

# REGIONAL INCOME DISPARITIES AND GROWTH: THE PERFORMANCE OF ESTONIA IN COMPARISON WITH THE EU

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## **Abstract**

*The paper aims to offer some empirical insights into the regional income disparities, convergence and growth in Estonia in comparison with the results of analysis in EU countries and their NUTS3 and NUTS2 level regions. The empirical results of the analysis indicate that both income convergence and divergence exist depending on the level of regional aggregation and the data used as proxies for measuring regional income. Leading to income convergence should serve as a measure to alleviate poverty and to continue with the catching-up processes for the poorer region, but income convergence should not always be the target itself. Though, sometimes more attention should be paid to elate people in highly developed areas for using their good potential for development in order to get benefit of spillover effects for all inhabitants, including the ones of the poorer regions. The policy means should support the investments in long run development of human capital as the prime engine for economic growth, particularly in small countries like Estonia.*

## **1. Introduction**

In the light of globalization, which produces both winners and losers within and between countries, the regional dimension of income inequality, convergence and growth is attracting a considerable research and policy interest. Following the Stolper-Samuelson theorem (1941), it is possible to predict that owners of relative rich endowment factors may be the winners from globalization and integration processes and of relative poor factors may be the losers of these processes. But there are several other theoretical explanations and plenty of empirical studies providing various conclusions that allow us to argue that globalization has not affected inequality on average. According to the World Bank Report (2003), globalization has mostly reduced inequality between countries. At the same time, there are plenty of empirical studies

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emphasizing that inequality within countries is increasing (e.g. Kanbur and Venables, 2005; Chen and Sapshord, 2005). Besides, the relationship between income inequality and growth is still a debated issue, which can be summarized by the Shakespearian-like dilemma “is inequality good or not good for growth”. There are still no clear theoretical explanations and/or overall accepted empirical evidence about this relationship that allow us to predict exactly what the consequences of increasing or declining income inequality may be. It is also not fully clear is regional income divergence definitely something to fight against.

Therefore this paper aims to offer some empirical insights in the debated issues described above, providing more distinct information on regional income disparities and convergence in the new EU member state Estonia, a small post-socialist economy having been faced with quick economic growth and rather high income inequality during the recent decade. Regional income disparities and convergence in Estonia are analyzed in comparison with the results of the studies that explore regional convergence in EU countries and their NUTS3 level regions (see Paas and Schlitte, 2007 and 2006). We also analyze other aspects of equality and welfare by measuring convergence in household’s disposable income and compensation of employees at the NUTS-2 level. Since Estonia as a small country is one region at the NUTS-2 level, we use county level data about household member’s average income, average hourly wage and average pension provided by Estonian Statistical Office. We also employ municipality level data about physical persons’ income tax provided by Estonian Tax and Customs Board. We estimate convergence processes on both levels, the level of counties and local municipalities, also testing for spillover effects and spatial heterogeneity.

The paper consists of the following sections. Section 2 shortly presents a theoretical framework and section 3 methodological framework for exploring regional income disparities and convergence. Section 4 gives a short overview of data used for the analysis. Section 4 gives an empirical insight into regional income disparities and convergence in GDP *per capita* levels in Estonia and compares the results of the analysis with the respective information about the regional disparities in EU. Section 6 discusses other measures of regional welfare than GDP per capita and provides results of the convergence analysis of households’ income. Section 7 provides some concluding remarks and policy implications.

## **2. Theoretical considerations for exploring regional income disparities and growth**

In recent years there has been a growing interest in exploring the relationship between income inequality and growth. A natural starting point of this debate is well-known as Kuznets hypothesis (Kuznets 1955). According to this hypothesis, inequality rises in early stages of development and falls as economic development proceeds. Since then, several theoretical models as well as empirical studies have been developed, which provide contradictory results (see overview by Ravallion 2005). Thus, it is possible to argue that the relationship between income inequality and growth is not stable over time and depends on the stage of a country's development. The development stage of a country is characterized by different role of capitals as the engines for economic growth. One of the widely accepted opinions is that in early stages of industrialization, the accumulation of physical capital is the prime engine of growth and therefore the relationship between inequality and economic growth is positive. Once the economy has passed the initial development stage, the accumulation of human capital is the prime engine of growth and therefore the relationship may be the opposite. A more egalitarian distribution of income allows more people to invest in education.

Moreover, empirical studies show different patterns of the relationship between inequality and growth. Early studies have supported the viewpoint that inequality reduces economic growth (Alesina and Rodrik, 1994; Deiniger and Squire, 1996). But more recently several other studies based on using larger data samples and more sophisticated econometric techniques provide results that vary depending on the time period and countries under investigation as well as methods applied for analysis. Thus, empirical results confirm the important role of business cycles as well as emphasize the necessity to apply proper estimation techniques. Additionally, new questions have risen about the relationship between spatial inequality and development (Kanbur and Venables 2005: 3). Spatial inequality is a dimension of overall inequality which has added significance when spatial and regional divisions align with political and social tensions. The exploration of spatial dimensions of inequality also needs the implementation of special methodological approaches that allow us to test spatial dependence and to take it into consideration while explaining empirical results. If spatial dependence is not taken into account by empirical studies, the results may often be biased and fail to give a profound picture of the real life.

Plenty of studies investigating regional disparities and convergence which have been carried out since the beginning of the 1990s (e.g. Barro and Sala-i-Martin 1995, Armstrong 1995, Tondl 2001, Le Gallo et al. 2003, Arbia and Piras 2004) allow us also to give some additional empirical insights into

this relationships. Since regional convergence is a long run phenomenon, convergence studies usually observe longer time spans of 15 years or more. Analyses observing regional convergence over a couple of decades found varying rates of convergence over time, showing that the speed of convergence over shorter periods may deviate significantly from the long run average. However, long run convergence analysis covering the enlarged EU is not feasible at the time. Due to the significant changes in accounting and production systems during the transition and EU enlargement processes, income data for the time before the middle of the 1990s cannot often be reasonably interpreted; in many cases these data are even missing.

### 3. Methodological framework

In order to examine regional catching up processes, regional GDP per *capita* disparities and differences in households' purchasing power in EU and in the counties and municipalities of its' small member state Estonia,  $\beta$ -convergence analysis is applied in this paper.

The concept of  $\beta$ -convergence is based on the traditional neoclassical growth model and it postulates that the poor economies grow faster than the rich ones. If regions differ only in initial income levels and capital endowment per worker, they converge towards an identical level of per capita income. This is referred to as absolute  $\beta$ -convergence. By contrast, conditional convergence emphasizes on spatial heterogeneity in growth factors leading to different growth paths. In the case of conditional convergence, where regions are marked for example by differences in institutions, technology, economic structures or qualification of the work force, regions converge towards different steady-state income levels. With respect to EU policy aiming at regional equity, absolute convergence is the appropriate concept to be used. However, considering the variety of regions in Europe, including large structural differences, conditional convergence might be more realistic. The crucial role played by national specifics, such as differences in national policies, legislation, tax-systems, etc., has been stressed in several studies on regional growth and convergence (e.g. Armstrong 1995). )

$\beta$ -convergence is defined as a negative relationship between initial income levels and subsequent growth rates. In order to test the regional  $\beta$ -convergence, we use the common cross-sectional OLS approach with *per capita* income growth as dependent variable and the initial income level as explanatory variable:

$$\ln\left(\frac{y_{i0+T}}{y_{i0}}\right) = \alpha_0 + \alpha_1 \ln(y_{i0}) + \varepsilon_i \quad (1),$$

where

$y_{i0}$  – initial GDP *per capita* in region  $i$ ,

$T$  – number of years in observation period,

$\alpha_0, \alpha_1$  – parameters to be estimated,

$\varepsilon_i$  – normally and independently distributed error term.

Estimations based on equation (1) are referred to as absolute  $\beta$ -convergence. In order to account for country specific effects, dummy variables for countries could be applied to allow testing for conditional convergence:

$$\ln\left(\frac{y_{i0+T}}{y_{i0}}\right) = \alpha_0 + \alpha_1 \ln(y_{i0}) + \sum_{j=1}^N \alpha_{2j} c_{ji} + \varepsilon_i \quad (2),$$

where

$c_{ij} = 1$  if region  $i$  belongs to country  $j$ , otherwise  $c_{ij} = 0$ .

When the estimated coefficient  $\alpha_1$  is negative, the poor economies tend to grow faster than the rich ones. The annual rate of convergence,  $\beta$ , can be obtained from the equation  $\beta = -\ln(1 - \alpha_1)/T$ , where  $T$  denotes the number of years between the initial and the final year of observation. Another common indicator to characterize the speed of convergence is the so-called half-life  $\tau$ , which can be obtained from the expression:  $\tau = \ln(2) / \beta$ . The half-life shows the time that is necessary for half of the initial income inequalities to vanish.

Anselin (1988) suggests two different model specifications in order to deal with the respective forms of spatial dependence. Both models are estimated with the maximum likelihood (ML) method. The spatial lag model (SLM) is suitable when spatial dependence is of the substantive form, where regional growth is directly affected by the growth rates in surrounding regions. In the spatial error model (SEM), spatial dependence is restricted to the error term. Spatial dependence can be taken into account by application of a spatial weight matrix  $W$ , which is supposed to capture spatial structure and intensity of spatial dependence. The specification of the matrix may be influential on regression results. However, there are various possibilities to specify a spatial weight matrix. Because there is usually no a priori information about the exact nature of spatial dependence, the choice for the design of the spatial weights is somewhat arbitrary (see Niebuhr 2001, Ertur and Le Gallo 2003). A common approach is the concept of binary contiguity where the elements of the matrix  $w_{ij}=1$ , if region  $i$  and region  $j$  share a common border or are within a certain distance range to each other and  $w_{ij}=0$  otherwise (e.g. Rey and Montouri 1999).

A specific problem associated with  $\beta$ -convergence is that it does not necessarily imply a reduction in variation of regional income levels over time (see Barro and Sala-i-Martin 1995). However,  $\beta$ -convergence is a frequently used concept because it allows controlling for various effects on the convergence process. Furthermore, it can be useful to explore the data on the development of regional income disparities besides conducting a formal  $\beta$ -convergence analysis.

#### 4. Data

Conducting regional income inequality as well as convergence analysis, it has to be kept in mind that the choice for the level of regional aggregation may impact the outcome. Applying same methods on different spatial scales may yield to different results. On the one hand, spatial heterogeneity and spatial interaction may be covered when the observational units are relatively large. On the other hand, using a very low level of regional aggregation increases the danger of slicing functional regions into parts. In the latter case, economic activities within a homogenous, functional region may be wrongly detected as spatial autocorrelation (see also Le Gallo and Ertur 2003).

In principle, the choice for the level of spatial aggregation has been somewhat arbitrary in previous empirical studies. Except for very few studies employing relatively low levels of spatial aggregation (e.g. Niebuhr 2001), regional disparities and convergence processes in Europe have so far ordinarily been analyzed at the NUTS-2 level or higher levels of regional aggregation. This can be explained by the improved data availability first of all at higher levels of regional aggregation in EU. In the analysis conducted by Paas and Schlitte (2007 and 2006) and the results of which are used for comparison the Estonia's regional income pattern in the framework on the EU-25, the cross-section database consists basically of NUTS-3 level regions. The size of the sample used for the comparison consists of 861 regions, of which 739 regions belong to the EU-15 and 122 to the new member states. As income measure, GDP per capita data measured in purchasing powers standards (PPS) taken from the Eurostat database are used in the referred study (ibid).

In 2003, the top income level in Inner London West, UK, with 477% of the average income level of the EU-25, was more than twenty times higher than the one of the poorest region Latgale, Latvia, with 21%. Furthermore, in the two sub-samples, the EU-15 and the NMS, there is a wide gap between the lowest and the highest income levels. The income level in the poorest region in the EU-15 – Tamega, Portugal, with 37% – was thirteen times lower than the respective income level of the richest region. The income level in the richest region of the NMS – Warsaw, Poland, with 139% – was 6.6 times higher than the average per capita income in Latgale. The range of regional income

disparities in Estonia is 142,932 EEK or around 3.5 times; and that is significantly large considering the possible consequences that may weaken social cohesion having negative impact on sustainable economic development in long run.

Estonia has five NUTS-3 level regions: North-Estonia (Põhja-Eesti), West-Estonia (Lääne-Eesti), South-Estonia (Lõuna-Eesti), North-East Estonia (Kirde-Eesti) and Central-Estonia (Kesk-Eesti). If we compare the range of regional income disparities in Estonia and EU-25, we see that regional heterogeneity is significantly higher when observational units are larger. The NUTS-3 regions are not functional regions and they do not correspond to the administrative-territorial structure of Estonia. Therefore, GDP data of the 15 Estonian counties are used in this paper. In Estonia, collecting data about GDP on the county level started at the year 2000. In the same year, the methodology of calculating overall GDP in Estonia was changed. For that reason we can use only very short time period (2000–2005) for exploring regional GDP *per capita* disparities and convergence on the level of the Estonia's counties.

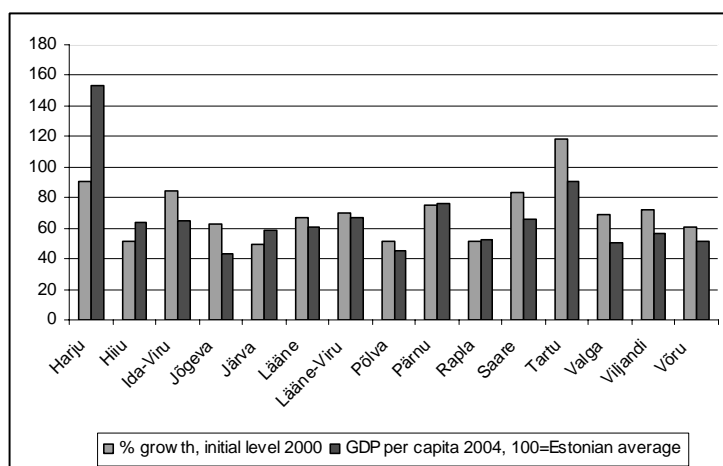
Since we consider that regional GDP is not the only and maybe even not the most appropriate measure of regional standard of living, we also apply Eurostat data for households' disposable income measured by purchasing power parities and compensation per employee. The last indicator was not directly available by Eurostat, but we calculated it by dividing the compensation of employees (millions of EUR) by the number of employees in the region, as suggested by López-Rodríguez and Faíña (2006). For Estonian regional analysis, we used data for household member's average income, average wage and average pension levels. In some cases, data are available for the period 1996–2004, which gives us an opportunity to investigate convergence in people's income since quite beginning of the transition period.

Data on smaller aggregation levels (municipalities) are not available for GDP or other welfare indicators used in this study. In order to analyze income disparities on the level of Estonian municipalities (n=241), we use the amount of income tax received by the municipality divided by the number of inhabitants as a proxy of wealth. The respective data are available thanks to the database of the Estonian Tax and Customs Board. Since Estonian municipalities are very small, commuting between place of residence and place of work is very likely and a physical person's income tax may not be the most appropriate measure of the wealth of a municipality. We are aware of this limitation of our study but for examining regional income disparities on the level of local municipalities, these are the only data available at the moment. We have also taken into account that there have been some administrative changes due to the amalgamation of some municipalities during the observable period (2000–2005) and therefore respective calculations have been made.

## 5. Regional disparities and convergence in GDP per capita

Resulting from the prosperous economic reforms during post-soviet transition coupled with low-wage but comparatively skilled labour force, Estonia attracted large amounts of foreign direct investments and created good conditions favouring quick economic growth. As a consequence, Estonia succeeded to achieve high growth rates already during the EU pre-accession period (around 6-8% *per year*) and this high growth rate also continued after joining the EU (8.1% in 2004; 10.5% in 2005 and 11.4% in 2006; see Estonian Economy..., 2007). Economic growth in the period 2000–2005 was also quick in the counties of the country (see figure 1) varying between 49 and 118 percents. The lowest economic growth occurred in the central part of Estonia, in Järva county. We can see from the figure that divergence may be assumed, richer regions – Harju and Tartu counties have higher growth rates.

Regional disparities in GDP *per capita* are rather high in Estonia. The minimum and maximum level of GDP *per capita* differed more than three times and these differences increased slightly during the years under observation. The level of the GDP *per capita* was the highest in Harju county and the lowest in Jõgeva county during all years under observation. The average value was higher than the medium, which indicates that most counties of Estonia had GDP *per capita* under average. It is mainly due to the very high level of GDP *per capita* in Harju county compared to other Estonian counties.



**Figure 1.** GDP per capita and % growth in Estonian counties, 2000- 2004

In this section we also test for the absolute convergence in case of GDP per capita in Estonian counties. We use the common cross-sectional OLS approach with *per capita* GDP growth as dependent variable and the initial GDP *per capita* level as explanatory variable (see equation 1). It resulted that



the convergence parameter is positive as assumed after taking a glance at data, but statistically insignificant. The value of the determination coefficient,  $R^2 = 0,097$ , is also very low. Evidently the sample is too small and/or homogenous for achieving statistical significance.

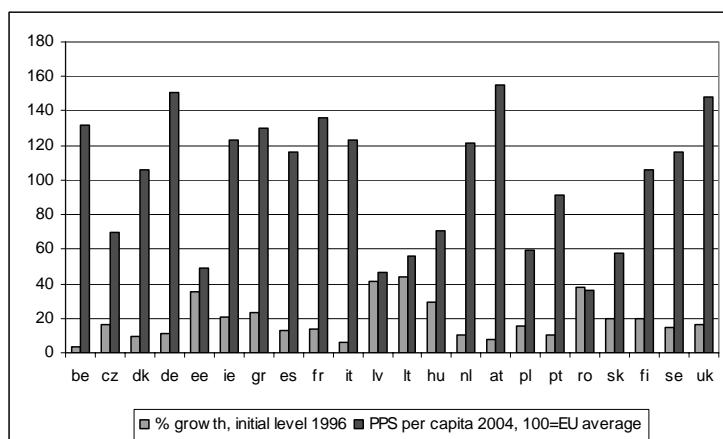
Anyway, we must consider the situation in Estonia, a former socialist country and a new EU member state differs from the situation in both – the EU-15 countries. According to Paas and Schlitte (2007), the enlarged EU (EU-25) experienced a significant between-countries catching-up of GDP *per capita* levels converging at an average rate of 2% p.a. Taking national effects into account, estimated convergence rates decrease substantially. There is no significant convergence process going on within the countries of the EU-25 at the NUTS-3 level and regional GDP *per capita* levels within the countries of the NMS actually diverge at a rate of 1.5% p.a.(ibid). Hence, within the countries of the NMS richer regions tend to grow faster than poorer ones. Consequently, regional development processes measured by the changes in GDP per capita on the counties' level in Estonia generally follows the overall pattern of the NMS.

We conclude that regional disparities within countries tend to increase. But is it something to fight against? Economic theories as well as previous empirical studies do not give a clear answer to that question (see the part 2 of the current paper). There is no doubt that alleviating poverty should be on of the most important target of economic policy measures. But divergence in GDP levels may also indicate to the concentration of production processes to regions, where it is more efficient and leads to higher growth. Also, more and more values are based on the development of info- and communication technologies, which reduces the significance of physical location and magnifies possibilities for spillovers. Developed infrastructure and info-technology gives us a chance to consume goods that are produces far away from us, without even going out from our house. This may indicate that also other measures of regional welfare should be analyzed than regional GDP per capita as we do in the next section.

## **6. Convergence in people's purchasing power in EU and Estonia**

In this section, we provide evidence that convergence has occurred in people's purchasing power. At the EU level, we use Eurostat data for household's disposable income per capita (in PPS) and the ratio of compensation of employees and the number of employees. The second measure is a proxy for average wage, as suggested by Jesús López-Rodríguez and J. Andrés Faíña (2006). The sample consists of these EU NUTS-2 level regions, for which the

data are available. Figure 2 indicates that growth in people's purchasing power has been faster in poorer regions.



**Figure 2.** Household's disposable income, % growth in Estonia, 1996-2004

We now estimated convergence in household's disposable income measured by PPS per inhabitant and found significant evidence on the convergence processes while analyzing both – NUTS 2 regions and European countries. The results indicate that differences between regional living standards have decreased during the observable period 2000–2004. Both convergence coefficients are negative and statistically significant on the 0.01 level (see table 1).

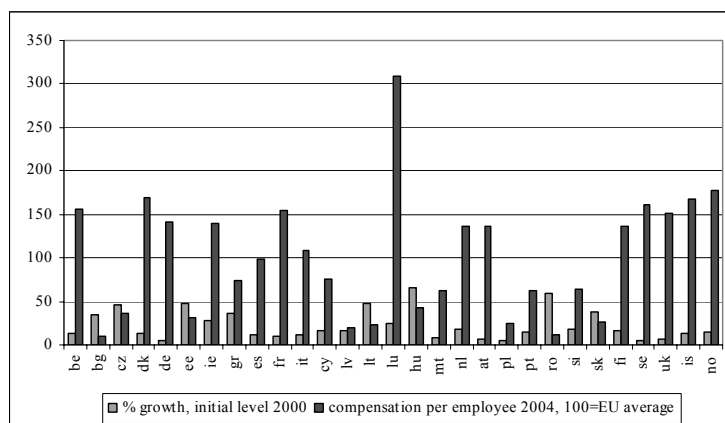
**Table 1.** Convergence coefficients for household's disposable income, EU countries 2000–2004

Disposable income <i>per</i> household	Regions, n=258, $R^2 = 27,2\%$		Countries, n=22, $R^2 = 68,8\%$	
	Coefficient	Standard error	Coefficient	Standard error
Intercept	1.164***	0.105	1.548***	0.201
Initial level 2000	-0.112***	0.011	-0.152***	0.022

Source: Eurostat, authors' calculations

For controlling the results, we also took under observation another personal income indicator – the ratio of compensation of employees and the number of employees as a proxy for average wage. The patterns of these two variables are similar (see figure 3 and table 2).

### Regional Income Disparities and Growth: the performance of Estonia in Comparison with the EU



**Figure 3.** Compensation per employees, % growth and the 2004 level

Growth rates of compensation per employee are also higher in regions with lower initial levels. It indicates that average wages tend to converge. Regression analysis supported this assumption, convergence coefficients were negative highly statistically significant. Growth rates of compensation per employee are also higher in regions with lower initial levels. It indicates that average wages tend to converge. Regression analysis supported this assumption, convergence coefficients were negative highly statistically significant.

**Table 2.** Convergence coefficients for compensation of employees, EU countries, 2000–2004

Compensation <i>per</i> employee	Regions, $n=261$ , $R^2 = 41\%$		Countries, $n=30$ , $R^2 = 43,6\%$	
	Coefficient	Standard error	Coefficient	Standard error
Intercept	0.428***	0.022	0.424***	0.051
Initial level 2000	-0.100***	0.007	-0.088***	0.018

Source: Eurostat; authors' calculations

In the following analysis we concentrate on differences in personal income levels in Estonia. At first we estimate convergence processes in household member's average income, average hourly wage and average pension. Then we go for regional income disparities analysis on the municipality level, exploiting the data for physical income tax per capita,

received by municipality. All of these indicators show different tendencies from the GDP per capita levels. We found significant evidence on convergence in personal income indicators between Estonian counties (see table 3). Thus we can conclude that purchasing power of European Union inhabitants rather moves towards equalizing, despite the increase in regional GDP *per capita* disparities.

**Table 3.** Convergence coefficients for household member's average income, average hourly wage and average pension, Estonian counties 2000–2005

n=15	Income per household member, $R^2 = 39,4\%$		Wage, $R^2 = 11,2\%$		Pension, $R^2 = 34,2\%$	
	Coeff.	Stand. error	Coeff.	Stand. Error	Coeff.	Stand. error
Intercept	2.904***	0.664	1.562***	0.419	3.842***	0.884
Initial level 2000	-0.289***	0.088	-0.279*	0.133	-0.481***	0.162

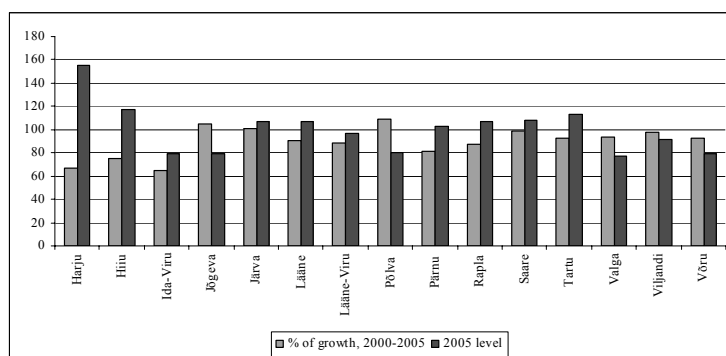
Source: Estonian Statistical Office; authors' calculations.

The analysis of income disparities in the municipalities of Estonia bases on the personal income tax data provided by the Estonian Tax and Customs Board. Contrary to the results of the regional disparities in GDP per capita in Estonia, receipts of physical persons' income tax have also grown faster in poorer municipalities. For county level developments, see figure 4.

Estonian municipalities are very heterogenous. The differences between minimum and maximum income proxies are high, but it is mainly due to the great amount of income growth in Harju and Tartu counties. While observing the same indicators for municipalities, we see that the quotient of maximum and minimum is rather stable (exceptional year is 2003) or has decreased slightly.

In the next step of our regional convergence analysis, we estimate regression models to examine, whether the convergence in physical persons' income tax receipts per capita has occurred in Estonia. At first, we investigate the regression results on the county level, and then we estimate the equations for absolute and conditional convergence (with county dummies) to consider possible effects of structural conditions that may differ across counties (see equations 1 and 2). We also estimated convergence equations taking into account possible spatial interactions using row-standardized contiguity based and distance based weight matrices.

# Regional Income Disparities and Growth: the performance of Estonia in Comparison with the EU



**Figure 4.** Receipts of physical persons' income tax *per capita*, % growth and the 2005 level

We can conclude from the above that the differences in individual income measured by the receipts of physical persons' income tax have decreased on both levels, in counties and municipalities. Hence, the income convergence occurs. The inclusion of county dummies for testing conditional convergence did not change the results much; though, all coefficients for dummies had positive signs and some of them were statistically significant. Table 4 presents estimation results for absolute convergence on the county and municipality levels. In the last column, spatial lag model estimates are shown for comparison.

**Table 4.** Estimators of the convergence equations for income per capita on the county and the municipality levels of Estonia

Variable	Counties, n=15 $R^2 = 39.2\%$		Municipalities, n=241 $R^2 = 38.2\%$		Spatial model, n=241	
	Coeff.	Stand. error	Coeff.	Stand. error	Coeff.	Stand. error
Intercept	0.780***	0.047	0.888***	0.014	0.813***	0.068
Initial level 2000	-0.196***	0.062	-0.274*	0.022	-0.249***	0.073

Source: Estonian Statistical Office; authors' calculations

The results of our spatial econometric estimations indicate that there is spatial dependence neither in nuisance nor in substantive form. One explanation to these results can be the smallness of the sample in use. In order to test the hypothesis about spatial dependence correctly, the sample size should be sufficiently large. The sample for analyzing regional income

convergence on the EU-25 NUTS-3 level was around three times larger ( $n=861$ ).

Though, it is more likely that Estonian economic structure differs from the ones of bigger regions. Estonian municipalities and even counties are very small and thus distances between them are almost diminishing, compared to large European regions, which act as independent economic units. Small distances increase the mobility of both – people and goods enough to make the borders of administrative units and economic units to differ significantly. In Estonia, a only few bigger towns serve as centres for counties in which they locate and even for neighbouring counties. A large share of the residents of rural municipalities work in towns, use infrastructure and other benefits of towns and commute daily or weekly between these towns and their residential municipalities. Thus not the nearest municipalities but the nearest centres probably have very strong influence on the economic structure of municipalities, which excludes establishing spatial interactions by standard spatial econometric analysis methods. Though, we could assume that spillovers take place faster in case of small regions, because innovations achieved in one area, soon become available for the neighbouring ones. Therefore areas with high potential for innovations and technological progress should be strongly supported. It would probably not lead to convergence, but definitely increases overall welfare through spillover effects.

The estimations based on the EU-25 NUTS-3 level sample lead to the conclusion that the substantive form of spatial autocorrelation is present in the regional income data of the EU-25 (see Paas and Schlitte, 2007). The results of this analysis also indicated that OLS estimates were not seriously biased. The conclusion was that national macroeconomic factors appear to be more influential on regional growth than spatial spillovers (ibid). To put it differently, spatial spillovers seem to stop at national borders. Similar results were found by Bräuninger and Niebuhr (2005) for NUTS-2 level regions in Western Europe and for NUTS-2 level regions in the enlarged EU. Thus, our results for Estonia are generally in line with the overall regional growth and income convergence pattern in EU-25 indicated by the previous empirical studies.

In conclusion, regarding the GDP per capita measured on the level of counties, we noticed divergence, but while regarding several personal income individual income indicators, we found evidence of convergence. Overall welfare and people's purchasing power have shown convergence in both – EU and Estonia. We argue that divergence in GDP per capita on the level of counties is a result of more effective distribution of production inputs and therefore, accumulation of capital in places, where production is more effective and all regions benefit from these developments due to spillovers. This aspect definitely deserves further investigation.

## 7. Concluding remarks and policy implications

Estonia as the new member state belongs to the periphery of the EU having had one of the highest growth rates in the EU during the recent years till the year 2008. Examining GDP per capita in the counties of Estonia shows significant regional disparities. There is a core-periphery structure with high income levels in the capital region, Harju county, and low income levels in peripheral regions. It worth pointing out that the core-periphery structure with relatively high income levels in the centre of the EU and relatively low income levels in peripheral regions is characteristic also for the EU.

In recent years, there has occurred divergence in regional GDP levels within many EU countries. Based on the NUTS3-level spatial econometric data analysis, regional spillovers, especially within countries, take place. Inequality between counties' GDP *per capita* levels has also increased in Estonia. Though, the authors consider that increases in within-country disparities may be the consequence of the concentration of production processes to regions, where it leads to gains in efficiency. Due to huge developments in info-technology, communication technologies and overall globalization, differences in regional GDP levels may not be something to definitely fight against. Analyzing other income indicators like disposable income per household and compensation per employee, we can admit that convergence has occurred, which indicates that people's welfare has increased faster in poorer regions. We found significant evidence on convergence in average personal income indicators like disposable income per household and the ratio of compensation of employees and the number of employees in the region on the EU NUTS2 level. Estonian data at the county level, measured by household average income, average wages or pensions and at the municipality level, measured by physical person's income tax *per capita* received by municipality, show statistically significant convergence processes.

But is regional income divergence definitely something to fight against? The authors of this paper share opinion that this is not always the case. Considering concrete circumstances and measuring benefits and losses in overall welfare is definitely needed before employing economic policy measures that should lead to convergence. Divergence in regional GDP levels may indicate to the concentration of production inputs in regions, where it is more efficient. In the light of globalization and huge development in info technology and communication systems, differences in GDP *per capita* levels and growth rates may just be a part of the overall progress, of which, due to spillover effects, also poorer regions benefit and that with less social expenditures, than it would take by public redistribution of income. According

to our opinion, the convergence process should not be the target itself. Of course, leading to convergence should sometimes definitely serve as a measure to alleviate poverty and helping to achieve the necessary aid for starting catching-up processes for the poorer regions. Though, maybe even more attention should be paid to elate people in highly developed areas for using their potential to achieve even greater development, which finally benefits for all inhabitants, including the ones of the poorer regions. Regional policy means

In European Union, the development level of communication systems and infrastructure injures that people in poorer regions sooner or later (depends on the magnitudes of spillovers) also gain from technological achievements made in other regions, and that with less social costs than it would take by extensive public income redistribution processes. Significant amount of attention should be paid to inspiring people in highly developed areas to use their complete potential for obtaining new achievements, of which again people in all regions finally gain. By our opinion, advantages from spillovers could be even much more effective, when cross-border co-operation and interactions between EU countries achieve higher levels. This will probably not lead to convergence in regional GDP per capita levels, but definitely to progress in overall development. The policy means should first of all support the investments in human capital as the prime engine for economic growth, particularly in small countries.

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