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DOES ECONOMIC INEQUALITY BOOSTS ECONOMIC GROWTH: EVIDENCE FROM THE REPUBLIC OF SRPSKA

ДА ЛИ ЕКОНОМСКА НЕЈЕДНАКОСТ ПОДСТИЧЕ ЕКОНОМСКИ РАСТ: ДОКАЗИ ИЗ РЕПУБЛИКЕ СРПСКЕ

Summary: *In this paper we will present the results of our survey on economic inequality, and its impact on economic growth in the Republic of Srpska. Here, we will express inequality as unequal distribution of the results and conditions of economic activity. To measure economic inequality we will use Theil's T index. Our basic assumption is that unequal distribution of the results and conditions of economic activity, all in favor of the real sector of the economy, will lead to the real GDP growth. We find that unequal distribution of the results of the economic activity have positive impact on GDP growth, and that unequal distribution of the conditions of economic activity has negative impact on GDP growth. Our results shows that the economy of the Republic of Srpska is full of anomalies.*

Key words: *economic inequality, economic growth, Theil's T index*

JEL Classification: *O 40, E 25, C 22*

Резиме: *У овом раду приказаћемо резултате нашег истраживања економске неједнакости и њеног утицаја на економски раст у републици Српској. Економску неједнакост ћемо приказати као неједнаку расподелу услова и резултата економске активности. За мјерење економске неједнакости користићемо Тејлов Т индекс. Наша основна претпоставка је та да ће неједнака расподела услова и резултата економске активности, која је у корист реалног сектора економије, довести до раста реалног БДП-а. Резултати истраживања показују да неједнака расподела резултата економске активности има позитиван утицај на раст БДП-а, а да неједнака расподела услова економске активности има негативан утицај на раст БДП-а. У раду је доказано да је привреда Републике Српске пуна аномалија.*

Каучне ријечи: *економска неједнакост, економски раст, Тејлов Т индекс*

JEL класификација: *O 40, E 25, C 22*

1. INTRODUCTION

What generates economic inequality and how it reproduces over time is one of the central themes of economics for more than one century. Nevertheless, there is still no full understanding of the relationship between inequality and economic growth. Over the last forty years in economics dominate two positions regarding the relationship between economic inequality and economic growth. When considering the impact of economic inequality on economic growth, it is axiomatic that economic inequality has a positive effect on economic growth, ie. there is an inverse relationship between economic equality and efficiency. Arthur Okun is among the first to analyze the inverse relationship between economic equality and efficiency in his book, *Equity and Efficiency: The Big Tradeoff* (Okun 1975). In his work Okun said that the conflict between economic equality and economic efficiency is inescapable (Okun 1975). To prove his thesis, Okun used the so-called "leaky bucket" experiment and claimed that every dollar that is transferred from the rich to the poor results in the growth of income of the poor, which is less than one dollar. Okun is one of the first authors who analyzed Pigou-Dalton principle of transfers. Pigou-Dalton principle means the transfer of income from the rich to the poor will reduce economic inequality. Okun has analyzed the principle of pure

transfers in the real case and he claims the income transfer from the rich to the poor in the "leaky bucket" will result with situation where the poor will not receive all the money which is taken from the rich (Okun 1975). Okun identifies four main causes of the "leaky bucket" effect: administrative costs of reallocation, changes in work effort, ie. productivity as a result of redistribution, changes in saving and investment as a result of redistribution and changes in attitudes (such as a lack of motivation to increase human capital) that are caused by redistribution. The result is that government's policy to achieve equality will inevitably lead to lower levels of income and the reduction of resource efficiency. The primary issue for policy makers is how much "leaking" from the "bucket" society is willing to accept in order to achieve some degree of economic equality.

When we analyze the impact of economic growth on economic inequality it is generally accepted that inequality follows Kuznets inverted U pattern. In 1955 Kuznets argued that as GDP grow economic inequality will firstly increase, and then, after peaked, it will decrease. In economic science this pattern is familiar as Kuznets curve. Kuznets work, although fundamental, is based on only three countries: USA, United Kingdom, and Germany.

In this paper we will investigate the impact of economic inequality on economic growth based on the Republic of Srpska (hereinafter RS). The RS is an entity in Bosnia and Herzegovina which is a former socialist country with a transitional economy. Here we will use diferent approach to express and measure economic inequality. Generally, the economic inequality means unequal distribution of the result of economic activity, and it si very often measured with Gini index. In this paper inequality will be expressed as unequal distribution of conditions and results of economic activity, and we will use the Theil's T index to measure inequality.

2. THEORETICAL BACKGROUND

Kuznets (1955), Okun (1955), and Kaldor (1960) argued that there is trade off between reducing economic inequality and economic growth. According to Adam Smith economic inequality is unavoidable. Since Kuznets and Kaldor, many economists have attempted to measure the relationship between economic inequality and economic growth. Persson and Tabellini (1994) proofed in their work that there is a significantly negative relationship between inequality and growth in democratic countries. Milanovic (1994) argues that inequality in richer countries decreases because those countries can be aware to build up a fairer social environment. Robert Barro (2000) finds no evidence on the relationship between economic inequality and economic growth. Barro then breaks up his sample in two parts, one stands for poor countries, and other one stands for rich countries. Barro finds a negative relationship between economic inequality and economic growth in the sample of poor countries and a positive relationship in the sample of rich countries. Li and Zou (1998), Forbes (2000) and Lundberg and Squire (2003) argued that growth-enhancing structural changes are likely to be associated with higher income equality. Knowles (2001) in his work claims that inequality would do harm to economic growth in four ways: "the first argument is that an unequal distribution of income will lead to pressure for redistribution through distorting taxes, hence reducing growth... the second argument is that inequality may lead to socio-political instability, which will in turn reduce investment and hence growth... The third argument is that in the presence of imperfect capital markets inequality will reduce investment in human capital, which will in turn reduce growth... the fourth is that as inequality increases, fertility is likely to rise and human capital investment fall, both reducing growth...". Many economists try to use Barro's cross-country growth regression by adding inequality as an independent variable. Among those who used Barro's cross-country growth regression, with inequality as an independent variable are Alberto Alesina and Roberto Perotti (1994), Alesina and Dani Rodrik (1994), Torsten Persson and Guido Tabellini (1994), Nancy Birdsall et al. (1995), George R. Clarke (1995), and Klaus Deininger and Lyn Squire (1998). Generally, these studies find a negative and just-significant coefficient on inequality. These results led many economists to conclusion that economic inequality has a negative impact on economic growth. Roland Benabou (1996a) concludes his survey with these lines "These regressions, run over a variety of data sets and periods with many different measures of income distribution, deliver a consistent message: initial inequality is detrimental to long-run growth".

3. MODEL AND METHODOLOGY

Many studies follow a growth regression of Barro-style expressed as follows (Knowles 2001; Qi Su 2001; Forbes 2000):

$$y = c + \beta_1 GDP_i + \beta_2 MSE_i + \beta_3 FSE_i + \beta_4 PPPI_i + \beta_5 Ineq_i + \varepsilon \quad (1)$$

Expression (1) includes the information of growth GDP per capita (y), income per capita (GDP), education of male (MSE, i.e., average years of male secondary schooling), education of female (FSE, i.e., average years of female secondary schooling), economic inequality (Ineq, income inequality), and investment (PPPI, PPP value of the investment deflator). In our paper we will present different relationship between economic growth and economic inequality. To measure economic inequality we will use Theil's T index, and economic inequality will be expressed as unequal distribution of conditions and results of economic activity. Theil's T index is also used by Galbraith (Galbraith et al. 2002) in his work. The main idea is to present economic inequality as function of unequal distribution of results of economic activity (measured as unequal distribution of average wages by sectors of economic activity), conditions of economic activity (measured as unequal distribution of average investments by employee by sectors of economic activity), and productivity (measured as unequal distribution of average productivity by sectors of economic activity):

$$\text{Growth} = F(\text{Ineq}_{W/L}, \text{Ineq}_{I/L}, \text{Ineq}_{Q/L})$$

Where W/L is average wage, I/L is average investments, and Q/L is average productivity. Theil's T index is the best choice for this purpose due to its characteristics. Theil's T index has a more flexible structure that often makes it more appropriate. If a researcher always had access to complete, individual level data for the population of interest, then measures like the coefficient of variation or the Gini coefficient would usually be sufficient for describing inequality. However, individual data is rarely available, and researchers are asked to make due with aggregated data. Proposed by Theil (1967), Theil's T index derives from the notion of entropy in information theory. Theil's index in particular satisfies the axioms of symmetry (anonymity), population replication (population homogeneity, replication invariance), mean independence (invariance to relative changes, scale invariance, homogeneity), the Dalton- Pigou principle of transfers (strong principle of transfers) and additive decomposability. Theil's T index can be decomposed in its two components to measure inequality between groups and within each of these groups. Theil's T index is calculated by the following form (Akita et al. 2003):

$$\begin{aligned} T &= T^W + T^B \\ T^W &= \sum_{i=1}^n s_i T_i \\ s_i &= \frac{\sum_{i=1}^n Y_i}{Y} \\ T^B &= \sum_{i=1}^n s_i \ln \left(\frac{Y_i}{E_i} \right) \Rightarrow T^B = \sum_{i=1}^n \left(\ln \left(\frac{Y_i}{E_i} \right) - \ln \left(\frac{Y}{E} \right) \right) * s_i \end{aligned} \quad (2)$$

T^W is inequality within-group, and T^B is between-group inequality. Y and E stand for total GVA and total employment, respectively and subscript i denotes a group identity. In our paper we will use T^B to measure between-group inequality. The same expression was used by Akita (Akita et al. 2003) and Borovic (Borovic et al. 2012) to calculate unequal distribution of productivity in Japan and RS, respectively. In his paper, Borovic measured unequal distribution of conditions and results of the economic activity in the RS. Here, we will use his results on unequal distribution of wages and productivity. The calculation of unequal distribution of investments will be carried out by expression (2). Decomposition is very important, because we will measure the impact of economic inequality by sectors of economic activity on economic growth. Theil's T index represents a sum across sectors of economic activity. This is very useful, because it will enable us an insight into the sectors which have the strongest influence on index. For example, it would be logical to presume that real sector of

economy has the highest impact on creating the index. For all of these reasons we chose Theil's T index, and equation:

$$y = c + \beta_1 T_{W/L} + \beta_2 T_{I/L} + \beta_3 T_{Q/L} + \varepsilon \quad (3)$$

Where y stands for economic growth, $T_{W/L}$, $T_{I/L}$, and $T_{Q/L}$ represents unequal distribution of average wages, average investments, and average productivity by sectors of economic activity respectively. C is constant, β_i are regression coefficients, and ε is error. We expect all three coefficients to be negative with increasing inequality, all in favor of the real sector of the economy.

4. DATA AND RESULTS

All data were collected from the Republic of Srpska Institute of Statistics (<http://rzs.rs.ba>). The economy of the RS is divided into the following activities:

- A - agriculture, hunting, and forestry;
- B - fishery;
- C - mining and quarrying;
- D - manufacturing;
- E - electricity, gas, and water supply;
- F - construction;
- G - wholesale and retail trade;
- H - hotels and restaurants;
- I - transport, storage, and communications;
- J - financial intermediation;
- K - real estate, renting, and business activities;
- L - public administration and defense, compulsory social security;
- M - education;
- N - health and social work;
- O - other community, social, and personal service activities.

All data are expressed in 2001 prices. The time period is objectively limited to eight years, 2004-2011. Instead of the data on GDP we will use the data on GVA (Gross Value Added). We will start with an overview of growth rates of GVA, average wages, average investments, and average productivity. Data for the RS are presented in Table 1:

Table 1.: GVA, labour, investments, average wages, average investments, and average GVA for the RS

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GVA	2888480	3290278	3596410	3866108	4306655	4572692	4650914	5055199	5139005	5293116	5155058
L	220791	233718	236438	236239	242624	248139	258236	259205	258635	244453	238956
GVA/L	13	14	15	16	18	18	18	20	20	22	22
W/L	309	341	364	397	423	433	477	574	602	584	580
I	na	na	na	748689	906718	809910	1114824	1357135	1184721	1077485	974793
I/L	na	na	na	3,2	3,7	3,3	4,3	5,2	4,6	4,4	4,1

Source: Author's calculations

Data on GVA, average productivity, investments, and average investments are presented in thousands of BAM. Average growth rate of GVA for this period is 6%, for the same period the labour force grew at average rate which is less than one percent. For the period 2004-2011, investment grew at average rate of 4%. Average growth rate for average productivity and for average investments is almost the same as it is growth rate of GVA and investments. The reason for this is the growth rate of

workers which is almost a constant during this period. Growth rate of average wage (purchasing power) is 6,5%. Data on Theil's index is presented in Table 2.

Table 2.: Theil's index for the RS

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
T _{I/L}	na	na	na	0,19	0,13	0,17	0,20	0,12	0,11	0,13	0,11
T _{Q/L}	0,45	0,43	0,4	0,39	0,35	0,35	0,34	0,41	0,24	0,21	0,19
T _{W/L}	-0,007	0,099	-0,02	-0,025	-0,032	-0,032	-0,044	-0,072	-0,06	-0,04	-0,04

Source: Borovic, et al. 2012 (Author's calculations)

For average investments and productivity, T index is decreasing and it is positive through the entire period. Positive index means that there are more sectors with positive Theil component than negative, i.e. more sectors have above average productivity and investments per employee, combined with large number of workers. For average investments, the sectors with the highest positive Theil component through entire period are sectors E, L, and J. Sectors with the smallest Theil component are sectors D, M, and N. For average productivity, sectors with the highest positive Theil component through entire period are sectors A, E, L, and J. Sectors with the smallest Theil component are sectors D, M, and N. For average wages, T index is negative through the entire period, except for year 2002, i.e. there are more sectors which have share in the distribution which is less than its fair share. For average wages, sectors with the highest positive Theil component through entire period are sectors E, L, N, and J. Sectors with the smallest Theil component are sectors D, A, and F. Applying the expression (3), we obtain the following results:

$$DLOG(Y) = 0.042945 - 0.917298*TI/L + 0.653225*TQ/L + 1.511357*TW/L$$

F-statistic - 0.07

Source: Author calculation

The calculation is made in Eviews 6.00, the econometric software. Our starting assumption about all three coefficients being positive was wrong. The second coefficient is negative, which means that increasing inequality in average investments will result in decreasing of the GVA growth rate. The other two coefficients were positive, i.e., rising inequality in average productivity and average wages will increase GVA growth rate.

5. DISCUSION AND CONCLUSION

Growth rate of the real GVA in the RS is positively correlated with unequal distribution of average wages and average productivity, and negatively correlated with unequal distribution of average investments. Rising inequality in average investments should lead to increasing a GVA growth rate, assuming that the highest positive Theil component has the real sector of the economy (A, C, D, E, and F for the RS). In the RS, sectors with the highest positive Theil component through the entire period are sectors E, L, and J. Sector E belongs to the real sector of the economy. But, this sector can be excluded from all analysis because it is 100% monopolistic, and it is 100% public corporation. This is sector whose product demand is perfectly inelastic. All investments in this sector have not resulted in the introduction of new and modern technology and increased capacity. Basically it comes to maintaining existing facilities. On the territory of the RS, the last power plant was built in 1989 (HPP in Visegrad). Sectors with the smallest Theil component are sectors D, M, and N. In the RS unequal distribution of average investments is in favour of public administration, public corporations, and financial sectors. These sectors are not productive, they do not create a new value, they belong to the service sector. Investments in the public administrations have for reasult a growing birocracy, and nothing more. The real sector is in mid-low and low section of Theil components. Our analysis shows that for the past eight years investments in the public administration are equal to investments in all real sector. This is an anomaly. We think that real growth can not be financed through the service sector, and therefore we have a negative correlation between real GVA growth and unequal distribution of

average investments. Sustainable growth must be financed through the real sector, education, and effective health care.

For average productivity, sectors with the highest positive Theil component through entire period are sectors A, E, L, and J. The real growth rate is positively correlated with unequal distribution of average productivity. Rising unequal distribution of average productivity should lead to increasing a GVA growth rate, assuming that the highest positive Theil component has the real sector of the economy. Instead, we have service sectors with the highest contribution to the Theil's index. These are the same sectors which have the highest contribution to the unequal distribution of average investments. It seems that the market system in the RS is effective. Sector A can be excluded from the analysis, because its share in total GVA is less than 1%, and because of nature of its activity. Sectors E, L, and J have above average share in total GVA combined with large number of employees. Sectors with the smallest Theil component are sectors D, M, and N. Again, it is not normal that real sector and education are far less productive than service sector. The GVA growth in the RS is a result of constantly growing credit market and public services, therefore, we have a positive correlation between GVA growth rate and unequal distribution of average productivity.

For average wages T index is negative through the entire period, except for year 2002, i.e. there are more sectors which have share in the distribution which is less than its fair share. For average wages sectors with the highest positive Theil component through the entire period are sectors E, L, N, and J. Sectors with the smallest Theil component are sectors D, A, and F. The strongest influence on the Theil's index have the same sectors which have the highest average productivity and the highest average investments. It is only natural to reward those sectors. Positive correlation can be the result of similar pattern of these two variables.

For the RS, inequality partially bursts economic growth. Growth in the RS is financed through service sector, which has the highest productivity and the highest wages as well. It seems that the market system in the RS is 100% fair and very effective. This kind of market system is a big anomaly. The real growth of the GVA cannot be financed through service sector and public administration. Sustainable growth cannot be a result of high labour productivity in financial sector and in public administration. Through the entire period, the real sector is in mid-low or low section of average investments, average productivity, and average wages. The real sector has a purchasing power twice less than public administration or financial sector. Also, the real sector has the same share in total investments as a public administration. The growth presented in our model is not sustainable, it is powered through expenditure, and it depends on loans from international financial institutions to preserve current expenditure. From year to year, the RS is spending more than it produces. Sustainable growth must be founded on its own production. Otherwise, the RS is heading to an increasing stratification and disappearing of the middle class. This leads to the enchanted cycle of poverty that is very difficult to break. Policy makers in the RS will have to change market conditions and public services to increase investments in the real sector, which will lead to increasing productivity, and finally to long-term growth of real GVA.

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