

Inclusive Growth in Selected Central European Countries¹

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Abstract

This research aims to investigate inclusive growth in six selected Central European countries (Austria, Germany, and the V4 countries) during the years 2006 – 2012. We have relied on the assumption that pro-poor growth, according to its absolute definition, is in line with the definition of inclusive growth (World Bank, 2009). To investigate pro-poor growth, the poverty equivalent growth rate methodology proposed by Kakwani et al. (2004 and 2008) has been applied. Pro-poor growth has been analyzed according to its absolute, relative and poverty reducing definitions. The results show that the selected countries experienced positive economic growth accompanied by absolute pro-poor growth throughout the time range analyzed, but in only few time periods, and not for all of the poverty measures applied.

Keywords: *inclusive growth in Central Europe, poverty, pro-poor growth, PEGR*

JEL Classification: I32, O47

Introduction

Inclusive growth as a pillar of the *Europe 2020* strategy has become, in the past few years, an intensively discussed issue. Its main targets are an employment rate over 75% for that part of the population aged 25 – 64 and a decrease in the population at risk of poverty by 25% by the year 2020 (European Commission, 2010). Achieving these goals is important for all strata of European society. We aim to contribute to the current discussion by answering the question how economic growth has so far affected the income distribution of populations in selected Central European countries (particularly Austria, the Czech Republic, Germany, Hungary, Poland, and the Slovak Republic). In this research we rely

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on the assumption that inclusive growth is in line with pro-poor growth according to an absolute definition (World Bank, 2009). We use the methodology of measuring pro-poor growth called *poverty equivalent growth rate* (PEGR) developed by Kakwani, Kandker and Son (2004) and Kakwani and Son (2008). The robustness of the results was checked by developing *Growth Incidence Curves* (GIC) and the robustness check for the selection of the poverty line was carried out by computing *Poverty Incidence Curves* (PIC) for first, second and third order stochastic dominances.

This paper is composed of four parts. At the beginning a literature review is presented. Then we continue with a description of the data and the methodology applied. After that, the results are presented and discussed. The last part is dedicated to conclusions.

Literature Review

Economic poverty has been subject to research for more than a century.² The most common way of expressing poverty for policy and economic analysis is by using aggregated measures. In general, aggregated poverty measures are usually a function of income or expenditure and the poverty line. One of the first measures explaining the economic definition of poverty is called the Watts index (Watts, 1968). The Watts index is a distribution sensitive measure that satisfies the focus, monotonicity and transfer axioms (Haughton and Khandker, 2008). Another important poverty measure called the Sen index was developed by Sen (1976).³ This measure was derived according to an axiomatic approach proposed by Sen, which was later followed by many scholars when deriving new poverty measures. The Sen index also satisfies the monotonicity axiom and the transfer axiom.⁴ The main drawback of the Sen index is that it is not additively decomposable⁵ but is multiplicatively decomposed (Xu and Osberg, 2001).

Other frequently used poverty measures are the Headcount index (HI), Poverty gap index (PGI) and the Severity of poverty index (SPI). These three measures belong to the Foster-Greer-Thorbecke (FGT) class of poverty measures (Foster, Greer and Thorbecke, 1984). These indicators are a result of a parametric function

² The history of poverty and the poverty line is discussed in Gillie (1996).

³ The Sen index was later generalized by Kakwani (1980). There is also a modification of the Sen index called Sen-Shorrocks-Thon index (Haughton and Khandker, 2008).

⁴ The monotonicity axiom and the transfer axiom are discussed in Sen (1976) and in Kakwani (1980).

⁵ An additively decomposable poverty measure according to Foster, Greer and Thorbecke (1984) is "a weighted average of the subgroup poverty levels".

where aversion to poverty is expressed by the value of the parameter. Furthermore, each of these indicators is additively decomposable, which allows the analysis of poverty in selected subgroups.

According to Haughton and Khandker (2008) the HI is a popular index which has an intuitive explanation, but it is not able to explain the changes in inequality among the population below the poverty line. The PGI expresses the average percentage fall of the poor below the poverty line. Contrary to the HI, the PGI measures the depth of poverty, but it does not take into account the numbers of the poor and the changes in the income distribution among the poor. The SPI gives a higher weight to the poorest strata of the society and thus it is sensitive to the depth and severity of poverty. This index is sensitive to the distributional changes among the poor.⁶ Each particular indicator discussed above has certain strengths and weaknesses, thus, in order to acquire a comprehensive picture about poverty, it is advisable not to rely exclusively on one particular measure, but rather utilize information from a broader selection simultaneously.

Later, the attention of researchers focused on the relationship between economic growth and its impact on poverty. Ravallion and Chen (2003) defined a measure of pro-poor growth.⁷ They set out to answer the question of how the change in aggregate income is distributed throughout society compared to an initial income, i.e. can economic growth be considered as pro-poor? Their measure is derived by using the Watts index and should satisfy two axioms. The first axiom assumes that an increase (decrease) in the pro-poor growth measure should imply a decrease (increase) in poverty. The second axiom assumes that this measure satisfies the focus, monotonicity and transfer axioms and is additively decomposable.

Later Kakwani, Kandker and Son (2004) and Kakwani and Son (2008) proposed an aggregated measurement of pro-poor growth called PEGR which reflects the impact of growth and how this growth is distributed among all of society. The PEGR is further defined as a monotonically changing function of poverty.⁸ Thus, the maximum reduction in poverty is achieved when the PEGR is maximized. Kakwani, Kandker and Son (2004) and Kakwani and Son (2008) discuss three different definitions of pro-poor growth according to which they developed different PEGR indices.

The first one is the relative concept of pro-poor growth, when the poor gain proportionally more than the non-poor from growth. The second is the absolute

⁶ The SPI satisfies the focus, monotonicity and transfer axioms (Zheng, 1997; and Foster, Greer and Thorbecke, 1984).

⁷ Pro-poor growth is also discussed in DFID (2004).

⁸ When poverty decreases (increases) the PEGR increases (decreases).

definition of pro-poor growth, which assumes, that the poor gain absolutely more than the non-poor from the growth. The last definition assumes growth is pro-poor in those cases where it reduces the level of poverty.

Analyses of poverty in Central European post-communist countries have not had a long tradition. The existence of poverty before 1989 was not even acknowledged because it was in conflict with the equality principle of the communist ideology (Bartošová and Želinský, 2013). These authors analyzed the extent of poverty in the Czech and Slovak Republics by using the general FGT poverty measures. They showed, based on EU-SILC⁹ data from 2005 to 2007, that poverty was higher in Slovakia than in the Czech Republic. They also showed that differences between Czech and Slovak households have decreased over time and we may expect to see convergence in their financial situations.

Madden (2013) applied the methodology of GIC for the time period 2003 – 2011 using EU-SILC data for Ireland. First the GIC between 2003 and 2011 is analyzed and then this period is split into two subsequent sub-periods, namely the pre-crisis period of economic boom from 2003 to 2007 and the crisis period of economic recession from 2008 to 2011. Furthermore, the PEGR is calculated as a summary measure of pro-poor growth for the same time periods for the HI, PGI and SPI. The results show that growth in Ireland tended to be, in general, pro-poor, except the second sub-period according to the SPI PEGR measure.

Raziye and Fahriye (2013) provided empirical evidence of the pro-poor growth nature of economic growth in Turkey in the post-2001 crisis period by using the PEGR methodology. They split the analysed time period into two sub-periods of 2003 – 2007 and 2007 – 2009. The results showed that growth was pro-poor only for the time period 2006 – 2007.

In the case of Slovakia, Domonkos, Jánošová and Ostrihoň (2013) analyzed inclusive growth for the years 2004 – 2009. They discussed the definition of inclusive growth and used the approximation of inclusive growth by the concept of absolute pro-poor growth. Then they provided an empirical analysis of inclusive growth in Slovakia based on EU-SILC data. The method used was based on the PEGR proposed by Kakwani and Son (2008). They came to the conclusion that high economic growth experienced in the pre-crisis period in Slovakia did not have any positive impact on the fairness of income distribution and the size of the population at risk of poverty.¹⁰

⁹ European Union Statistics on Income and Living Conditions.

¹⁰ Other notable studies include Brzezinski (2011a and 2011b) analyzing pro-poor growth in Poland, Kahanec et al. (2012) providing an extensive overview of growing inequalities in the Czech Republic and in the Slovak Republic, Pauhofová and Martinák (2014) discussing regional income stratification in Slovakia, and CASE (2004) discussing pro-poor growth policies for Romania.

Data and Methodology

The initial assumption this research relies on is that according to the World Bank (2009), inclusive growth¹¹ is in line with the pro-poor growth according to an absolute definition. We determine pro-poor growth according to absolute, relative and poverty reducing concepts. We follow this procedure since we want to provide a comprehensive overview of the development of pro-poor growth among the six selected Central European countries. Four of the six countries surveyed are the so-called V4 countries which also belong to the group of post-communist European countries. In these countries pro-poor growth is vital, because it helps to decrease the unequal distribution of income which developed during the transition period. The analysis is further extended by including Germany and Austria which are at different stages of economic development and both are in stable economic and social situations. The database used in this research draws from the EU-SILC micro-data for the period of 2006 – 2012 published by Eurostat. As a welfare indicator and approximation of economic growth, the mean equalized disposable income of households¹² using 2005 prices was used.¹³ We also applied cross-sectional weights attached to the households¹⁴ in the calculations. The poverty line was determined as 60% of the median national equalized disposable income published by the Eurostat.

The calculation of the FGT class of poverty measures, particularly the HI, PGI and SPI were carried out by the approach suggested by Eurostat and by that presented in Haughton and Khandker (2008). The difference, compared to Eurostat methodology, resides in using the households' cross sectional weights augmented by the number of household members, instead of the adjusted cross sectional weights¹⁵ used by Eurostat. The differences on the level of third decimal were caused by the fact that we included all the observations available in the EU-SILC database, except negative values. Eurostat adjusts the weights of observations which have missing data for any of the dimensions reported, thus, not all particular households are included in their computations.¹⁶

¹¹ Inclusive growth is discussed by Ali and Son (2007) or UNCTAD (2012).

¹² The equalised disposable income of households is denoted as HX090 in the EU-SILC database.

¹³ Negative observations were excluded from the sample and the disposable income of the sample was deflated by Harmonized Consumer Price Index with base year 2005.

¹⁴ The cross-sectional weights of households are denoted as DB090 in the EU-SILC database.

¹⁵ We were not able to use the adjusted cross sectional weights (marked as RB050a in the Eurostat methodology) due to the fact that they were not included in the available version of the EU-SILC database.

¹⁶ For further information see Eurostat methodology available at: <http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_%28EU-SILC%29_methodology_-_Europe_2020_target_on_poverty_and_social_exclusion>.

The calculation relies on the PEGR concept and methodology proposed by Kakwani, Kandker and Son (2004) and Kakwani and Son (2008).¹⁷ This PEGR framework assumes an arbitrary poverty measure θ :

$$\theta = \int_0^z P(z, x) f(x) dx \quad (1)$$

where

- $f(x)$ – an income distribution density function,
- $P(z, x)$ – a homogeneous function which evaluates the actual poverty of a given household,
- x – the income of the individual or household,
- z – the poverty line.

Based on the particular form of $P(z, x)$ in the relation (1), a particular poverty measure can be obtained. Kakwani, Kandker and Son (2004) and Kakwani and Son (2008) devised an approach to estimate the necessary variables as follows:

- The growth elasticity of poverty as

$$\hat{\delta} = \left(\ln \left[\theta(z, \tilde{x}_2) \right] - \ln \left[\theta(z, \tilde{x}_1) \right] \right) / \hat{\gamma} \quad (2)$$

- The growth rate of mean income

$$\hat{\gamma} = \ln(\mu_2) - \ln(\mu_1) \quad (3)$$

- The neutral relative growth elasticity of poverty

$$\hat{\eta} = \left\{ \ln \left[\theta(z, \mu_2 \tilde{x}_1 / \mu_1) \right] - \ln \left[\theta(z, \tilde{x}_1) \right] + \ln \left[\theta(z, \tilde{x}_2) \right] - \ln \left[\theta(z, \mu_1 \tilde{x}_2 / \mu_2) \right] \right\} / 2\hat{\gamma} \quad (4)$$

- The percentage change in poverty, caused by changes in income distribution accompanied by the growth process

$$\hat{\zeta} = \left\{ \ln \left[\theta(z, \mu_1 \tilde{x}_2 / \mu_2) \right] - \ln \left[\theta(z, \tilde{x}_1) \right] + \ln \left[\theta(z, \tilde{x}_2) \right] - \ln \left[\theta(z, \mu_2 \tilde{x}_1 / \mu_1) \right] \right\} / 2\hat{\gamma} \quad (5)$$

- The relative pro-poor growth index

$$\varphi = \frac{\hat{\delta}}{\hat{\eta}} \quad (6)$$

¹⁷ All of the notations and symbols used, as well as the meanings of various indices and rates, are explained in Kakwani, Kandker and Son (2004) and Kakwani and Son (2008), therefore we consider restating them at this juncture to be superfluous. We only describe in detail the procedure used for the evaluation of the pro-poor growth pattern.

- The PEGR

$$\hat{\gamma}^* = \varphi \hat{\gamma} \quad (7)$$

- The neutral absolute growth elasticity of poverty

$$\hat{\eta}^* = \left\{ \ln \left[\theta(z, \mu_2 + \tilde{x}_1 - \mu_1) \right] - \ln \left[\theta(z, \tilde{x}_1) \right] + \ln \left[\theta(z, \tilde{x}_2) \right] - \ln \left[\theta(z, \mu_1 + \tilde{x}_2 - \mu_2) \right] \right\} / 2\hat{\gamma} \quad (8)$$

- The absolute pro-poor growth index

$$\varphi^* = \frac{\hat{\delta}}{\hat{\eta}^*} \quad (9)$$

• And finally the condition to distinguish pro-poor growth in the absolute sense. Economic growth $\hat{\gamma}$ is considered pro-poor in the absolute sense, if the following condition is satisfied:

$$\hat{\gamma}^* > \hat{\gamma} \left[1 + (\varphi - \varphi^*) \right] \quad (10)$$

After determining the PEGR index according to equation (7), the poverty reducing pro-poor growth can be evaluated. In cases where the PEGR is greater than zero, the poverty reducing pro-poor growth condition is met. When assessing the relative pro-poor growth condition, the PEGR index is compared to the actual economic growth rate. If the PEGR is greater (lower) than the economic growth we experience (do not experience) relative pro-poor growth. Finally, the absolute pro-poor growth condition is satisfied (violated) when the PEGR index is greater (lower) than the right hand side of the relation (10). If economic growth was absolutely pro-poor, then it was considered inclusive. According to Kakwani and Son (2008) poverty reducing pro-poor growth is, in the case of negative economic growth, the strongest definition of pro-poor growth and, in the case of positive economic growth, the weakest definition of pro-poor growth. The absolute definition is in the case of positive economic growth, the strongest definition of pro-poor growth and in case if economic loss it is the weakest definition.

We do recognize that there are more aspects to the concept of inclusive growth (see e.g. Klasen, 2010) and that income is merely just one of them, but for the sake of simplicity and consistency in the framework used, we disregard from them. The robustness of the results was checked by developing GIC proposed by Ravallion and Chen (2003). The GIC is determined by inverting the cumulative distribution function of income $F_t(x)$ at the p^{th} percentile.

$$x_t(p) = F_t^{-1}(p) \quad (11)$$

GIC is then defined as follows:

$$g_i(p) = \frac{x_i(p)}{x_{i-1}(p)} - 1 \quad (12)$$

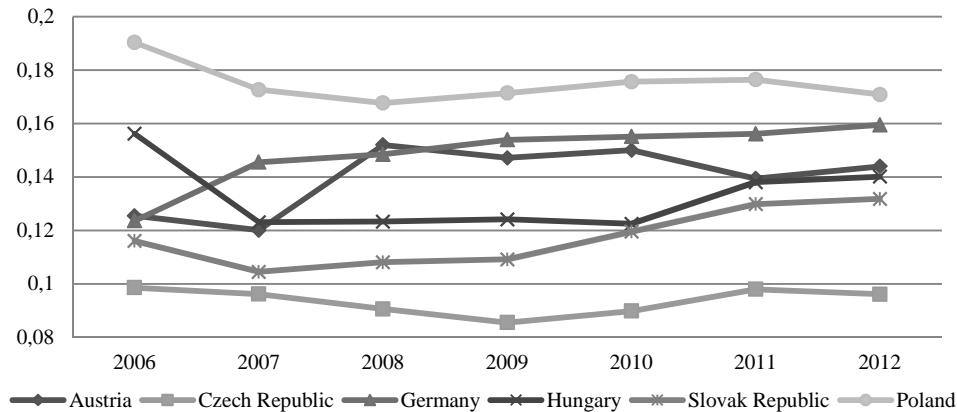
The GIC allows us to compare the growth of the mean income in each percentile to the growth of the mean income or median income of the entire sample. If the growth of the mean income of a particular percentile exceeds the sample's mean income growth, then the particular percentile of the population benefited from growth to a greater extent than the mean. In cases where the growth of the mean income of a particular percentile falls below the mean income growth, then the percentile benefited less from the economic growth than the mean. In general, growth is considered to be pro-poor when the poorer strata of the society benefit from growth to a greater extent than the richer strata of society – in such cases the GIC has a monotonically decreasing pattern. The results of the GIC for each particular country from the sample are presented in Appendix A.

Furthermore, the robustness check of the selection of the poverty line was carried out by determining the PIC for first, second and third order stochastic dominance according to Haughton and Khandker (2008).

Results and Discussion

Based on the result for the HI presented in Figure 1, the development of long-term poverty is rather divergent in the countries analyzed. Poverty, according to the HI, was above 16.7% in Poland in all the time periods. In this country, the HI tended to decrease from 2006 till 2008. After the beginning of the crisis from 2009, the HI changed its decreasing path to an increasing one by 2011. Germany shows a very stable increasing development in terms of its HI which was around 12.3% in 2006 and slightly lower than 16% in 2012. The HI in Hungary sharply decreased from 15.6% to 12.3% in the first time period examined. After that, from 2007 till 2010, it fluctuated slightly above 12.3%. Then an increase can be detected which was 13.8% in 2011 and 14% in 2012. In the case of Austria, the HI increased from its 12.6% level in 2006 to 15.2% in 2008. A notable decrease from 14.9% to 13.9% of HI happened between 2010 and 2011 which was followed by a moderate increase to 14.4% in 2012. The reported HI in Slovakia decreased between the years 2006 and 2007 from 11.6% to 10.4%. This initial decrease was followed by a stable increasing development throughout the years 2007 – 2012. Poverty reported in the Czech Republic fluctuated throughout the period examined between 8.5% and 10%.

Figure 1

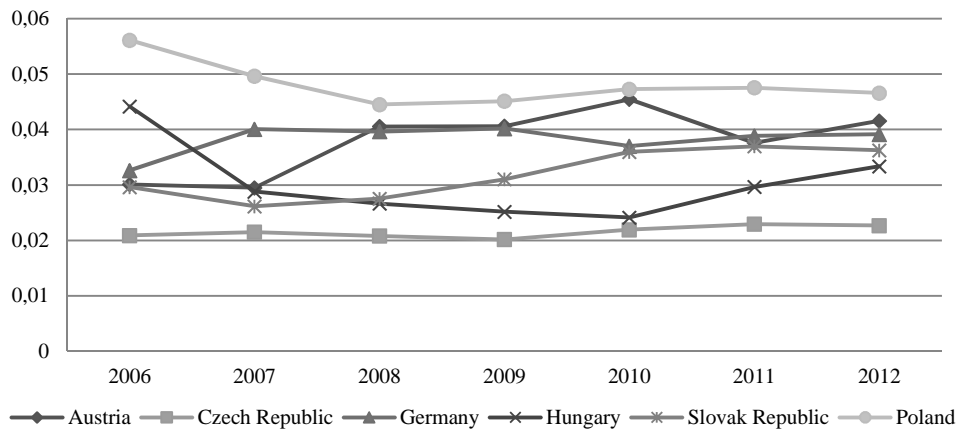
Headcount Index

Source: Authors' calculations based on EU-SILC data.

The PGI (Fig. 2) measure is used to express the depth of poverty and, contrary to the HI, does not take into consideration the number of poor people. The results obtained show similar developments in most of the time periods analyzed in comparison to the HI presented above. Poland seems to have its PGI fluctuating in the range from 0.056 till 0.045. The PGI in Germany increased in the first time period. Subsequently, over the 2007 – 2012 period, it has a rather stable development within the range 0.037 to 0.04. In the case of Austria, a very large variation of the results can be seen. The lowest level of PGI was around 0.03, and the highest around 0.045. The development of PGI in Hungary shows a similar development as for the HI. It decreased from the first time period till 2010, and from 2011 up to the end of the time period examined, a steep increase was reported. The PGI in Slovakia varied in the range 0.026 to 0.037. It decreased in the first and the last time periods, and increased over the years 2007 – 2011. A similar development of PGI in comparison with HI is reported for the Czech Republic.

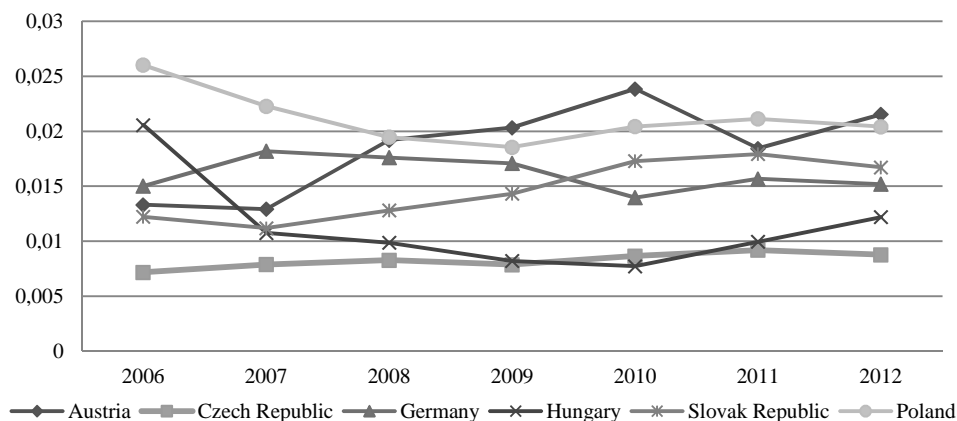
The conclusions drawn from the HI and PGI are partially confirmed by the results of the SPI (Fig. 3). In Slovakia, the SPI shows an increasing path from 2007 till 2011. Subsequently a moderate decrease between 2011 and 2012 can be detected, indicating that poverty was becoming more severe, i.e. the poor became even poorer. The SPI of Austria has a very similar path compared with the PGI. The SPI confirms the stable development of poverty in the Czech Republic according to the HI and PGI results. The development of the SPI in Hungary, Germany and Poland copied the path shown by the HI and the PGI in most of the time periods. In the case of Poland, the increase of the SPI after the 2009 crisis period was steeper than the PGI and HI, thus, the crisis affected the poorest strata of the society to a greater extent.

Figure 2
Poverty Gap Index



Source: Authors' calculations based on EU-SILC data.

Figure 3
Severity of Poverty Index



Source: Authors' calculations based on EU-SILC data.

The results from the FGT measures used are somewhat surprising, especially that three of the post-communist convergence countries, where the living standard is more modest than in Western Europe, have lower relative poverty indices than Germany and Austria. On the other hand, Poland has, on average, the highest FGT poverty rates from the V4 countries, close to or exceeding the rates of Germany and Austria. One would expect that the transition countries would have faced higher relative poverty than the non-transition countries. This is caused by the relative and country-specific approach used, when the poverty line is determined. One may argue, that the line should be set according to the environment

in which an individual lives and to which he compares his well-being. However, this seems to be a biased approach for EU cross-country comparisons that can make antipoverty policy-making at the EU level difficult.¹⁸ Since our intention is not a cross-country comparison, we can rely on this methodology developed by Eurostat in our subsequent calculations.¹⁹

To get a deeper insight into the development of poverty, we performed a robustness check on the analyzed FGT class of poverty measures against the selection of the poverty line (Table 1). In the case of Poland, only two time periods were robust for all three poverty measures. Slovakia and the Czech Republic did not have robust FGT poverty measures at all in any of the years analyzed. There are a few time periods for Germany, Austria and Hungary where the results can be considered as robust, but not for all three poverty indices. The results showed that the poverty measures used are rather sensitive to the selection of the poverty line, and thus, this should be taken into consideration when conclusions are drawn about the development of poverty according to only one selected poverty line.

Table 1

Poverty Incidence Curve Summary Results

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Austria</i>	First order stochastic dominance	No	No	No	No	No	No
	Second order stochastic dominance	No	No	No	Increase	Decrease	No
	Third order stochastic dominance	Decrease	Increase	No	Increase	Decrease	No
<i>Czech Republic</i>	First order stochastic dominance	No	No	No	No	No	No
	Second order stochastic dominance	No	No	No	No	No	No
	Third order stochastic dominance	No	No	No	No	No	No
<i>Germany</i>	First order stochastic dominance	No	No	No	No	Increase	No
	Second order stochastic dominance	No	No	No	Decrease	Increase	Decrease
	Third order stochastic dominance	No	Decrease	No	Decrease	Increase	Decrease
<i>Hungary</i>	First order stochastic dominance	No	No	Decrease	Increase	No	No
	Second order stochastic dominance	No	Decrease	Decrease	Increase	No	Increase
	Third order stochastic dominance	Decrease	Decrease	Decrease	Increase	No	Increase
<i>Poland</i>	First order stochastic dominance	No	No	Decrease	Increase	No	No
	Second order stochastic dominance	No	No	Decrease	Increase	No	No
	Third order stochastic dominance	No	No	Decrease	Increase	No	No
<i>Slovak Republic</i>	First order stochastic dominance	No	No	No	No	No	No
	Second order stochastic dominance	No	No	No	No	No	No
	Third order stochastic dominance	No	No	No	No	No	No

Note: Increases in poverty are shown as light gray areas and decreases in poverty are shown as dark gray areas. “No” means that it is not possible to conclude whether poverty increased or decreased regardless the selection of the poverty line.

Source: Authors’ calculations based on EU-SILC data.

¹⁸ The construction of poverty lines is discussed in Haughton and Khandker (2008).

¹⁹ Different approaches to analyzing poverty across countries may be carried out by the comparison of the poverty line based on the Purchasing Power Standards (Eurostat, 2015).

While the evolution of the FGT class of poverty measures over time provided an idea about the development of poverty in each particular country, the information provided was, nevertheless, insufficient to assess whether economic performance was pro-poor or not in any given country. Such evaluations can be made with the computed PEGR measures, which were enumerated for each country and each particular poverty measure. The results of the assessments for each examined country are presented over Tables 2 to 7.

Table 2
Patterns of Pro-poor Growth in Austria

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Headcount</i>	Relative pro-poor growth	Yes	No	No	No	Yes	Yes
	Absolute pro-poor growth	No	No	No	No	Yes	Yes
	Poverty reducing pro-poor growth	Yes	No	Yes	No	Yes	No
<i>Poverty gap</i>	Relative pro-poor growth	No	No	No	No	Yes	No
	Absolute pro-poor growth	No	No	No	No	Yes	Yes
	Poverty reduction pro-poor growth	Yes	No	No	No	Yes	No
<i>Severity of poverty</i>	Relative pro-poor growth	Yes	No	No	No	Yes	No
	Absolute pro-poor growth	No	No	No	No	Yes	No
	Poverty reduction pro-poor growth	Yes	No	No	No	Yes	No

Note: Sub-period of economic loss is shown as light gray area.

Source: Authors' calculations based on EU-SILC data.

Table 3
Patterns of Pro-poor Growth in Czech Republic

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Headcount</i>	Relative pro-poor growth	No	No	No	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	No	No
	Poverty reducing pro-poor growth	Yes	Yes	Yes	No	No	Yes
<i>Poverty gap</i>	Relative pro-poor growth	No	No	No	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	No	No
	Poverty reduction pro-poor growth	No	Yes	Yes	No	No	Yes
<i>Severity of poverty</i>	Relative pro-poor growth	No	No	No	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	No	Yes
	Poverty reduction pro-poor growth	No	No	Yes	No	No	Yes

Note: Sub-period of economic loss is shown as light gray area.

Source: Authors' calculations based on EU-SILC data.

In the case of Austria, there are no clear signs of income growth which favors the poor, in any of the time periods examined. The sub-period 2010 – 2011 showed signs of pro-poor growth for all three indices, but this was a period of

economic loss. Certain signs of pro-poor growth can be noticed according to the HI and PGI for the period of economic loss 2011 – 2012, but not for all three pro-poor growth concepts in the same time and not for all three particular poverty measures. Positive results can be seen in the development of the HI, PGI and SPI for the period 2006 – 2007 for which poverty reducing pro-poor growth is reported, regardless of the type of poverty measure used, and relative pro-poor growth is apparent for the HI and SPI. According to these results, it seems that economic growth in Austria was not purely inclusive for any of the time periods analyzed.

A slightly different development was depicted by the obtained results of PEGR for the Czech Republic. Firstly, the amount of economic growth (loss) periods which reduce poverty is equal to the number of non-reducing ones. However, this reduction is negligible compared to the change in mean income and, therefore, leads to situations where growth is not pro-poor, either in an absolute or relative sense. The only exception is the sub-period 2009 – 2010 for which the conditions for pro-poor growth in relative and absolute senses were met for every poverty measure. To be thorough, it is important to note that this change is a sub-period of income loss rather than growth, since the average income fell between the years 2009 and 2010 which was probably the aftermath of the economic recession and was also evident for other Central European countries. This means that the distribution of loss was skewed towards the richer strata of society and the poor shared this loss to a lesser extent. It is important to bear in mind that in times of economic loss, poverty reducing pro-poor growth is the strongest assumption of pro-poor growth. Promising results were reported also for the sub-period 2011 – 2012, when poverty reducing and relative pro-poor growth was apparent, regardless of the poverty measure applied. Unfortunately the condition of absolute pro-poor growth was met only for SPI.

Table 4
Patterns of Pro-poor Growth in Germany

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Headcount</i>	Relative pro-poor growth	No	No	No	No	Yes	No
	Absolute pro-poor growth	No	No	No	No	Yes	No
	Poverty reducing pro-poor growth	No	No	No	No	No	No
<i>Poverty gap</i>	Relative pro-poor growth	No	No	No	Yes	Yes	No
	Absolute pro-poor growth	No	No	No	Yes	Yes	No
	Poverty reduction pro-poor growth	No	Yes	No	Yes	No	No
<i>Severity of poverty</i>	Relative pro-poor growth	No	Yes	Yes	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	Yes	Yes
	Poverty reduction pro-poor growth	No	Yes	Yes	Yes	No	Yes
		No	Yes	Yes	Yes	No	Yes

Note: Sub-period of economic loss is shown as light gray area.

Source: Authors' calculations based on EU-SILC data.

The evolution of poverty in Germany varied substantially during 2006 – 2012. There were no changes in income and its distribution which can be designated as pro-poor for all three definitions regardless the poverty measure applied. The change of income in only two time periods, 2009 – 2010 and 2011 – 2012, qualifies as pro-poor in terms of both relative and absolute pro-poor growth, but only for the SPI and PGI for the first sub-period and for the SPI for the second sub-period. On the other hand, the sub-period 2006 – 2007 shows no features of pro-poor growth at all. However, pro-poor growth was not apparent for the HI, except for the period of loss 2010 – 2011. On the other hand, the two poverty measures PGI and SPI indicated that the impact of economic growth had a certain positive impact on the impoverished in few of the time periods examined.

Table 5
Patterns of Pro-poor Growth in Hungary

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Head count</i>	Relative pro-poor growth	Yes	No	No	Yes	No	Yes
	Absolute pro-poor growth	Yes	No	No	Yes	No	Yes
	Poverty reduction pro-poor growth	Yes	No	No	Yes	No	No
<i>Poverty gap</i>	Relative pro-poor growth	Yes	No	No	Yes	No	No
	Absolute pro-poor growth	Yes	No	No	Yes	No	Yes
	Poverty reduction pro-poor growth	Yes	Yes	Yes	Yes	No	No
<i>Severity of poverty</i>	Relative pro-poor growth	Yes	No	Yes	Yes	No	No
	Absolute pro-poor growth	Yes	No	No	Yes	No	No
	Poverty reduction pro-poor growth	Yes	Yes	Yes	Yes	No	No

Note: Sub-period of economic loss is shown as light gray area.

Source: Authors' calculations based on EU-SILC data.

The development of poverty in Hungary between 2006 – 2012, for the SPI and PGI, seems positive at first glance since the majority of income changes meet the conditions for poverty reducing property for more than the half of the sub-periods analyzed. After a deeper examination, we can notice that the results are not that promising. Nevertheless, only the periods of economic loss in the years 2006 – 2007, and 2009 – 2010 exhibited signs of both relative and absolute pro-poor growth (loss) accompanied by poverty reducing pro-poor growth for all three particular poverty measures. The situation of the ultra-poor worsened in the last two sub-periods, 2010 – 2011 and 2011 – 2012, during which the income of the poor diminished. The results for the sub-period 2010 – 2011 show no pro-poor growth at all for any of the applied poverty rates, regardless of the selected poverty measure. The result is supported by the shape of the particular GIC (Appendix A, Graph A.4). The GIC for the sub-period of 2010 – 2011 is an increasing function.

Table 6
Patterns of Pro-poor Growth in Poland

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Head count</i>	Relative pro-poor growth	No	No	No	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	No	Yes
	Poverty reduction pro-poor growth	Yes	Yes	No	No	No	Yes
<i>Poverty gap</i>	Relative pro-poor growth	No	No	No	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	No	Yes
	Poverty reduction pro-poor growth	Yes	Yes	No	No	No	Yes
<i>Severity of poverty</i>	Relative pro-poor growth	No	No	No	Yes	No	Yes
	Absolute pro-poor growth	No	No	No	Yes	No	Yes
	Poverty reduction pro-poor growth	Yes	Yes	Yes	No	No	Yes

Note: Sub-period of economic loss is shown as light gray area.

Source: Authors' calculations based on EU-SILC data.

The situation in Poland seemed similar to Hungary in the sense, that pro-poor growth is reported only in the sub-periods of economic loss. The sub-period of economic loss in 2009 – 2010 failed the property of poverty reduction for the HI, PGI and SPI, but meets the conditions for both relative and absolute pro-poor growth (loss) for all three poverty measures. As we mentioned above, poverty reduction property is a stronger condition in times of loss than the relative or absolute pro-poor growth condition. In the period 2011 – 2012, all three pro-poor growth conditions were met, regardless of the applied poverty index, but again this was a period of economic loss. The results showed that there was no clear inclusive growth in Poland throughout the time period examined.

Table 7
Patterns of Pro-poor Growth in Slovak Republic

		2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
<i>Head count</i>	Relative pro-poor growth	No	No	No	No	No	No
	Absolute pro-poor growth	No	No	No	No	No	No
	Poverty reduction pro-poor growth	Yes	No	No	No	No	No
<i>Poverty gap</i>	Relative pro-poor growth	No	No	No	No	Yes	No
	Absolute pro-poor growth	No	No	No	No	Yes	No
	Poverty reduction pro-poor growth	Yes	No	No	No	No	Yes
<i>Severity of poverty</i>	Relative pro-poor growth	No	No	No	No	No	No
	Absolute pro-poor growth	No	No	No	No	Yes	No
	Poverty reduction pro-poor growth	Yes	No	No	No	No	Yes

Note: Sub-period of economic loss is shown as light gray area.

Source: Authors' calculations based on EU-SILC data.

Slovakia experienced income growth throughout the period examined, except for 2010 – 2011. This led to an expectation that this growth could be accompanied by a reduction in poverty. However, only a few of the changes examined exhibited the poverty reduction property, which is the weakest definition of pro-poor growth in the case of positive income growth. Therefore, in many cases, the conditions of the poor actually worsened, despite the annual increases of mean income. In other words, there were no indications of pro-poor growth and inclusive growth at all. This means that economic growth was distributed towards the richer strata of society and income inequality deepened.

When comparing the patterns of pro-poor growth across the sample of Central European countries analyzed, some common features may be discerned. In each particular country that experienced economic loss in 2009 – 2010 during the time frame analyzed (the Czech Republic, Hungary, and Poland), the conditions for both relative and absolute growth were met for all three applied measures. However, the strongest poverty reducing pro-poor growth condition was met, regardless of the poverty measure considered, only in case of Hungary. However, the reaction differs for Poland and the Czech Republic which don't experience poverty reducing effects for all three poverty measures. This means that, the loss was only shared in a fairer way but poverty did not decrease, i.e. the income of the poor in this situation decreased, but absolutely and proportionately less than the non-poor.

Such a finding may imply that the distribution of income is more set towards pro-poor loss than pro-poor growth, since in some countries the evidence of pro-poor growth came mostly during times of economic loss. Such an observation can be explained by the social systems and the safety networks of EU countries, which might not foster positive income changes among the poor, but prevent even greater deprivation of the poor in times of economic downturn. However, there are also noticeable negative phenomena, such as periods of economic growth during which the income of the poor fell (lack of poverty reducing property), according to which growth can be deemed rather anti-poor than pro-poor, and which occurred in multiple countries according to some, or all, of the poverty measures used. It is important to note, that none of the countries showed pro-poor growth, regardless of the poverty measure applied, according to poverty reducing, relative and absolute pro-poor growth concepts at the same time in years of economic growth.

Conclusion

The main aim of this research was to investigate whether the six selected Central European countries experienced inclusive growth through the years 2006 – 2012. Inclusive growth is one of the pillars of the EU 2020 strategy, thus, it has

to be among the priorities of national policy makers. First the FGT class of poverty measures was calculated and then the PEGR according to each of the three FGT measures was determined. The robustness of the results to the selection of the poverty line was tested by computing PIC for first and higher order stochastic dominances and the robustness of the PEGR was checked by GIC.

The result for the HI, PGI and SPI provided an idea about the development of poverty. This development showed a rather divergent path between the analyzed countries. One of the main drawbacks of the cross-country comparison is the relative and country-specific approach used when the poverty line is determined. This can make antipoverty policy-making based only on these indices equally benefiting for each member state at the EU level difficult.

As was mentioned above, the three applied FGT class of poverty measures alone are not able to evaluate the impact of economic growth on poverty reduction and on the changes of income distribution. This can be done by the PEGR methodology proposed by Kakwani, Kandker and Son (2004) and Kakwani and Son (2008). The PEGR was applied to the three FGT measures calculated and pro-poor growth was tested according to its absolute, relative and poverty reducing definitions. The basic assumption this research relies on is that inclusive growth is in line with pro-poor growth according to an absolute definition (World Bank, 2009). The robustness of the results was checked by the GIC for each particular country and sub-period of time.

The results obtained did not reveal a pleasant picture about the development of inclusive growth in the selected sample of Central European countries. None of the countries analyzed, experienced positive economic growth accompanied by pro-poor growth at the same time regardless the applied poverty indices. Hungary, Austria and Poland experienced in times of negative economic growth pro-poor growth according to the relative absolute and poverty reducing definitions. Slovakia did not show signs of inclusive growth throughout the time frame analyzed. This result shows us that the distribution of income throughout the years of relatively high economic growth was rather unfair and towards the richer strata of the society.

The results may reflect the crises which affected the European economies, but their impact does not seem to be the most critical issue because inclusive growth was not apparent in the pre-crisis periods. During the crisis, when negative economic growth appeared, several countries experienced pro-poor growth according to each of the three definitions applied. Such findings may imply that the distribution of income is set towards pro-poor loss than pro-poor growth. This can be explained by the social systems and the safety networks of social security systems present in EU countries which might not foster positive income changes

among the poor, but prevent greater deprivation of the poor in times of economic downturn. Taking into consideration the limitations of the methodology applied, as well as the data, according to our results, signs of inclusive growth are rarely noticeable in the selected sample of Central European countries.

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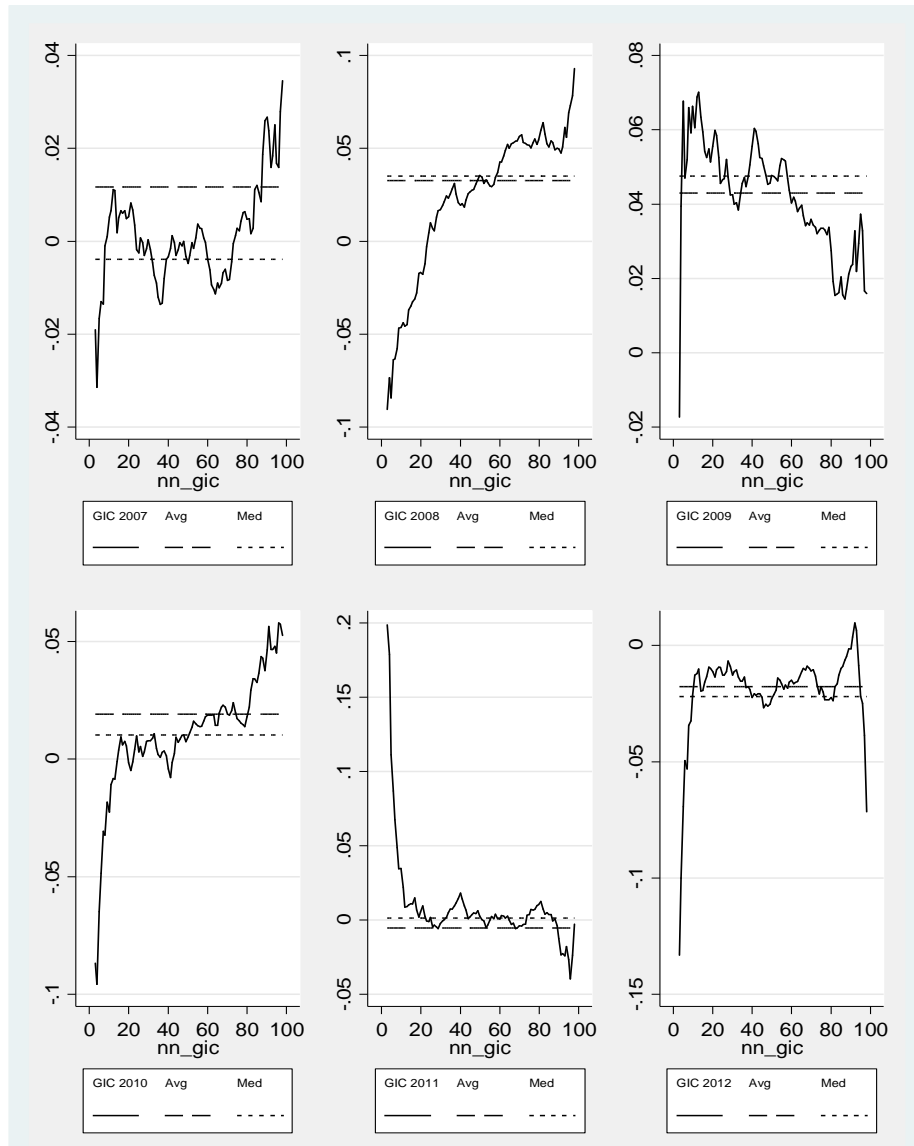
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Appendix A

Growth Incidence Curves for the Years 2006 – 2012²⁰

Graph A.1

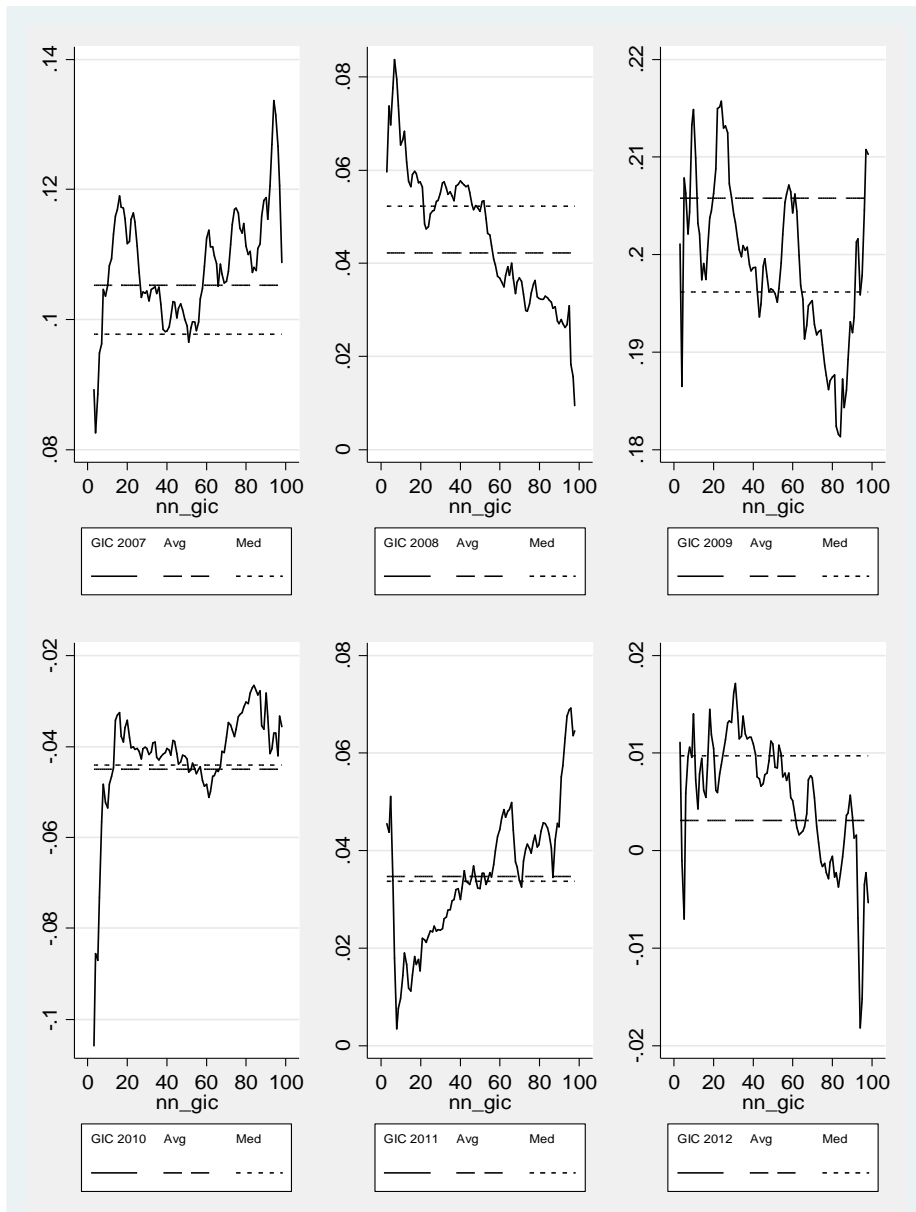
Growth Incidence Curves for Austria for the Years 2006 to 2012



Source: Own calculations based on EU-SILC data.

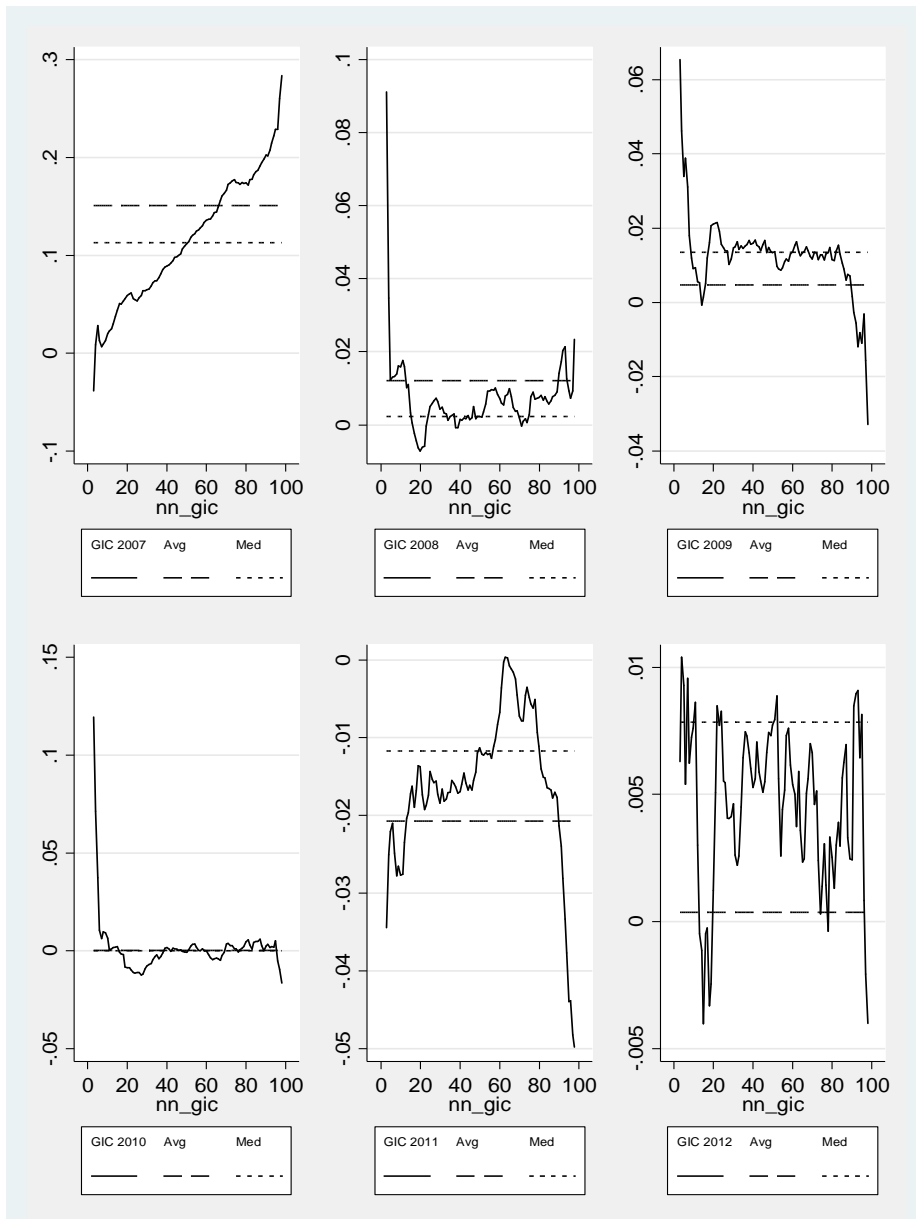
²⁰ The analysis includes all data from the original sample, but the outliers caused very wide intervals on the y-axis of the GIC graphs. Thus, in order to improve the readability of the GIC graphs we decided to exclude the first two and the last two percentiles.

Graph A.2

Growth Incidence Curves for the Czech Republic for the Years from 2006 to 2012

Source: Own calculations based on EU-SILC data.

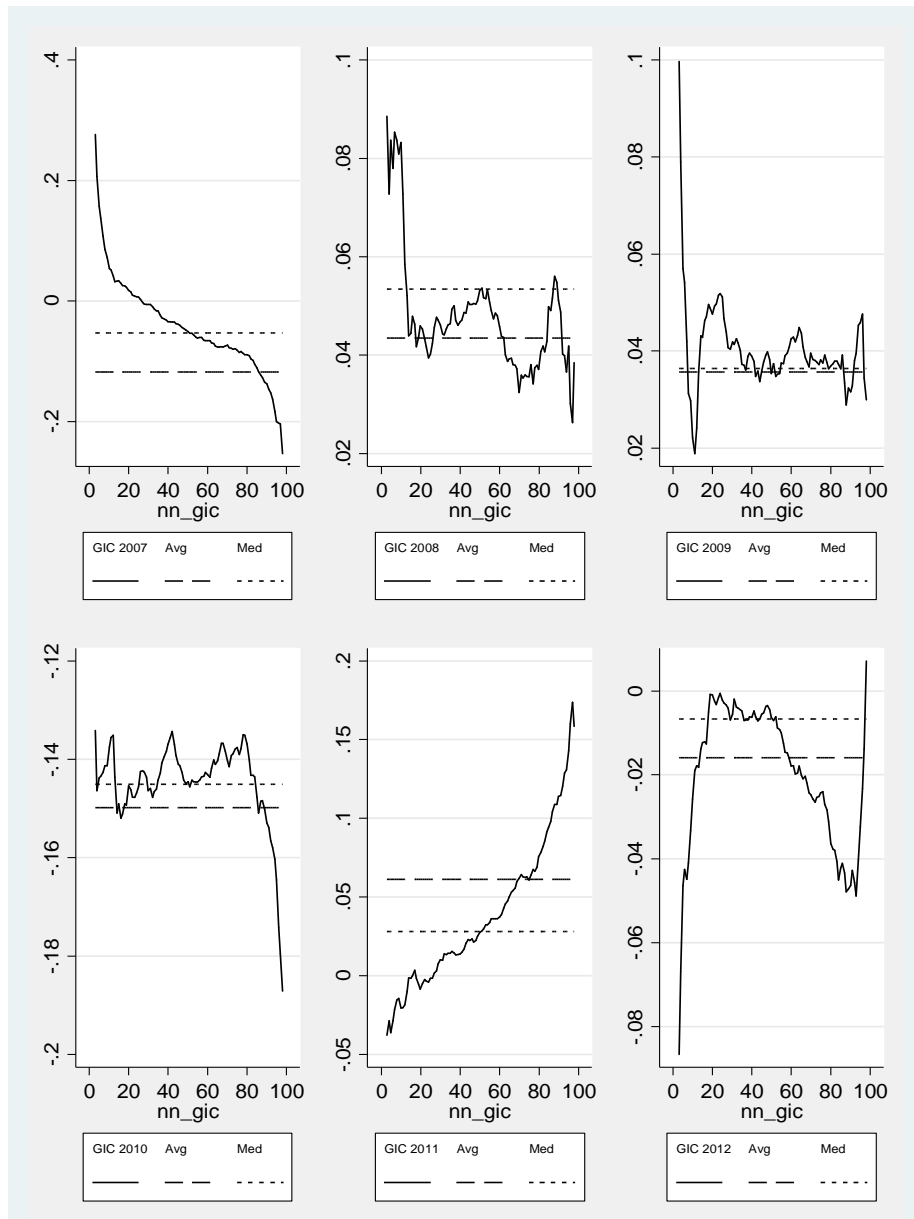
Graph A.3
Growth Incidence Curves for Germany for the Years from 2006 to 2012



Source: Own calculations based on EU-SILC data.

Graph A.4

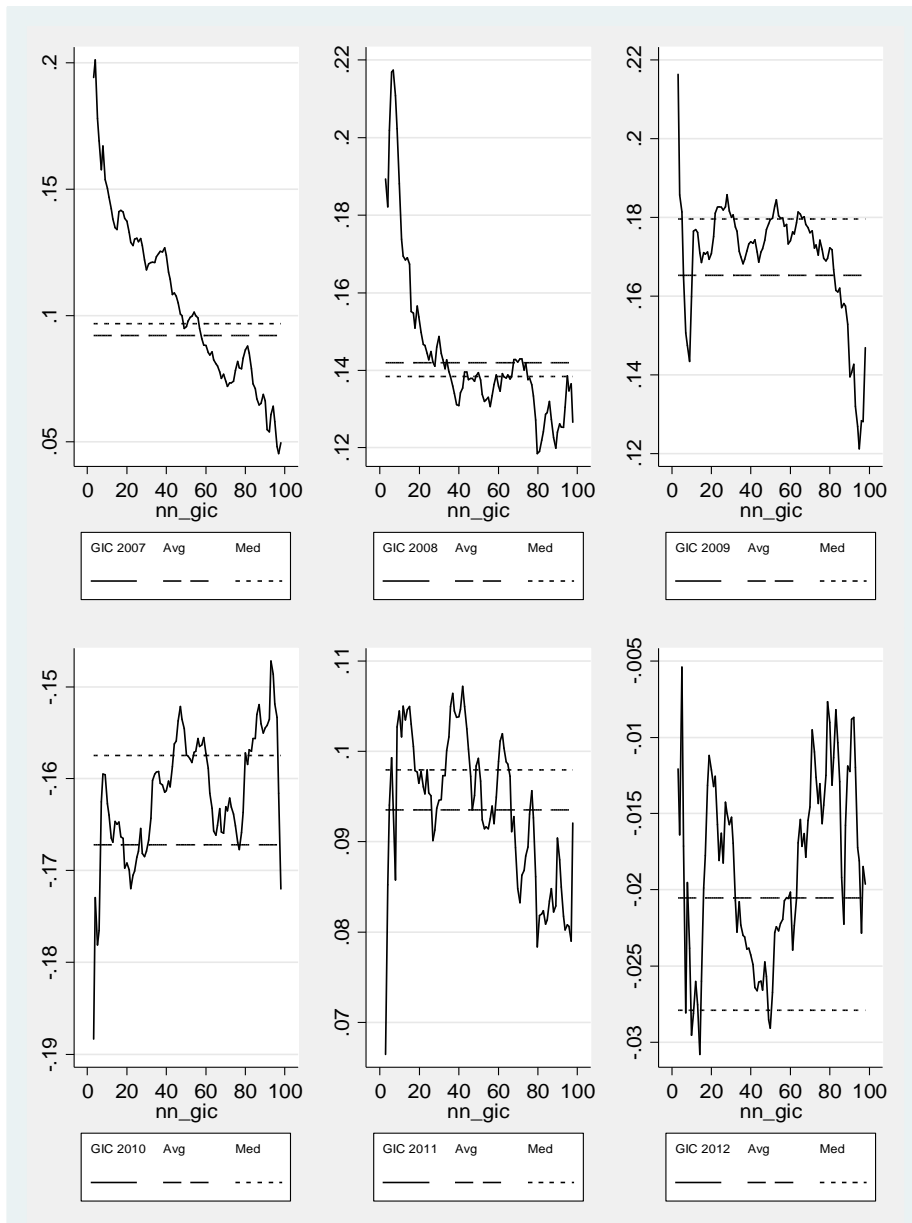
Growth Incidence Curves for Hungary for the Years from 2006 to 2012



Source: Own calculations based on EU-SILC data.

Graph A.5

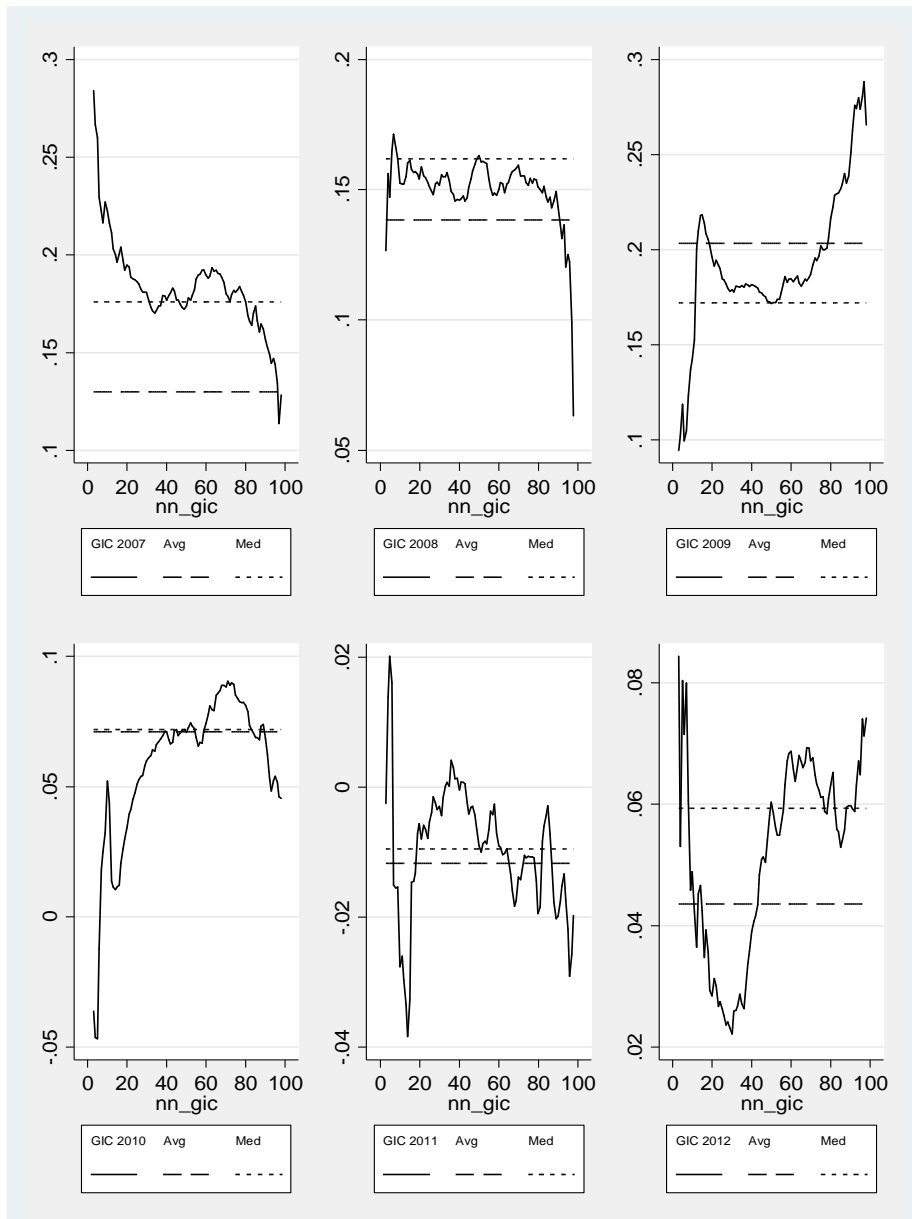
Growth Incidence Curves for Poland for the Years from 2006 to 2012



Source: Own calculations based on EU-SILC data.

Graph A.6

Growth Incidence Curves for the Slovak Republic for the Years from 2006 to 2012



Source: Own calculations based on EU-SILC data.