# Re-examining the relationship between economic growth and inequality in the New Member States

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Abstract:

The link between income inequality and economic growth has raised many debates in the literature and has generated a large spectrum of results over time. This paper aims at analyzing the relationship between economic growth and income inequality, as well as their macroeconomic and institutional determinants in the New Member States, between 2000 and 2009. In the presence of a set of explicative variables, the economic growth influences the social inequality through a U-shaped relationship. Health, education and gross capital formation generate different direct and indirect effects on income inequality as the per capita GDP growths, while the transition indicators are found to be either common or specific determinants of inequality and growth.

## Introduction

At present, the European Union has to face a spiral of economic and social problems that have cumulated over time, especially after the global economic crisis that hit the world in 2007. The weak growth prospects in the long term, the rise of inequality and unemployment affecting especially youth, and the poor shape of public finances are challenges for the EU cohesion policy, but in the same time they represent the reasoning for the configuration of new EU social policies. The experience of Old Member States facing high budgetary deficits between 2009 and 2010 has shown that instead of supporting inefficient economic sectors by fiscal

policies, the national, regional and EU level- policies must stimulate the sustainable growth and economic convergence. In this new context, the EU institutes, as well as the regional, national and local institutes must collaborate and strengthen their role in promoting long-term pro-growth policies and reducing inequality and poverty, which are indirectly induced by the achievement of economic goals.

The adoption of pro-growth policies in general, and especially during the global economic crisis, must tackle the underlying economic and social imbalances accompanying the crisis in the EU economies. In the decades before the crisis, the economic growth produced just few jobs, widened income inequalities and reduced the weight of wages in national income in most of EU countries. The future economic growth needs therefore an employment-oriented framework to support acceleration of the job rich recovery.

In the aftermath of the global economic crisis, the European Union is in train to conceive and to follow a new growth model, based on innovation, sustainable growth and regional endogenous growth assets, aimed to ensure smart, sustainable and inclusive growth. This new model imposes the improvement of coordination between the national, regional and EU-level institutions and the strengthening of the role played by regions, cities and local institutions (also mentioned in the Europe 2020 strategy). But a stronger and new cohesion policy is also needed to support the social disequilibria generated by the new concept of growth.

The long-term and sustainable growth, as well as the triangle growth-poverty-inequality, is not a key issue only in the EU development strategies, but in the whole world, including the United States. The Word Bank, together with the Hewlett Foundation, and the Governments of Australia, Netherlands, Sweden, and the United Kingdom, has formed the Commission on Growth and Development - an independent

group of policy makers, business leaders and scholars. According to their theoretical orientation, 'growth is not an end in itself. But it makes it possible to achieve other important objectives of individuals and societies. It can spare people *en masse* from poverty and drudgery. Nothing else ever has. It also creates the resources to support health care, education, and the other Millennium Development Goals to which the world has committed itself' (CGD, 2008, p.1). In their view, a competitive environment is the most important condition which ensures the sustainable growth.

> *Growth ... is the result of competitive pressure. Governments committed to growth must therefore liberalize product markets, allowing new, more productive firms to enter and obsolete firms to exit. They must also create room to manoeuvre in the labour market, so that new industries can quickly create jobs and workers can move freely to fill them* (CGD 2008, p. 6).

This paper sheds some light on the relationship between economic growth and income inequality in the presence of common and specific determinants in the New Member States (NMS). Most papers studying this issue in the EU either look at the whole EU, or catch only the period before the global crisis. New empirical insights based on the latest available data produced by the World Bank, Eurostat and European Bank for Reconstruction and Development could be useful for governmental policy purposes, especially in the context of the new post-crisis EU growth strategy.

The paper is structured as follows. The first section of the paper is the introduction. Section 2 consists of the literature review and points out the lack of consensus regarding the relationship economic growth-income inequality. Section 3 presents the methodology that will be applied in the empirical part, as well as a brief

description of data. Section 4 presents our econometric results, while the section 5 concludes.

## Literature review

As economic growth and inequality reduction are both important targets for any government in the EU, especially when considering the dramatic economic and social consequences of the global economic crisis, some questions regarding the optimal governmental policies arise. Are pro-growth policies also beneficial for the improvement of income distribution? What kind of economic growth allows reducing income inequalities? Or are there other factors enhancing both the economic growth and decrease of income inequality? To answer these questions, one should first establish the causality of the relationship between growth and inequality, as well as their common and specific determinants. There is a large body of literature studying the relationship economic growth-income inequality, but the findings are diverse, depending on the group of countries selected and the period of time considered.

According to Kuznets (1955), the relationship between economic growth and social inequality takes the form of an inverted –U, which suggests that in early stages of development inequality increases, it reaches a maximum point at a medium level of income, and declines when the average level of per capita income is relatively high. Most of studies testing the Kuznets hypothesis used cross-sectional data and only a few used time-series data. The results are contrasting but it seems that the cross-sectional studies are more supportive for the Kuznets hypothesis (Deininger and Squire, 1996).

The seminal work of Kuznets (1955) has opened a long series of debates about the form and peculiarities of the interactions social inequality-economic growth,

based on the empirical evidence raised by the analysis of different groups of countries (Anand and Kanbur, 1993; Alesina and Rodrik, 1994; Barro, 2000, Galbraith and Kum, 2003; Deutsch and Silber, 2004). Even though the findings are of different types and sometimes quite divergent (which is partialy explained by the use of different methodologies), some similar conclusions occur over time: the economic growth is conditioned by income inequality; in some cases the relationship income inequality- economic growth has an inverted U-shaped form (Deininger and Squire, 1996; Galor and Tsiddon, 1996; Higgins and Williamson, 2002), while in others a negative relation is identified (Ravallion and Chen, 1997) or no relationship (Fields, 1980) is found.

In the New Member states, a high level of income inequality has determined the shrinking of middle class and obstruction of economic growth (Kornai, 2000). This evidence has a theoretical explanation. In early stages of development inequality stimulates economic growth because the wealth accumulated by a small number of people allows investments and production, but in another perspective this might be detrimental for economic growth, because the access to such economic activities is limited.

Looking at the common factors affecting both economic growth and social inequality, Keane and Prasad (2001) found that if two countries had the same extent of reform and the same initial conditions, the country that permitted a 10 percent greater increase in inequality in terms of the Gini measure would experience a real GDP growth rate that was about 1 percentage point lower.

One of the most important factors of economic growth is the institutional factor. There is a wide range of literature showing that informal and formal community level institutions have a positive impact on economic growth (Zak and Knack, 2001; Knack,

2003; Beugelsdijk and van Schaik, 2005; Bengtsson, Berggren and Jordahl, 2005). It is well acknowledged that the enforcement characteristics of institutions explain better than their nature the differences between the effectiveness of governmental policies and governance across countries (North, 1990; LaPorta et al, 1999; Acemoglu, Johnson and Robinson, 2004)[1].

One channel through which institutions shape patterns of economic growth is the socio-economic one, because institutions stimulate individual participation and confidence. Another channel and probably the most important is the political channel (Acemoglu, Johnson and Robinson, 2004; Tabellini, 2005). The institutions can mitigate the distributional conflict, by facilitating access to/ delivery of public goods, protecting minorities and disadvantaged persons etc. Therefore institutions indirectly stimulate economic growth by bringing positive effects in terms of governmental policies. The economic institutions are important for economic growth because they influence the structure of economic incentives, investments in human and physical capital and technology, and organization of production. Also they help to allocate resources on efficient bases, facilitate and encourage factor accumulation.

For North and Thomas (1973), the most important explanation of comparative economic growth is given by differences in institutions. In their view, innovation, education, capital accumulation 'are not causes of growth; they *are* growth'. Or, in other words, they are *proximate* determinates of growth.

The quality of institutions is linked not only to economic growth, but also to income inequality. While the institutional settings have a positive effect on economic growth, inequality negatively affects institutional quality and slows growth (Easterly

[1] The empirical findings regarding the relationship between economic growth and institutions often indicate a positive and strong relationship on long term. The validity of results is sometimes contested because of the endogeneity problems which occur in the analysis of this relationship (Tabellini, 2005).

2001; Keefer and Knack, 2002). At least at a theoretical level, poor-quality institutions may be conducive to income inequality, but in the same time high income inequality can subvert institutions because the rich have a strong political influence. The second causal relationship is stronger especially in the poor countries and explains why they fail to pursue dramatic institutional reforms (Chong and Gradstein, 2004).

In literature there is a large consensus that education generates positive effects on economic growth and reduction of income inequality and poverty. Barro (1997) finds that one extra year of education (for men) raises the growth rate by 1.2% p.a.. Topel (1999) and Sianesi and van Reenen (2003) also find, using different methodologies, that the effects of education on growth are implausibly large. Krueger & Lindahl (2001) identify a positive link between education and growth, especially for the countries with low average levels of education. For this particular group of countries, education contributes positively to growth while, for high levels of education, it depresses the rate of growth.

Most studies find a negative relationship between income inequality and median educational attainment (De Gregorio and Lee, 2002; Park, 1996; Ram, 1984), although positive correlations (Deininger and Squire, 1998) or U-shaped relationship are also found (Checchi, 2000). Particularly, higher enrolments at the secondary level are associated with decreased income inequality (Alderson & Nielsen, 2002; Barro, 2000; Bourguignon & Morrisson, 1990).

Health has been considered in literature as a capital productive asset and an engine of economic growth (Barro, 1996). The Solow model of growth is extended by Mankiw et al. (1992) who includes the human capital among the determinants of economic growth. Bloom and Canning (2000) explain healthy individuals are more receptive at new knowledge and, in consequence they obtain higher productivity

levels, with positive implications for economic growth. Significant results attesting the influence of health capital on growth are found when different periods of time and group of countries are analyzed (Grossman, 1972; Mankiw et al., 1992; Barro, 1996; Bloom et al., 2001). The evidence of the relationship between income distribution and population health reflects different findings, depending on the sample size, period of analysis and areas under examination (Wilkinson and Pickett, 2006).

Research has also analyzed the link between economic growth and macroeconomic policies and reforms. The literature indicates that lower inflation rates are associated with higher growth rates (Fisher and Sahay, 2004; Fischer et al., 1996), economic reforms are beneficial for growth, especially on middle term (De Melo et al., 2001), and liberalisation and small-scale privatisation are the main determinants of economic growth (Havrylyshyn and van Rooden, 2003).

Rising corruption has been found in literature to be linked with income inequality and economic growth, when countries at different stages of development and with different growth experiences are analyzed. The high corruption increases income inequality and poverty by reducing the economic growth, the progressivity of tax system, the level and effectiveness of social spending, and the formation of human capital, and by perpetuating an unequal distribution of asset ownership and unequal access to education (Gupta et al, 1998).

## Methodology and data

In our paper, the relationship between economic growth and inequality is suspected to be a bilateral one, so that both economic growth and inequality might be influenced by common and specific economic, social, demographic and institutional factors.

This paper follows the methodological approach developed by Lundberg and Squire (2003), in which the equations of economic growth and inequality take the following form:

$$\Delta y_{it} = S'_{it}\alpha + X'_{it}\beta + u_{it} \tag{1}$$

$$Gini_{it} = S'_{it}\omega + Z'_{it}\psi + e_{it} \tag{2}$$

Where $\Delta y_{it}$ represents the economic growth, $X$ is a vector of explicative variables of economic growth, $Z$ is a vector of inequality' explicative variables, $S$ is a vector of common explicative variables for both growth and inequality, while $u_{it}$ and $e_{it}$ are the error terms. Subscript $i$ denotes country and $t$ denotes the period of reference.

To also include economic growth and inequality as explicative variables in the inequality and respectively economic growth models, equations (1) and (2) can be also written as:

$$\Delta y_{it} = S'_{it}\alpha + X'_{it}\beta + \lambda Gini_{it} + u_{it} \tag{3}$$

$$Gini_{it} = S'_{it}\omega + Z'_{it}\psi + \xi\Delta y_{it} + e_{it} \tag{4}$$

In the empirical part, different estimation models have been comparatively examined and finally the Generalized Least Squares (GLS) has been selected.

To examine whether the relationship growth-inequality has an inverted U-shape, as well as to analyze the direct versus indirect effects of some explicative variables on inequality, a special form of equation (2) has been used.

$$Gini_{it} = \beta \ln y_{it} + Z'_{it}\psi + Z'_{it}\psi \ln y^2_{it} + e_{it} \tag{5}$$

Where, *Z* is a vector of explicative variables of income inequality that could generate both direct and indirect effects on inequality. The model specified in equation (5) relies on other standard models used in the literature (Davis, 2007; Bhandari et al, 2010).

The study uses data from the 10 New Member States, over the period 2000-2009. The main variables of interest are income inequality measured by the Gini coefficient, and the real per capita economic growth rate. Beside them, the analysis uses standard variables usually included in the growth regressions.

The dynamics of real per capita GDP growth rates and the Gini coefficients in the New Member States between 2000 and 2009 are graphically represented in the figure 1 and figure 2.

While the real per capita GDP growth rates in the NMS seem to follow a common path, the Gini indexes follow different trajectories. In this light, the two variables look seemingly unrelated one with another.

Figure 1. Real GDP per capita, growth rate (2000-2009)
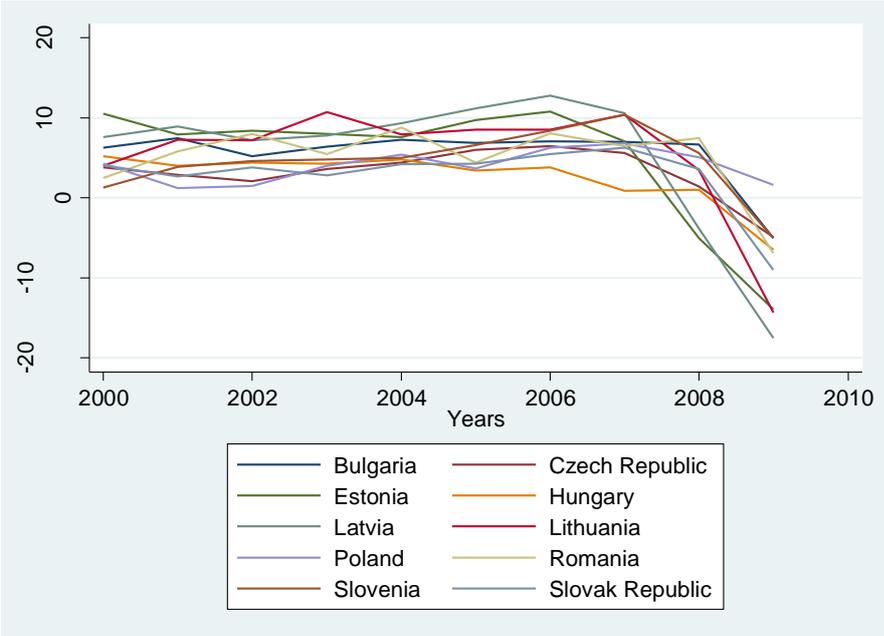


Source: Eurostat data.

Figure 2. Gini index, NMS, 2000-2009
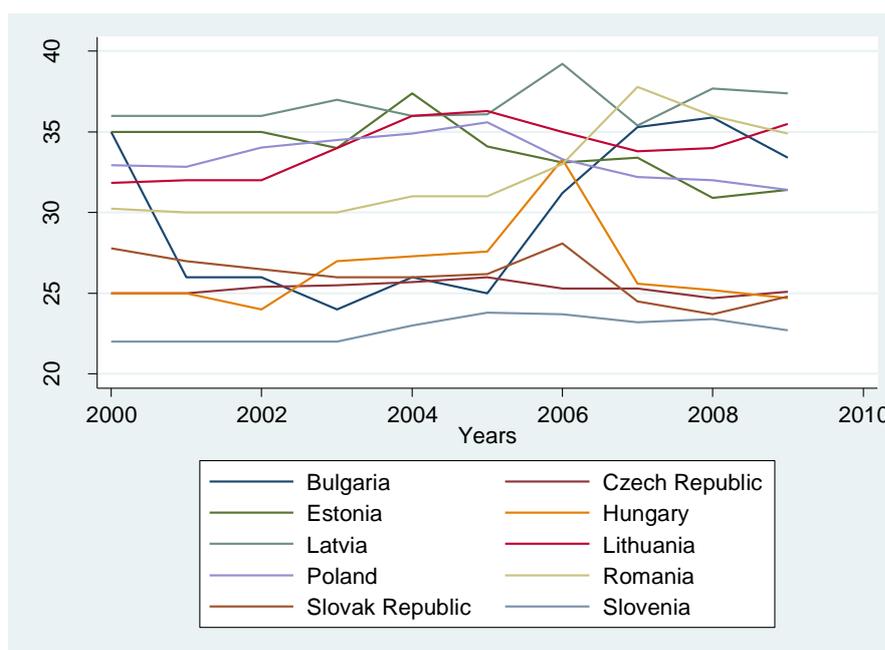
Table 1 below presents a set of descriptive statistics for income inequality and economic growth rates in the NMS. When comparing the average value of Gini index in the NMS (29.98) with the average value of EU27 (i.e. 30.5), EU15 (i.e. 29.84) and Euro zone (i.e. 29.66), according to the Eurostat data, we find close similarities across the EU. In turn, the average of the real GDP per capita growth rate is higher in the NMS area than in EU27 (1.56%), EU15 (1.4%) and Euro zone (1.37%).

Table 1. Descriptive statistics- income inequality and economic growth rate

| Variable | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| Gini index | 29.98 | 4.95 | 22 | 39.2 |
| Economic growth rate | 4.35 | 5.37 | -17.5 | 12.8 |

In order to examine the determinants of economic growth and income inequality, a large set of explicative variables has been initially analyzed, but only a small part of them has been finally included in the analysis, either because of their

unavailability for some years, or because of their lack of significance in the regression models.

A special group of variables used in the empirical part is represented by the transition indicators, which are provided by the European Bank for Reconstruction and Development. They are particularly relevant for the NMS because they assess the gradual progress achieved by these countries in the transition process. Their measurement scale goes from 1 to 4+, where 1 represents no change from a centrally planned economy and 4+ represents the standards of an industrialized market economy. From this set of indicators, a number of three indicators have been used: "large scale privatisation', "governmental policy' and "governance and enterprise restructuring'. We expect to find that the achievements obtained by the NMS in surpassing the transition period have positively influenced economic growth, but in the same time have deepened income inequality. Although the privatisation, enterprise restructuring and the effective governmental policies are necessary steps toward a free market economy, they also determine the increase in the number of vulnerable people who cannot find a job on the new labour market, leading therefore to social polarisation.

In the field of education, we have initially chosen to use from the World Bank database the variables "secondary school enrolment rates' and "tertiary school enrolment', considering that, from a theoretical perspective, both variables could be important drivers of economic growth. Finally, only the variable "secondary school enrolment' has been included in the analysis, because the variable "tertiary school enrolment' was not found significant in any regression model.

Other variables selected from the set of World Bank Indicators are inflation and health expenditure (as per cent in GDP). While inflation is expected to be linked

especially to economic growth, the health expenditure is expected to be a strong determinant of income inequality. Another indicator used in the empirical study is the corruption perception, published by Transparency International. As corruption has affected most of the NMS during the transition period, its dynamic could influence both economic growth and income inequality.

## Empirical analysis

The empirical analysis in this section is aimed at analyzing the relationship between economic growth and income inequality in the NMS area. The common/ specific determinants of these variables are also examined. Particularly, the Grange causality test, graphical analysis tools and panel linear regression models are used.

In the first step, the relationship between economic growth and income inequality is described using a graphical analysis. The following chart (fig.3) includes a number of 10 NMS and plots the natural logarithm of per capita GDP in 2000, on the horizontal axis, against the average value of Gini index between 2000 and 2009, on the vertical axis. Although this type of graphical approach is used as a standard representation of the real convergence process, in this case it gives insights to the relationship between income inequality and economic growth.

The relationship suggests that countries with a higher initial level of per capita GDP will experience later lower levels of income inequality, while countries having lower initial levels of per capita GDP will experience higher levels of income inequality.

Figure 3. Relationship income inequality-economic growth, 2000-2009
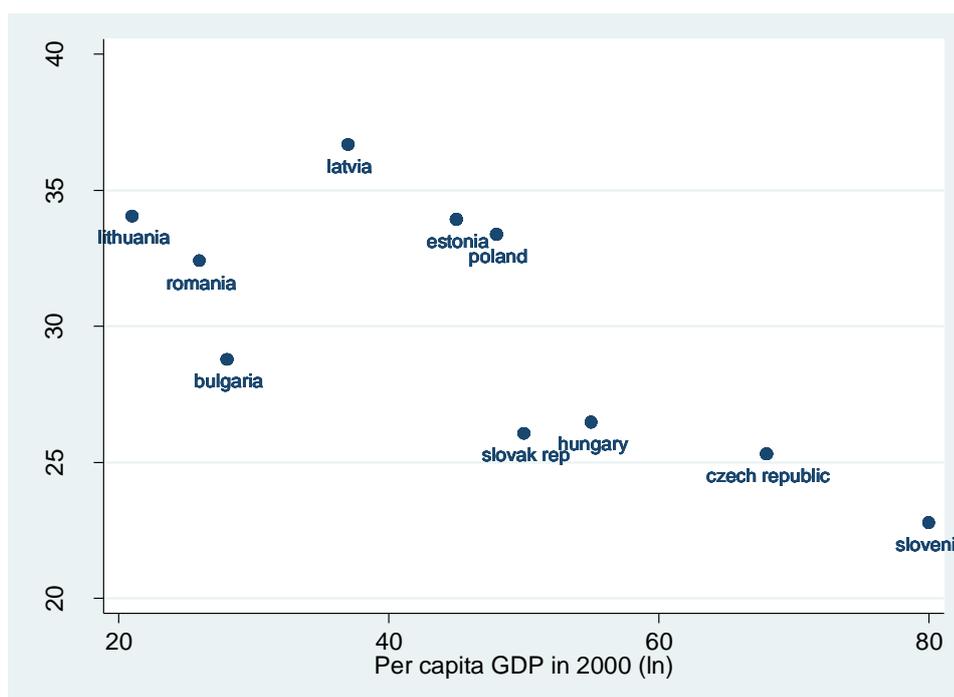


In the second step, the Grange causality test is used to determine the causality between income inequality and economic growth, i.e. whether income inequality is a determinant of economic growth or economic growth is a determinant of income inequality.

A time-series X Granger-causes Y if X can be used to predict Y. This relationship can be operationalized by regressing Y on lagged values of X and Y. If the coefficients of the lag of X are statistically significant and different from zero, then one can argue that "X Granger-cause Y'.

In order to test the causality involved in the relationship between income inequality and economic growth, we use the methodology advanced by Stock and Watson (2007) and Green (2008).

Table 2 summarizes the results of the Granger causality test applied on our data.

Table 2 Granger causality tests

| Null hypotheses | F-stat. | Probability |
|---|---|---|
| 1. Economic growth does not Granger-cause income inequality | 5.00 | 0.2872 |
| 2. Income inequality does not Granger-cause economic growth | 3.34 | 0.5028 |

According to the results above, the null hypothesis that all coefficients of lag of 'income inequality' are equal to 0 cannot be rejected and therefore income inequality does not Granger cause economic growth. Data allow deriving the same conclusion about the second hypothesis, i.e. economic growth does not Granger- cause income inequality.

As the Granger tests indicate that there is no direct and unconditional (or absolute) relationship between growth and inequality, the next step of our empirical analysis consists of applying panel data regression models in order to examine the conditional relationship between growth and inequality, as well as their determinants.

To decide on what estimation method is more appropriate to be used in the panel data regression analysis, several tests are applied. They aim at identifying whether the dataset is affected by heterokedasticity, endogeneity and/ or serial correlation. In the presence of at least one of these problems, the OLS estimation is still consistent, but no longer minimum variance or efficient. Depending on what kind of problem is prevalent in the dataset, specific estimation methods are required.

When studying the relationship between economic growth and income inequality or the determinants of economic growth, a problem of simultaneity/ endogeneity of some regressors (such as the Gini coefficient and education) is expected. In order to test whether this hypothesis is met in our dataset, the "*C* statistic' also called 'difference-in-Sargan' statistic and the Davidson-MacKinnon test

are calculated. The *C* test is defined as the difference of the Hansen-Sargan of the unrestricted equation (with the smaller set of instruments) and restricted equation (with the larger set of instruments), and allows a test of a subset of the orthogonality conditions. The Davidson-MacKinnon test (1993) is a test of exogeneity for a fixed-effect regression estimated via instrumental variables. A rejection of the null indicates that endogenous regressors' effects on the estimates are meaningful, and instrumental variables techniques are required.

The value of the Davidson-MacKinnon test of exogeneity is $0.65^2$ (p=0.3086), which suggests that the endogenous regressors' effects on the estimates are not meaningful, and the instrumental variables techniques are not required. For the explicative variable "income inequality', the value of *C* statistic is 0.025 (p=0.8734), and in the case of "education' the value of *C* is 0.699 (p=0.4030). Again, these results indicate that education and income inequality are not endogenous regressors in our dataset.

Surprisingly, according to both *C* statistic and Davidson-MacKinnon test, income inequality and education are exogenous regressors in relation with economic growth. In the light of these results, as endogeneity is not a problem of our data, the instruments and specific instrumental variable methods (e.g. 2SLS, 2ECSLS) are useless.

Several tests have been applied to check whether the dataset is affected by heterokedasticity and serial correlation in the idiosyncratic errors of a linear panel-data model. The likelihood ratio tests indicate the presence of heterokedasticity, while the Wald test, adapted upon Wooldridge (2002) shows that there is no serial

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[2] The values of tests have been obtained by regressing economic growth against the main determinants (as presented in the next part of the empirical analysis).

correlation in the dataset. According to the Frees' and Friedman's tests, the dataset is not affected by cross-sectional dependence.

At the end of this preliminary analysis, it seems that the most difficult issue that we have to handle in the empirical part is not the endogeneity, heterokedasticity or serial correlation, but the small number of years and countries. This inconvenient makes inappropriate the use of autocorrelation tests, especially when the number of explanatory variables is high.

Although in the presence of heterokedasticity the OLS estimators remain unbiased, consistent and asymptotically normally distributed, they are no longer efficient and the usual t, F and chi sq tests cannot be legitimately applied.

Due to the limitations discussed above, the generalized least squares (GLS), controlling for heterokedasticity is chosen as econometric technique to examine the bilateral relationship between economic growth and income inequality, and the determinants of economic growth. Even if we obtain consistent estimate of the variance-covariance matrix for OLS in the presence of heteroscedastic errors, the OLS is not the most efficient estimator here. The least-square estimates weight observations with lower variance more heavily than those with higher variance, so that it places a greater emphasis on observations in the dataset for which the observable explanatory variables better explain the dependant variable. Therefore, the GLS, in comparison with the OLS, allows gaining more precision in estimation.

The results obtained from the feasible generalized least squares (FGLS) are presented in table 3.

Table 3. Estimates of FGLS

| Explanatory variable | R1. Dependant variable: Real economic growth | R2. Dependant variable: Income inequality |
|---|---|---|
| Real economic growth | - | -0.46*** (0.1937) |
| Income inequality (Gini) | -0.17*** (0.0708) | |
| Initial per capita real GDP (ln) | -7.92*** (1.8188) | -27.51*** (4.0464) |
| Gross capital formation | 0.32*** (0.0427) | 0.15** (0.0748) |
| Governmental policies | 7.71*** (1.2871) | 9.89*** (1.7690) |
| Health | -0.51*** (0.2821) | -1.75*** (0.4271) |
| Corruption | -5.82*** (1.2191) | - |
| Large privatisation | -2.99*** (0.7871) | -6.30*** (1.4960) |
| Secondary school enrolment | - | -0.46*** (0.0983) |
| Inflation | -0.28*** (0.0840) | - |
| Economic restructuring | - | 2.21*** (0.8746) |
| Constant | 89.37*** (18.4560) | 308.78*** (39.2807) |

Notes. (1) Standard errors are reported under brackets. (2) *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

As shown in table 3, most covariates explain both the economic growth and income inequality. When adding them into the regression equations beside the Gini index and economic growth, the relationship between income inequality and economic growth becomes significant and negative. This leads to the conclusion that this relationship is a conditional one, and not a direct one. The Kuznets hypothesis is

therefore rejected by our data. This finding is consistent with other papers studying transition countries, such as Wan (2002).

The most important determinant of economic growth is the initial level of the real per capita GDP. The negative and significant relationship between economic growth and the initial level of per capita GDP suggests the achievement of conditional convergence in the NMS area, as concluded by other papers as well (Holzner and Leitner, 2008; Raileanu Szeles and Marinescu, 2010).

As regards the transition indicators, only *large privatisation*, *economic restructuring* and *governmental policies* are found to be significant in relation with the dependant variables, and therefore only them have been included in the model. The effective governmental policies have a strong and positive influence on both economic growth and income inequality, while the process of large privatisation has a negative influence on both dependent variables reported in table 3. Our findings at this point are different from those provided by other studies (Havrylyshyn and van Rooden, 2003; Holzner, 2010), but there is a specific explanation regarding the second phase of transition (2000-2009) in the NMS area. In the second part of transition, the governmental policies had rather a "pro-growth' orientation then a social one. This has indirectly contributed to the rise of income inequality. Although the process of large privatisation is expected to accelerate the economic growth, our results indicate that the large privatisations realized in the NMS area after 2000 have determined the decline of economic growth. This negative relationship can be explained by the inefficient privatisations which succeeded over time, without stimulating economic growth. On contrary, they have determined the contraction of growth and decrease of income inequality because most of the former employees in the state companies didn't escape from being at the bottom of income distribution

after privatisations. Anyway, since *large privatisation* as well as *governmental policies* influence in the same direction the economic growth and inequality, it is not possible to use them as to target both the economic growth and inequality reduction in the same time. The pro-growth measures will generate side effects, such as the inequality deepening.

The gross capital formation has a positive effect on economic growth and a negative effect on income inequality, while inflation discourages economic growth and deepens the income inequality. While the secondary enrolment has no significant influence on economic growth, it carries a positive effect on social inequality, i.e. the increase of the secondary school enrolment rate determines the decrease of income inequality.

As expected, a low inflation is a stimulus for economic growth, but has no effect on income inequality. In contrast, the proportion of health expenditures in GDP is a significant determinant of both economic growth and income inequality. A large proportion of health expenditures in GDP discourages economic growth but reduces income inequality. The negative effect of heath expenditures on growth, on short term, is a direct one, in the sense that this kind of governmental expenditures is not productive, i.e. they do not generate added value in the economy. On long term, this effect could become positive, through the channel of productivity growth. Overall, the proportion of health expenditures could be an effective governmental instrument in the NMS area, especially when social targets (e.g. reduction of income inequality) are aimed. Corruption is found to be a significant covariate of growth, but not of income inequality as well. Es expected, we found that a high corruption discourages economic growth.

Given that, in the presence of a certain set of covariates, the relationship between economic inequality and economic growth becomes significant, we want to test further whether a sub-set of explicative variables directly and/or indirectly interact to affect inequality. The same model allows examining whether the relationship growth-inequality takes the form of inverted-U.

The next regression model captures direct and interactive effects of some explicative variables on inequality. An inverted-U shape is suggested by a positive sign of the coefficient *lnGDP* and a negative sign of the coefficient of *(lnGDP)²*. This could arise together with a change in the sign of the coefficients of some explicative variables, when being interacted with *(lnGDP)²*. The change in the sign of the coefficients indicates that the effects of these covariates on inequality are different, at different stages of economic development.

Table 4. Estimates of FGLS

| Explicative variables | Coefficients/ St.err. |
|---|---|
| ln GDP | -233.02*** (67.42) |
| (ln GDP)$^2$ | 26.80*** (8.17) |
| Gini (t-1) | 0.58*** (0.09) |
| Secondary school enrolment | -3.95*** (0.9) |
| Secondary school enrolment * (ln GDP)$^2$ | 0.24*** (0.05) |
| Health | -3.04*** (1.22) |
| Health * (ln GDP)$^2$ | 0.13** (0.07) |
| Gross capital formation | 1.33*** (0.37) |
| Gross capital formation * (ln GDP)$^2$ | -0.07*** (0.02) |
| Constant | 520.10*** (141.46) |

Notes. (1) FGLS regression model with income inequality (represented

by Gini index) as dependent variable. (2) *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

According to the results reported in table 4, the relationship between inequality and growth is rather a U-shaped one than an inverted U-shaped, because the coefficient of *ln GDP* is negative (as also assessed in table 3) and the coefficient of *(ln GDP)$^2$* is positive.

The direct effect of the secondary school enrolment rate on income inequality is negative, which shows that the increase of this rate reduces the inequality. But education may affect income inequality differently over time, as the average per capita income grows. In the long term the effect is positive, because the income gap between the low and high educated people increases.

The increase of health expenditure as a share of GDP ensures the access of the entire population to health services, being therefore favourable for inequality reduction. In the medium term this effect may become slightly negative, leading to the deepening of inequality.

The gross capital formation is an essential engine of economic growth, but in the short time it determines the rise of inequality because only a small part of population benefits from this factor. The indirect effect of the gross capital formation is that in the long term it helps reducing income inequality.

The group of transition indicators has not been included in the regression reported in table 4 because, as expected, their impact on growth and inequality didn't change from 2000 to 2009. The consensus emerged in the literature of transition is to distinguish between initial phase reforms specific for the first period of transition, such as price and trade liberalisation and small-scale privatisation, and second-phase reforms which occur in the second period  of transition, such as corporate governance, competition policy and reform of financial institutions (Falcetti et al.,

2006). The impact of these transition indicators should therefore be different on short and medium term, according to the stage of economic development. In our paper, there is not possible to make this distinction because the data describe only the second period of transition.

## Conclusions

In this paper we have analyzed the specific and common determinants of income inequality and economic growth, and the direct link between them, in the NMS, from 2000 to 2009.

The main finding of our paper is that in the NMS area there is no evidence of a significant direct relationship between economic growth and income inequality. Only economic growth is found to be a significant determinant of income inequality, and only in the presence of certain macroeconomic and institutional factors. Our data thus clearly reject the Kuznets hypothesis.

The GDP per capita has the highest explanatory power for both economic growth and income inequality. Among the other variables, the differences in the effectiveness of governmental policies are the most decisive in explaining the differences in the level of economic growth and income inequality across the NMS. Furthermore corruption is found to discourage economic growth without having a significant effect on inequality, while the enhancement of secondary school enrolment and discouragement of economic restructuring are beneficial for inequality reduction, without affecting in any way the economic growth.

The direct and indirect effects of some explicative variables on income inequality are different. The relationship between economic growth and social inequality is a U-shaped one, which is contrary to the Kuznets curve (1955). The

increase of secondary school enrolment rate and the increase of health expenditures lead to the reduction of income inequality, but these effects turn to the opposite direction as the per capita GDP increases. This suggests that the public expenditures for secondary education and health are important for inequality reduction, only in the early stages of development. The relationship between the gross capital formation and income inequality is an inverted U-shaped one. This indicates that the social policies must compensate the negative effects that the gross capital formation carries on inequality in early stages of development.

The findings of the paper could be useful for policy purposes. The U-shaped relationship between inequality and growth indicates that the economic growth will not be anymore a factor of inequality reduction as per capita GDP growths in the NMS. Furthermore, the large privatisations and governmental policies aimed at encouraging economic growth will deepen the social inequality. The economic growth will cause the society polarisation at higher stages of economic development so that the pro-growth economic policies should be accompanied by social policies targeting inequality reduction. Also, the policy makers should consider the direct and indirect effects of health and education on inequality in order to promote effective social policies.

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