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Social Inequality, Human Capital and Economic Growth in OECD Countries. Synthesis*

INTRODUCTION

Interesting conclusions concerning the relationships between economic growth and inequalities arise from endogenous growth theory. The assumption of this theory is that human capital not only determines the rate of long-term growth, but also that based on this factor of production changes in income distribution between economic entities can be explained. Moreover, it can be observed from models of endogenous growth based on human capital, that smaller inequalities lead to increased pace of economic growth in the long-run.

Unfortunately, existing empirical research does not yield unambiguous conclusions on the directions of impacts of social inequality on economic growth. It is our thinking, that the cause of this ambiguity in results of these studies lies in over-aggregation of indicators of social inequalities.

The purpose of the article is therefore, to overview the theoretical and empirical literature and present the own analysis of relationships between economic growth, human capital and social inequalities, separated into activating and frustrating ones.

The article has been structured as follows. Paragraph 2 presents conclusions from the theory of endogenous growth as regards impacts of human capital on income inequalities between economic entities. Paragraph 3 presents conclusions of empirical studies on existing dependences between economic growth and inequalities. Paragraph 4 is a description of the classification of inequalities separated into activating types, i.e., for promoting growth and efficiency, and

frustrating types, i.e., those that impede economic growth. Paragraph 5 presents test methods applied as well as macroeconomic variables, along with the source of data therein contained. The summary and conclusions from discussions carried out are contained in the last, paragraph 7.

HUMAN CAPITAL AND INCOME INEQUALITIES IN ENDOGENOUS MODELS OF ECONOMIC GROWTH

It is understood from the theory of endogenous growth that, human capital enables changes in income distribution between economic entities to be explained. There are endogenous growth models, in which there exist perennial income disparities between economic entities [Romer, 1990; Lucas, 1988; Glomm and Ravikumar, 1992]. There are also such in which income disparities between economic entities either decrease or remain constant. In these models a key factor limiting income disparities is human capital, and in particular the additional requirements that accompany its accumulation, i.e.:

– the external effects associated with the accumulation of human capital, that occur at the family, neighbourhood, local community level as well as in the economy as a whole [Tamura, 1991, 2004; Benabou, 1996];
– the type of financing for education (public or private) [Glomm and Ravikumar, 1992; Benabou, 1996; Fernandez and Rogerson, 2003];
– fertility and mortality of microeconomic entities [Becker, Murphy and Tamura, 1991; Doepke, 2004; de la Croix and Doepke, 2003];
– heterogeneity of decisions taken by microeconomic entities regarding expenditures on education, [Cardak, 1999; Benabou, 2002].

For example, Glomm and Ravikumar [1992], in comparing public and private sources of funding for education, explained that accumulation of human capital limits income inequalities as a result of decreasing marginal productivity of human capital, i.e., in times of neo-classical growth, as well as of increasing marginal productivity of the factor of production in question, i.e., in times of endogenous growth. However, income inequality decrease when education is publicly funded but, not privately. In turn, Cardak [1999], by introducing differentiated preferences as regards education into Glomm's and Ravikumar's model [1992], suggests that, the magnitude of income disparity between employees decrease faster due to human capital accumulation in times of endogenous growth as against neoclassical.

Decreasing income inequalities also occur in models based on the external effects of human capital. The effects occur as a result of inter- and intragenerational relationships existing between economic entities. Consequently, an economic entity enriches its human capital through experience inherited from

his family (e.g. parents), as well as from other members of the national and international community, [Tamura, 2004; Benabou, 1996; de la Croix and Doepke, 2003]. Therefore, entities with a level of human capital, lower than the average for the community (family, national and international) accumulate this factor of production faster compared to subjects with a relatively higher level of human capital than the average. In consequence, there is an alignment of incomes between various subjects on the path of sustainable growth. It can be seen from these models that economies with smaller inequalities in the area of human capital and thus earned incomes, are characterized by higher rate of long-term economic growth than those with wider inequalities.

The de la Croix and Doepke model [2003], on the other hand opines that income inequalities are caused by disparities in fertility rates amongst economic entities. The fertility of each person becomes higher, the lower level of its human capital in relation to the average for a given population. Moreover, restricting inequalities in the area of human capital between subjects leads to lower disparities in fertility in the society. Consequently, less inequality in the distribution of human capital diminishes disparities in fertility rates thus leading to greater equality in the distribution of income between those microeconomic subjects.

From the models of economic growth presented, it cannot be conclusively deduced that the accumulation of human capital enhances the process of reducing income inequality amongst economic entities. They however show that, there exist possibilities for promoting egalitarian incomes through investment in human capital, without prejudice to the economic efficiency. In addition, less differentiation of incomes derived in a society enhances long-term economic growth. This relates mainly to highly developed economies where economic growth is essentially based on human capital.

INEQUALITY AND ECONOMIC GROWTH – REVIEW OF EMPIRICAL RESEARCH

The outcomes of theoretical research on inequalities and economic growth are feedbacks that exist between these economic categories. In consequence, empirical research consists of identifying the impact of growth on inequality and of inequality on economic growth.

Unambiguous conclusions have derived from the extensive researches undertaken by various authors to verify the assumption of the impact of growth on inequality. Deininger and Squire [1996], Chen and Ravallion [1997, pp. 357–382], Easterly [1999, pp. 239–276] and Dollar and Kraay [2002 pp. 195–225] imply in their studies that periods of accelerated economic growth did not tarry with changes in inequality. Based on this, Ferreira [2004] concludes that accelerated economic growth, in principle, enhances the reduction of social inequalities. This dependency was not however observed in Central and Eastern European countries.

However, in the case of research to determine the impact of inequality on growth three extreme interpretations can be observed. Alesina i Rodrik [1994, pp. 465–49][1] and Perotti [1996, pp. 149–187] explained the negative impact of inequality on economic growth based on estimated regressions using the least squares method. Banerjee and Durfo [2000] showed that the negative impacts of inequality on growth were, in most cases, deduced from these studies, which were based on the method of least squares, while in other cases, the conclusions were limited to the confirmation of positive impacts of inequalities in GDP growth.

Table 1. Relationship between growth and inequalities in empirical studies

Impact of growth on income distribution		Impact of income inequalities on growth		Impact of inequality in resources on growth		Impact of reallocation on growth	
Author	Type of impact	Author	Type of impact	Author	Type of impact	Author	Type of impact
Dollar, Kraay [2002]	n.a	Forbes [2000]	Positive	Deininger, Squire [1998]	Negative	Perotti [1996]	Positive
Easterly [1999]	n.a.	Li, Zou [1998]	Positive				
Chen, Ravallion [1997]	n.a	Barro [2000]	n.a				
Deininger, Squire [1996]	n.a	Lopez [2004]	n.a				
		Alesina, Rodrik [1994]	Negative				
		Perotti [1996]	Negative				

Source: [Lopez, 2005].

Li and Zou [1998, pp. 318–334] and Forbes [2000, pp. 869–897] on the other hand, using the Generalized Method of Moments explained the positive link between the inequalities and economic growth[2].

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[1] Alesina and Rodrik [1994] showed that disparities will reduce growth rate in democratic countries, but will be neutral to the growth of non democratic countries.

[2] Lopez [2004] showed the presence of a very poor relationship between inequalities and economic growth. 1% reduction in inequality (Gini index) result in reducing the rate of growth by 0,007% [Lopez, 2005].

The lack of any impact of inequality on economic growth was however, recorded by Barro, Charente [2000]. In analyzing this huge group of countries, the author does not confirm any influence, positive or negative, of inequalities on growth. However, he suggests that inequality seems to enhance growth in poor countries while impeding it in rich countries.

Despite the diversity of results of empirical analyses, it is however clear, that the relationships between economic growth and social inequalities are of highly complex nature. The question that therefore arises is, what could have led to the complexity and ambiguity in the links between these categories? Are they due to shortcomings of research methodologies, or to the properties of real processes i.e., the complexity of the nature of inequalities, their non-measurability and non-commensurability, the multi-dimensional impact of the different constituents of the structure as well as diversity of their impacts depending on the specific conditions of their occurrence?

ACTIVATING VERSUS FRUSTRATING TYPES OF INEQUALITY

Negative impacts of inequality of incomes on GDP growth rate at the early stage dominate publications on this subject [Perrson and Tabellini, 1994, pp. 600–621; Ferreira, 2004]. This view is often corroborated by increasing social costs of deepening incomparability of incomes. In consequence, this has resulted in additional direct and indirect inputs in the form of higher taxes, growing black market and crime, social and political conflicts, diminishing investments in human capital amongst the poor, the loss of social trust and capital incentives for competition. The negative impact of growing social inequality on the GDP per capita growth rate is also the result of declining social capital, i.e., waning trust, solidarity, and loyalty.

The search for a "fair" level of social inequality, i.e., maximising long-term growth rates of consumption per capita, would make sense only if empirical evidence could show dropping costs of transaction and increasing efficiency, and as a result the cost thus saved might be put to alternative uses.

It seems that the cause of ambiguity in results of empirical researches on the interactions between growth and inequalities is the use of synthetic indicators of inequalities, such as the Gini coefficient. These dependencies could be better categorized and understood, if it were possible to distinguish at least two groups of inequalities with quantifiable effects on costs and incomes as well as demand and supply.

The first group of inequalities, has been termed activating types. They include those connected with active adaptation[3]. As a result, they ought to trigger

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[3] This issue was first mentioned in Woźniak [2004], as well as Woźniak, Jabłoński [2008].

off social energy towards overcoming poverty and social exclusion, lead to focusing on productive activities, active adaptations for resolving the economic problems of individuals and families.

The second group of inequalities, the frustrating types, could be those connected with increasing crime, declining enthusiasm to cooperate, propagation of the acquired syndrome of helplessness, that invariably result in higher taxes, higher transactional costs, lower productivity and declining economic growth as well as inevitable increases in demand.

It seems that one of the determinants of this division could be the scale and scope of these inequalities. Frustrating inequalities are undoubtedly associated with persistent unemployment and it affects the socially excluded, touched by poverty, and living at subsistence level. However, this is not exhaustive of all the inequalities.

Unfortunately, official statistics are not suited to this type of analysis. No standards that can be used to precisely define when and in what circumstances could an observed inequality be classified into any of the listed groups have ever been set.

The proposed approaches to inequalities indicate the existence of cost and demand inequality effects, that are predominant when they are of a frustrating nature as well as of income, supply and demand effects which is characteristic of activating inequalities. Therefore, relying on synthetic measurements of social inequalities makes the determination of their impact on economic growth difficult. Suppositions, based on these approaches often contained in economic publications ought to be treated as coincidental.

The yet unresolved key issue is finding relevant determinants for frustrating and activating inequalities. A good determinant of activating inequality may be indicators illustrating differentials in wage levels for work between the best and the worst earning employees. A reflection of frustrating inequalities on the other hand, could be data on the percentage of people benefitting from social supports, the proportion of citizens living below poverty line, as well as the rate of long-term unemployment.

METHOD OF ANALYSIS AND MACROECONOMIC VARIABLES
AND SOURCE OF DATA[4]

The studies were based on a group of countries belonging to the Organisation for Economic Cooperation and Development (OECD) during 1994–2008. The limitation of the period to 1994–2008 was due to the availability of comparable statistical data and the nature of economic growth in post-socialist OECD countries. In comparison to countries with stable market and capitalist systems

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[4] For detailed description of method of analysis and the results of calculations see: [Jabłoński, Woźniak, 2011, s. 193–223].

statistical data for the Czech Republic, Poland, Slovakia and Hungary became available only from 1992–1993. Moreover, studies on market introduction processes have shown, that in transforming under recession, patterns of growth in post-socialist countries were overtly affected by legacies of central planning.

Table 2. Macroeconomic variables, their symbols and the source of data

Name of variable	Symbol	Source
GDP per capita at constant prices by PPP, USD, prices fixed since 2000.	GDP p.c.	OECD [2010]
Investment rate measured as %GDP	inv	WDI [2010]
Average increase in consumer price in a year (excluding end of year)	infl	OECD [2010]
Human capital – education		
Public and private expenditures on education, measured in % GDP	edu_exp	OECD [2010][5]
Proportion of workforce with elementary education	LF_primar	WDI [2010]
Proportion of workforce with secondary education	LF_second	
Proportion of workforce with tertiary education	LF_tertiar	
Human capital – health		
Expenditure on healthcare, measured in % GDP	health_exp	OECD [2010]
life expectancy at time of birth	life_expect	
child mortality rate per 1000 live-births	babies	
number of doctor per 1000 residents	physician	
Inequalities		
The Gini coefficient	Gini	Eurostat [2010]
Activating types of inequalities		
Minimum to average pay relationship	in_ak1	OECD [2010]
relationship in levels of remuneration 9 to 1 quantiles	in_ak2	
Frustrating types of inequalities		
Proportion of work force unemployed longer than 12 months	in_fr1	OECD [2010][6]
Proportion of work force unemployed from 6 to 12 months	in_fr2	

Source: own calculations.

Consequently, processes of reallocation rather than accumulation of factors of production became dominant in these economies. Following their attainment

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[5] The value of the edu_exp measurable for OECD countries was calculated based on OECD [2010] data on public and private expenditure as a component of the global demand, as well as the GDP of countries surveyed.

[6] Values of In_fr1 and in_fr2 indicators were calculated on the basis of data published by the OECD [2010] on the number of unemployed persons from 6 to 12 months and over 12 months, the number of working age population (workforce).

of a positive growth path in GDP, a point has thus been set, after which the economies of those countries became characterized by natural growth processes [Havrylyshyn, 2001, 2008; Popov, 2000, 2006]. It is therefore assumed that processes of accumulation rather than reallocation of resources[7] have since 1994 been dominating in all post-socialist OECD countries.

Statistical analyses were carried out in three stages.

– The first stage consisted in identifying trends of the relationships between rate of economic growth, human capital and social inequalities.

– The second phase of the study consisted in calculating the value of parameters of the regression equation of economic growth (independent variables: human capital and social inequalities) and social inequalities (independent variable: human capital).

– The third phase of the study consisted in identifying the impact of human capital and activating and frustrating types of inequality on the economic growth of countries surveyed compared to other determinants of real economic processes[8].

The studies were carried out on temporary-cross-sectional data consisting of 16 indicators reflecting the level of economic development, human capital, social inequality, and other major determinants of economic growth in OECD countries, which were presented in table 2.

RESULTS OF CALCULATIONS AND FINAL CONCLUSIONS

Dependences existing between human capital, economic growth and social inequalities, including activating and frustrating types during 1994–12008 were analyzed based on statistical data for OECD countries.

The following conclusions can be drawn from the identified dependences existing between growth rate and level of GDP per capita and also human capital (table 3).

1. Human capital which embodies level of education as well as investment in education, is characterised by a positive correlation with rate of growth of GDP per capita in countries surveyed. It was demonstrated in the study that the percentage of workforce with secondary and tertiary education is much more positively correlated with economic growth, than the percentage of workforce with elementary education.

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[7] Transformation in recession ended earliest in Poland (1991), while in the Czech Republic including Hungary and Slovakia it ended in 1992 and 1993 respectively.

[8] Parameters of the regression equations were calculated using the fixed effect metod.

2. In the course of undertaking the calculations, it was observed that the values of coefficients of correlation between human capital, indicated as standard of health including investments in its maintenance as well as of economic growth had values contrary to that expected. Therefore, there is lack of premise for a positive verification of the hypotheses about a strong positive correlation between quality of health and the investments in health maintenance and economic growth. Nevertheless, one should bear in mind that it can be reasoned from the values of these coefficients of correlation that the effects of convergence is very strong in these countries. Consequently, as GDP per capita grew the rate of economic growth tended to decline in the countries surveyed. Moreover, as the standard of living, measured by GDP per capita improved, the standard of health including expenditures on health maintenance increased as well. Consequently, it is not surprising that, in the course of these studies, negative values of coefficients of correlation between the GDP per capita growth rate and indicators of health standards including investments in its maintenance were observed.

Table 3. Correlation coefficients between the rate of growth and the level of GDP per capita, including selected macroeconomic variables for OECD countries

Variable	GDP per capita rate of growth			GDP per capita		
	Correlation coefficient	Value p	Sample number	Correlation coefficient	Value p	Sample number
Inv	0,169	0,000	441	-0,189	0,000	471
Infl	-0,034	0,454	466	-0,404	0,000	496
GDP p.c.	-0,166	0,000	466	---	---	---
Indicators of human capital						
edu_exp	0,079	0,157	319	-0,103	0,062	319
LF_primar	-0,047	0,371	356	-0,238	0,000	364
LF_second	0,113	0,033	351	0,037	0,475	359
LF_tertiar	-0,099	0,059	356	0,455	0,000	364
health_exp	-0,250	0,000	413	0,504	0,000	442
life_expec	-0,224	0,000	416	0,678	0,000	446
Babies	-0,034	0,484	407	-0,535	0,000	437
physician	-0,112	0,025	393	0,229	0,000	419
Indicators of social inequality						
Gini	0,020	0,771	208	-0,339	0,000	208
in_ak1	-0,014	0,806	297	0,249	0,000	316
in_ak2	0,165	0,010	238	-0,130	0,038	250
in_fr1	0,212	0,000	437	-0,410	0,000	464
in_fr2	0,161	0,000	437	-0,464	0,000	464

Legend: value p – level of statistical significance student's t-distribution

Source: own calculations based on data source as presented in table 2.

3. It is observable from the regression analyses of GDP per capita growth rate in the OECD countries, where the variables were alternatively human capital and the inequalities, that the macroeconomic variables analyzed had significant impact on growth in the countries surveyed. Majority of the calculations presented suggested a positive impact of human capital on economic growth of these economies.

The following conclusions can be drawn from the diagnoses of dependences existing between growth rate and level of GDP per capita as well as social inequalities (tables 4 and 5).

**Table 4. The results of estimates of regression
for GDP per capita growth rate for OECD countries**

Variable	Dependent variable: GDP per capita rate of growth								
Constant	0,025	0,019	0,036	0,057	0,031	0,057	-0,035	0,063	0,017
Value p	0,000	0,000	0,000	0,009	0,000	0,022	0,032	0,004	0,000
edu_exp	0,000								
Value p	0,048								
LF_primar		0,024							
Value p		0,102							
LF_tertiar			-0,040						
Value p			0,041						
health_exp				-0,003					
Value p				0,009					
babies					-0,001				
Value p					0,114				
Gini						-0,001			
Value p						0,218			
in_akt1							0,171		
Value p							0,000		
in_ak2								-0,012	
Value p								0,079	
in_fr1									0,266
Value p									0,000
R^2	0,239	0,267	0,270	0,258	0,286	0,338	0,231	0,305	0,234
adjusted. R^2	0,160	0,200	0,203	0,200	0,230	0,260	0,173	0,234	0,178
Size of sample	321	358	358	415	409	210	299	240	439
No. of countries	30	30	30	30	30	22	21	22	30

Legend: value p – level of statistical significance student's t-distribution.

Source: own calculations based on source data contained in table 2.

1. Social inequalities measured using Gini coefficient, impeded the GDP per capita growth rate in OECD countries.
2. It is difficult to reach, based on the estimates, conclusive decisions on the impact of both activating and frustrating types of inequalities on growth of GDP per capita of OECD countries.
3. Increasing wage disproportion, understood in this paper to be activating type of inequalities increased the rate of economic growth in OECD countries (table 7). These calculations are not however, hard evidences to confirm the hypothesis of the positive impact of activating types of inequalities on rate of economic growth.
4. In addition, the results show that the level of long time unemployment as a frustrating type of inequalities led to increased GDP per capita growth rate. It is important, however, to note the strong influence of conditions that associated economic growth and development in post-socialist countries of the OECD on the group surveyed. It is also worthy of mention that most analyses of moves towards market economy in post-socialist countries point to economic growth devoid of unemployment in these countries, especially during the 1990s.
5. As the living standards, measured in GDP per capita, in these countries increased there were decreases in social inequalities show as the Gini synthetic index. Declines were also observed in frustrating types of inequalities reflected as proportion of workforce lingering in unemployment for 6 or more months.

From the results of analysis on dependences between human capital and inequalities the following conclusions can be made (tables 5 and 6).

1. Increasing the percentage of workforce with higher education, and expenditure on health care as well as improving health standards, reflected in the prolongation of life expectancy and in lower infant mortality, escalated the scale of income inequality, measured by the Gini coefficient. In consequence of these estimates, there exists contradictory conclusions regarding the impact of human capital on inequalities in relation to convictions evolving from endogenous growth theory.
2. However, the results of the estimates, where the described variables were indicators of the activating and frustrating types of social inequalities were measures of social inequalities, have proven to be compatible with deductions taken from potential dependences existing between human capital and income disproportions. The following findings are worthy of special notice.
   – Intensification of investments in education and health care increased activating types of inequalities while diminishing frustrating types of inequalities. Therefore, increases in these expenses led to growing disproportions in level of salaries but curtailed the level of long-term unemployment, which is a manifestation of frustrating type of inequalities.
   – Growing proportion of workforce with secondary and tertiary education provoked increases in activating inequalities but reduced frustrating inequalities.

Table 5. Results of the estimates of the regression for indicators of inequalities for OECD countries

Variable	Description of variable														
	Gini	Gini	Gini	Gini	in_ak1	in_ak1	in_ak1	in_ak2	in_ak2	in_ak2	in_ak2	in_ak2	in_ak2	in_ak2	in_ak2
Constant	26,94	24,34	-2,901	30,88	0,334	0,135	0,376	2,301	3,378	3,023	2,937	1,942	-5,371	3,698	2,122
Value p	0,000	0,000	0,770	0,000	0,000	0,224	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
edu_exp								15,22							
Value p								0,000							
LF_primar									-0,719						
Value p									0,000						
LF_second					0,051					0,400					
Value p					0,035					0,093					
LF_tertiar	7,695										1,014				
Value p	0,041										0,000				
health_exp		0,488										0,145			
Value p		0,009										0,000			
life_expec			0,401			0,002							0,110		
Value p			0,001			0,047							0,000		
babies				-0,48			-0,002							-0,104	
Value p				0,001			0,002							0,000	
physician															0,415
Value p															0,000
R^2	0,912	0,905	0,908	0,909	0,899	0,890	0,886	0,970	0,947	0,944	0,948	0,955	0,969	0,971	0,952
adjusted R^2	0,899	0,892	0,896	0,897	0,889	0,882	0,877	0,966	0,940	0,937	0,942	0,951	0,966	0,968	0,946
Size of sample	161	189	188	187	241	297	287	185	205	200	205	245	243	234	231
No of countries	21	22	22	22	21	21	21	22	22	22	22	22	22	22	22

Legend: value p – level of statistical significance student's t-distribution

Source: own calculations based on source data contained in table 2.

Table 6. Results of estimates of the regression for indicators of inequalities for OECD countries

Variable	Description of variable												
	in_fr1	in_fr1	in_fr1	in_fr1	in_fr1	in_fr1	in_fr2	in_fr2	in_fr2	in_fr2	in_fr2	in_fr2	in_fr2
Constant	0,021	0,045	0,068	0,270	0,026	0,070	0,010	0,016	0,015	0,028	0,133	0,010	0,027
Value p	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
LF_primar	0,025						0,009						
Value p	0,008						0,004						
LF_second								-0,007					
Value p								0,040					
LF_tertiar		-0,068							-0,012				
Value p		0,000							0,003				
health_exp			-0,005							-0,001			
Value p			0,000							0,000			
life_expec				-0,003							-0,001		
Value p				0,000							0,000		
babies					0,000							0,000	
Value p					0,220							0,000	
physician						-0,015							-0,005
Value p						0,000							0,000
R^2	0,781	0,794	0,766	0,769	0,742	0,782	0,766	0,762	0,766	0,742	0,766	0,724	0,791
adjusted R^2	0,761	0,775	0,749	0,752	0,723	0,764	0,744	0,740	0,745	0,723	0,749	0,703	0,774
Size of sample	359	359	432	436	427	410	359	354	359	432	436	427	410
No of countries	30	30	30	30	30	30	30	30	30	30	30	30	30

Legend: value p – level of statistical significance student's t-distribution

Source: own calculations based on source data contained in table 2.

- The impact of the percentage of the workforce with elementary education on the two types of inequalities was, however, contrasting. Thus, increased participation of workforce with elementary education escalated frustrating types of inequalities while reducing the activating types. This conclusion seems adequate having noted the fact that the OECD countries surveyed are highly developed. Consequently, their economic growth and development rely largely on high level qualifications and skills which are lacking among employees with elementary education.

Table 7. Results of estimating the regression of GDP per capita growth rate for OECD countries

Variable	Dependent variable: GDP per capita rate of growth				
Constans	-0,091	0,276	-0,147	-0,046	-0,081
Value p	0,000	0,000	0,000	0,278	0,004
inv	0,207	0,073	0,283	0,259	0,192
Value p	0,000	0,144	0,000	0,001	0,003
infl		-0,088		-0,121	
Value p		0,000		0,000	
edu_exp			0,000	0,000	
Value p			0,203	0,014	
LF_primar					0,022
Value p					0,169
health_exp				-0,006	
Value p				0,012	
life_expec		-0,003			
Value p		0,001			
babies	-0,000				-0,001
Value p	0,071				0,055
in_akt1	0,223		0,313	0,204	0,195
Value p	0,000		0,000	0,001	0,000
in_fr2		-0,470			
Value p		0,097			
R^2	0,329	0,320	0,288	0,378	0,331
adjusted R^2	0,266	0,260	0,200	0,293	0,252
Size of sample	268	409	209	208	228
No of countries	21	30	21	21	21

Legend: value p – level of statistical significance student's t-distribution

Source: own calculations based on source data contained in table 2.

In light of the discussions undertaken several proposals for future research can be proffered.

1. The need to identify existing differences between countries with stable market-capitalist economies and post-socialist ones due to:
   - impacts of activating and frustrating types of inequalities on economic growth,

– influence of human capital on social inequalities.
2. The need to diagnose the extent to which human capital has become a causative factor and hence a de facto factor of real economic processes and to diagnose how this has been the outcome of convergence effects, i.e., growing demand for investment in education and healthcare.

REFERENCES

Alesina A., Rodrik D., 1994, *Distributive policies and economic growth*, "Quarterly Journal of Economics", vol. 109.

Banerjee A.V., Durfo E., 2000, *Inequality and growth: What can the data say?*, Working Paper 7793, NBER, July.

Barro R.J., 2000, *Inequality and growth in a panel of countries*, "Journal of Economic Growth", vol. 5.

Becker G.S., Murphy K.M., Tamura R., 1990, *Human capital, fertility, and economic growth*, "Journal of Political Economy", vol. 98, no. 5, part 2.

Benabou R., 1996, *Heterogeneity, stratification, and growth: macroeconomic implication of community structure and school finance*, "American Economic Review", vol. 86.

Benabou R., 2002, *Tax and education policy in a heterogeneous-agent economy: What levels of redistribution maximize growth and efficiency?*, "Econometrica", vol. 70, no. 2.

Cardak B.A., 1999, *Heterogeneous, preferences, education expenditures and income distribution*, "The Economic Record", vol. 75, no. 228.

Chen S., Ravallion M., 1997, *What can new survey data tell us abort recent changes in distribution and poverty?*, "The World Bank Economic Review", vol. 11, no. 2.

de la Croix D., Doepke M., 2003, *Inequality and growth: Why different fertility matters*, "The American Economic Review", vol. 93, no. 4.

Deininger K., Squire L., 1996, *A new data set measuring income inequality*, "World Bank Economic Review", no. 10.

Doepke M., 2004, *Accounting for fertility decline during the transition to growth*, "Journal of Economic Growth", no. 9.

Dollar D., Kraay A., 2002, *Growth is good for the poor*, "Journal of Economic Growth", vol. 7.

Easterly W., 1999, *Life during growth*, "Journal of Economic Growth", vol. 4.

Eurostat, 2010, data extracted on the 2 May 2010 from http://epp.eurostat.ec.europa.eu.

Fernandez R., Rogerson R., 2003, *Equity and resources: An analysis of education finance systems*, "The Journal of Political Economy", vol. 111, no. 4.

Ferreira H.G., 2004, *Inequality and economic performance. A brief overview to theories of growth and distribution*, paper prepared for the http://www.worldbank.org, extracted on the 4 July 2004.

Forbes K., 2000, *A reassessment of the relation between inequality and growth*, "American Economic Review", vol. 90.

Glomm G., Ravikumar B., 1992, *Public versus private investment in human capital: endogenous growth and income inequality*, "Journal of Political Economy", vol. 100.

Havrylyshyn O., 2001, *Recovery and Growth in Transition: A Decade of Evidence*, "IMF Staff Papers", vol. 48, Special Issue: Transition Economies: How Much Progress?.

Havrylyshyn O., 2008, *Growth recovery in CIS countries: the minimum threshold of reform*, "Comparative Economic Studies", vol. 50, no. 1, p. 53–78.

Jabłoński Ł., Woźniak M.G., 2011, *Nierówności społeczne, kapitał ludzki a wzrost gospodarczy w krajach OECD*, Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu, nr 176, p. 193–223.

Li H., Zou H., 1998, *Income inequality is not harmful for growth: theory and evidence*, "Review of Development Economics", vol. 2, no. 3.

Lopez J.H., 2004, *Pro-poor-Pro-growth: Is there a trade off?*, "Policy Research Working Paper", The World Bank, no. 3378.

Lopez J.H., 2005, *Pro-poor growth: a review of what we know (and of what we don't)*, paper prepared for the www.worldbank.org, extracted on the 5 July 2005.

Lucas R.E., 1988, *On the mechanics of economic development*, "Journal of Monetary Economics", no. 22.

OECD, 2010, OECD statistics portal, data extracted on the 2 May 2010 from http://stats.oecd.org/WBOS/index.aspx.

Perotti R., 1996, *Growth, income distribution and democracy*, "Journal of Economic Growth", 1996, vol. 1, p. 149–187.

Perrson T., Tabellini G., 1994, *Is Inequality Harmful for Growth?*, "American Economic Review", vol. 84, no. 3.

Popov V., 2000, *Shock therapy versus gradualism: The end of the debate (explaining the magnitude of the transformation recession)*, "Comparative Economic Studies", vol. 42, no. 1, Spring, p. 1–57.

Popov V., 2006, *Shock therapy versus gradualism reconsidered: Lessons from transition economies after 15 years of reforms*, TIGER Working Paper Series, no. 82.

Romer P., 1990, *Endogenous technological change*, "Journal of Political Economy", vol. 98, p. 71–102.

Tamura R., 1991, *Income convergence in an endogenous growth model*, "Journal of Political Economy", vol. 99, no. 31, p. 523–540.

Tamura R., 2004, *Human capital and economic development*, Federal Reserve Bank of Atlanta, Working Papers Series, WP 2004–34, December.

WDI, 2010, *World Development Indicators*, Online database, worldbank.org, (02.05. 2010).

Woźniak M.G., 2004, raport z Badań Statutowych pt. Kapitał ludzki i intelektualny jako czynnik wzrostu i ograniczania nierówności społecznych w Polsce, nr 14/KMae/4/ 2004/S/125 zrealizowany w Katedrze Makroekonomii, Akademia Ekonomiczna w Krakowie pod kierunkiem: M.G. Woźniaka.

Woźniak M.G., Jabłoński Ł., 2008, *Nierówności społeczne i akumulacja kapitału ludzkiego a wzrost gospodarczy. Próba empirycznej weryfikacji współzależności na przykładzie Polski*, Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie, nr 786, p. 43–67.

Summary

The aim of the paper is the statistical analysis of economic growth, human capital and inequality, which are disaggregated into activating and frustrating inequalities. The research was conducted on the OECD-countries during 1994–2008. The article consists of presenting the findings from the endogenous growth theory referring to the human capital impact on the income inequality, and findings from the empirical research between economic growth and income inequality. The following parts present disaggregated nature of inequality, i.e. activating, which foster economic growth and frustrating that mitigate the economic growth. The essential part of the paper is the empirical analysis of the relations between inequality, human capital and economic growth in the OECD countries. The conducted research provide strong arguments for anticipating the two natures of the inequalities in the economic growth research. The results of the calculations are not enough strong basis for producing findings about the relations between the economic categories concerned. However, it is justified to emphasize that human capital fosters the activating inequality and mitigates frustrating inequality. Thus, the activating inequality fosters economic growth and frustrating one limits the rate of economic growth.

Nierówności społeczne, kapitał ludzki i wzrost gospodarczy w krajach OECD. Synteza

Streszczenie

Celem artykułu jest statystyczna analiza wzrostu gospodarczego, kapitału ludzkiego oraz nierówności, zdezagregowanych do nierówności typu aktywizującego i frustrującego. Badanie przeprowadzono na grupie krajów OECD w latach 1994–2008. W artykule zawarto obszerną prezentację wniosków wynikających z endogenicznej teorii wzrostu gospodarczego odnoszących się do wpływu kapitału ludzkiego na nierówności dochodowe, a także wyników badań empirycznych nad zależnościami występującymi między nierównościami a wzrostem gospodarczym. Kolejna część artykułu wyjaśnia istotę dezagregacji nierówności na aktywizujące, a więc wspierające wzrost gospodarczy oraz frustrujące, czyli spowalniające wzrost gospodarczy. Zasadnicza część artykułu odnosi się do przeprowadzonych badań statystycznych nad zależnościami występującymi między wzrostem gospodarczym, kapitałem ludzkim oraz dwoma typami nierówności w krajach OECD. Z badań wynikają dość mocne argumenty przemawiające za ujmowaniem w badaniach teoretycznych i empirycznych dwoistej natury nierówności. Wyniki obliczeń uniemożliwiają dokonanie konkretnych rozstrzygnięć między analizowanymi kategoriami ekonomicznymi. Jednakże z wyników badań empirycznych wynika, iż akumulacja kapitału ludzkiego pogłębia nierówności aktywizujące oraz ogranicza nierówności typu frustrującego. W związku z tym w badaniu tym stwierdzono, że nierówności typu aktywizującego wspierają, zaś nierówności typu frustrującego spowalniają wzrost gospodarczy.