to the data obtained by national survey on innovation in Bulgaria, a lot of innovation active enterprises are not R&D performers i.e. enterprises implement innovations without engaging in R&D activities. Data shows that more than a 60% of the total expenditures are done for purchase of machinery, equipment and software.

Regarding the expenditures of innovative activities, very similar is the situation in the Serbian business sector. Even the 64% of the total cost of innovative activities Serbian innovative enterprises made for the purchase of machinery, equipment or software.

Analyzed data related with the expenditures done for innovative activities a different situation shows only in Slovenia, which is a leading country in the region in terms of cost made for innovation activities. The innovative enterprises of Slovenian business sector 58% of the total funds for innovative activities earmarked for the activities of research and development.

Conclusions

Based on the conducted analysis, we can derive the following relevant conclusions:

First, among the analyzed countries with the higher rate of innovativeness, is the Slovenian business sector, where almost 46% of the enterprises are innovative. Next in line is Serbia, with a percent of 40,5% innovative businesses, Macedonia is in the third place with 36% innovative businesses and lastly, Bulgaria with a score of 26,1% innovative businesses. Collected data show that the business sectors in the four selected countries have significantly smaller innovativeness rate compared to the most innovative countries in the EU-28, Germany (67%), Luxembourg (65,1%) and Belgium (64,2%), but also show notably higher innovativeness rate when compared to business sectors of the least innovative countries in the EU-28, Latvia (25,5%), Poland (21%) and Romania (12,8%).

Second, in terms of types of innovations, only in Bulgaria (where the level of innovativeness is very low) the technological innovations (process and product innovations) overrun the non-technological innovations (organizational and marketing innovations). Analysis based on the four types of innovations (individually) show that in Macedonia the dominant part falls back on the process innovations, in Bulgaria and Slovenia on the marketing innovations and in Serbia there is the highest level of organizational innovations.

Third, the degree of innovation in businesses is directly connected to the size of the enterprises. Hence, in the four analyzed countries, the highest rate of innovation can be spotted in the largest enterprises and after them the medium-sized enterprises while the small ones have the lowest rate for innovativeness. This is a general legitimacy that can also be confirmed by the example of all member countries of the EU (EU-28) and on an even wider territory.

Fourth, analysis shows that besides Slovenia, in Bulgaria, Macedonia and Serbia, there is no coincidence between the indicator for R&D intensity (and through that in the participating of the business sector in financing of research and development) and the degree of innovativeness of the business sector. Legitimacy in terms of high correlation in investment in R&D and the dominant positions of the entrepreneurial sector in those investments, along with the whole innovativeness of the business sector, it is almost always confirmed in the highly developed countries, and in this context, in Slovenia as well. As a matter of fact, Slovenia has an indicator of R&D intensity of 2.47% (that is somewhere above the European average), with participation of the entrepreneurial sector in financing of research and development with a mark of 60% (within European average), with a huge number of small and medium-sized businesses and highly sophisticated support measures, has achieved significant results in innovative activities in terms of the whole economy. The aforementioned correlation can in no way be found in the case of Macedonia – the business sector shows relatively high level of innovativeness (36%) in the case of exquisitely low R&D intensity indicator (0.22%) with marginal exceptions in the sphere of businesses financing research and development. There can be a number of different reasons for such outcome - bad (unstable) statistical evidence on investment in R&D intensity, bias of enterprises in conducting surveys about determining their own innovativeness etc. On the other hand, in the past few years in Macedonia, there has been a growth in the number of foreign companies investing in the country (in the technological-industrial development zones), that are highly intense, which has resulted in an increased export of good with higher finalization rate, investing in trainings of employees etc. Be what it may, in the future, the presented disconnection will require a more serious research for determining the actual situation. In the case of Bulgaria, the situation is different. The low level of innovation in business can be as a result of the fact that innovative activity is characterized by dominance of the technological innovations (machines, equipment, software), that absorb relatively high means, but are also focused on relatively small number of big enterprises. This is also that case with Serbia, with about 64% of the cost for innovative activities, the innovative enterprises made purchases for machines, equipment or software.

Fifth, there should be efforts made in Macedonia, Serbia and Bulgaria for qualitative improvements of statistical data for research and development in general, and by that, to also strengthen the innovative activity of the business sector.

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Appendix 1

Econometric model for measuring of determinants of innovation and their impact on the productivity of firms in Republic of Macedonia

The impact of innovation on firm's performance has been a topic of great interest for the economists and policy makers for decades. Although in the literature it is generally accepted that innovation leads to improvement of the competitiveness of firms and their performance, this relationship has not been studied unambiguously by empirical models. The empirical estimation of this relationship is based on an already existing theoretical framework as a starting point for the construction of the models. For the estimation of this relationship are mostly used multi-stage models.

The data used for the empirical analyses presented in this paper are obtained by the Survey on innovation and innovation activities. The survey was conducted by the State Statistical Office of the Republic of Macedonia. The main aim of the survey was to collect data on innovation in manufacture and service firms in the country. Data used in the model refers for the reference period 2010 – 2012. The survey has the same structure as Community Innovation Survey (CIS) and as a methodological background has been used the Oslo Manuel.

The estimated model used is an adaptation of the original CDM model.¹⁴ The model starts with the estimation of innovation input. The input estimation has two phases. In the first phase the firm decides whether or not to invest in innovation and if the firm decides positively, to invest in innovation, than in the second phase the firm should decide how much to invest in innovation.

If g^*_i presents the unobserved decision variable of whether or not a firm to invests in innovation, k^*_i is the unobserved level of firm's innovation investment, g_i and k_i are their observed counterparts, than the first two equations of the model can be defined in the following way:

$$g^*_i = \beta_0 x^0_i + u^0_i \quad (1)$$

$$g_i = 1 \text{ if } g^*_i > 0 \quad \text{otherwise,} \\ = 0 \text{ if } g^*_i \leq 0 \text{ and}$$

$$k_i | (g_i > 0) = \beta_1 x^1_i + u^1_i \quad (2)$$

$$k_i = k^*_i \text{ if } k^*_i > 0, \text{ otherwise} \\ = 0$$

In this regression x^0_i , x^1_i , β_0 , β_1 are vectors of independent variables and their corresponding unknown parameters, which reflects the impact of certain determinants on the firm's decision to innovate and the level of investment in innovation. u^0_i and u^1_i are random error terms with mean zero and constant variance not correlated with the explanatory variables.

The third stage it is represented in the following equation and connects the innovation input with the innovation output:

$$t_i = \alpha_k k_i + \beta_2 x^2_i + u^2_i \quad (3)$$

with t_i indicating the observed level of innovation output, k_i representing the innovation input from the previous equation and α_k it is representing the corresponding unknown parameter. x^2_i is the vector of other explanatory variables and β_2 is the vector of corresponding unknown parameters. u^2_i is a random error term with mean zero and constant variance not correlated with the explanatory variables.

14) The CDM model is the most used model for the estimation of relationship between innovation and firm's performance. The CDM model has started to be frequently applied by scholars in many countries using the data from Community Innovation Surveys.

The last model equation connects the innovation output with firm's performance.

$$q_i = \alpha_i t_i + \beta_3 x^3_i + u^3_i \quad (4)$$

where q_i represents firm performance, t_i and α_i represents the innovation output from the previous equation and its corresponding unknown parameter, x^3_i and β_3 is vector of independent variables and its corresponding unknown parameters. u^3_i is an error term.

Model estimation is performed in two parts. In the first part, the decision to innovate and innovation input equations are estimated together by the Heckman two-step estimation procedure. In the second part, both equations, the innovation output and performance equations are estimated jointly using three-stage least square estimation of simultaneous equations. The model estimations are performed in STATA.

The results of the model estimation are in line with the basic postulates of existing theoretical and empirical literature on innovation. The findings indicate that the intensity of domestic and foreign competition motivates firms to innovate and the decision on how much to invest in innovation is under the pressure of domestic and international competition in the case of Republic of Macedonia.

An important conclusion is the confirmation of the relationship between innovation and firm size. According to the results larger firms are investing more in innovation compared with the small ones and medium sized. The results indicate that the usage of market sources related with the introduction of innovation lead to the increase of innovation output. The usage of national and EU financial funds for implementation of innovation has positive effect on the innovation output.

At the end the model results indicates the positive and statistical significance relationship between firm's productivity and innovation output. The finding from the estimated model indicates that in the case of Republic of Macedonia the introduction of innovation improves the firm's performance and competitiveness and on a long term positively reflects on the country economic growth.



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