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REGIONAL DISPARITIES IN SLOVENIA

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ABSTRACT

This paper finds that regional disparities in the levels of GDP per capita and labor utilization have widened in Slovenia since 1999. However, because of higher social transfers to the poorest regions and the growing incidence of inter-regional commuting to work, regional gaps in per capita household disposable income have declined. Econometric analysis shows that there is heterogeneity in steady-states across regions, and regional growth in per capita GDP and labor productivity are converging to these region-specific steady states. Labor productivity growth has been driven by both capital deepening and growing importance of TFP improvement mainly due to within-sector effects. The main policy priorities are to develop transportation infrastructure, improve the structural and policy determinants of productivity, and strengthen competitiveness.

JEL Classification: O18, O47, O52

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I. Introduction

Interest in the issue of regional disparities in the European Union (EU) is growing (e.g., Borys *et al,* 2008; Funck and Pizzati, 2003; Marelli and Signiorelli, 2010c; OECD, 2010). An important aim of the EU is to ensure economic and social cohesion between member states and within them. The availability of Structural Funds and the Cohesion Fund aimed at achieving the convergence goal has created new impetus for regional policy. However, as Marelli and Signiorelli (2010a, 2010b) note, while the New Member States (NMS) of the EU have reduced the gap in per capita GDP at the national level with Old Member States, within-country regional disparities have increased. Eurostat data for NMS show two notable cross-country patterns: the increase in within-country regional disparities[1] has tended to be greater in countries that (i) had a lower level of initial per capita GDP relative to the EU-15 average,[2] and (ii) have been more successful in reducing the gap between the national and EU-15 average per capita GDP.[3]

The co-existence of increasing within-country regional disparities and convergence with the Old Member States can be explained within the traditional framework of the economic growth literature. According to this framework, disparities in the level of income could widen even when there was convergence in the growth rate of income, if steady state growth rates were heterogeneous across regions and regions were converging to region-specific steady states (Islam, 2003). The speed of transition to the steady state is commonly examined in the literature

[1] Eurostat measures disparity by the sum of absolute differences between regional and national GDP per capita, weighted by the share of population and expressed in percent of national GDP. Qualitatively, this measure should provide a picture similar to that shown by the coefficient of variation or by the Gini index.

[2] For a sample of nine NMS (Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia, and Slovenia), the correlation between the change in disparity during 1999−2007 and initial level of per capita GDP relative to the EU-15 average is negative and statistically significant ($\rho = -0.77$). The inclusion of Latvia (which is an outlier) in the sample makes the relationship statistically insignificant.

[3] For a sample of eight NMS (Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia, and Slovenia), the correlation between the change in disparity during 1999−2007 and the absolute change in the level of per capita GDP relative to the EU-15 average is positive and statistically significant ($\rho = 0.72$). The inclusion of Bulgaria and Latvia (which are outliers) in the sample makes the relationship statistically insignificant.

through the concept of β (beta)-convergence. As the marginal productivity of capital is generally higher in poorer economies with lower levels of physical capital, it is expected that poorer economies will grow at a faster rate than richer economies, leading to convergence of income over time. If the steady state growth rate is the same for all economies (i.e., the structural parameters of the underlying production function are the same for all economies), convergence to the common steady state is characterized as *unconditional or absolute convergence.* However, if the steady state level of income varies across economies because the structural parameters of the underlying production function are different for the economies under consideration, convergence to the economy-specific steady state is characterized as *conditional convergence*. Many researchers have highlighted factors that may contribute to differences in growth rates and the steady state level of income across regions in NMS: location advantages that facilitate the development of growth poles, differences in human capital endowments, differentiated impact of the restructuring process across regions, and uneven spatial coverage of technical progress (Bogumił, 2009; Bruncko, 2003; OECD, 2011; Marelli and Signorelli, 2010a). The examination of the dynamics of dispersion of income levels across economies is an alternative method of investigating convergence, referred to as *σ (sigma)-convergence*. β-convergence is a necessary but not sufficient condition of σ-convergence. As noted above, if economies are converging to different economy-specific steady states, it is possible for β-convergence to take place together with σ-divergence.

In this paper, we examine economic growth and various dimensions of regional disparities in Slovenia during 1996−2008. Slovenia's per capita GDP grew at an annual average rate of 4.2 percent during this period, against a backdrop of prudent macroeconomic policies, a gradualist approach to structural reform, and increasing integration with the EU. Adjusted for differences in purchasing power, Slovenia's per capita GDP was around 82 percent of the EU-15 average in 2008, much above the levels for other NMS. Eurostat data show that the dispersion in regional per capita GDP in Slovenia is the lowest among NMS. During 1996–2004, the dispersion in regional GDP per capita increased in Slovenia by a broadly similar magnitude to that recorded in the majority of NMS. However, the dispersion in regional GDP per capita has

increased only slightly since EU accession in 2004, in contrast to the experience of most NMS.[4] Perhaps because of the low level of regional income disparity, Slovenia is still considered a single NUTS2 programming area under the EU's Cohesion Policy framework, although the Slovene authorities have established twelve "development" or statistical regions corresponding to NUTS3 units.[5] OECD (2011) and Wostner (2002) have suggested that regional disparities in Slovenia are low because of the country's small size and good infrastructural connectedness, and because of its long-standing regional policies that supported a scattering of industries across its regions.

The paper is organized as follows. Section II examines the various dimensions of regional disparities in Slovenia and their evolution over time. Section III presents the results of the econometric analysis of β–convergence. Section IV applies the standard growth accounting framework to identify the main determinants of growth of total output and productivity. Section V looks at the sectoral patterns of productivity growth. Section VI concludes.

II. Dimensions of regional disparities in Slovenia

The eastern regions in Slovenia generally have lower per capita GDP than the western regions. Osrednjeslovenska, the capital region, is the richest region with per capita GDP in 2008 equivalent to about 142 percent of the national average, and Pomurska in the extreme east the poorest with per capita GDP about 65 percent of the national average.[6] However, the east-west divide is not a sharp one, as two of the three poorest regions—Zasavska and Notranjsko-kraška— are nested next to the capital region (Figure 1).

The data indicate σ-divergence in the level of per capita GDP across regions since 1999 (Table 1). The widening dispersion is indicated by the increase in the coefficient of variation

[4] Income disparity has also remained broadly unchanged in Estonia since EU accession, but decreased in Latvia. In all other NMS, the dispersion in per capita GDP continued to increase after EU accession.

[5] The Nomenclature Units from Territorial Statistics (NUTS) is a geocode standard for referencing the subdivision of countries for statistical purposes.

[6] The only other region to exceed the national average for per capita GDP is Obalno-kraška.

over time. A regression equation confirms a statistically significant quadratic relationship between the coefficient of variation of regional GDP per capita and time during 1999–2008.[7] The regional differentials widened more during the pre-EU accession period (1999–2003), when economic growth in Slovenia slowed down, than following EU membership in 2004 when economic growth was stronger. The widening dispersion mainly reflects developments in three regions: a slight improvement in the relative position of Osrednjeslovenska, and a marked worsening of the relative position of Zasavska and Pomurska, the two poorest regions. The per capita GDP of Pomurska relative to the national average fell from 75 percent to 65 percent during 1995–2008, and the drop for Zasavska was much steeper, from 85 percent to 65 percent.

The divergence in per capita GDP does not necessarily imply a widening of regional income inequalities. Regional differences in per capita household disposable income are considerably smaller than the differences in per capita GDP (Table 2). The data also indicate σ-convergence or decreasing disparities in per capita household disposable income since 1999.[8] The small and decreasing gaps in per capita household disposable income reflects two factors. First, as table 3 shows, expenditures on transfers and other social safety nets are greater for regions with lower per capita GDP. In addition, transfer payments to the two poorest regions (Zasavska and Pomurska) have increased over time while payments to the other regions have fallen or remained unchanged as ratio to regional GDP. Second, as table 4 shows, commuting to work outside the region of residence is sizeable and has become increasingly important over time. The volume of inter-regional commuting and its increase are largest for residents of regions with the lowest per capita GDP. Osrednjeslovenska, the capital region, is a major destination for commuting workers. In 2008, nearly one-fourth of the workers in Osrednjeslovenska were commuters from other regions. Slovenia being a small country with good transportation network, commuting is an

[7] $0.1696 + 0.0095\,t - 0.0003\,t^2 \qquad \bar{R}^2 = 0.9381$
$(0.0051)^{***} \quad (0.0020)^{***} \quad (0.0002)^{*}$
*** significant at 1% level; * significant at 10% level. Standard errors are shown in parentheses.

[8] In an earlier study on Slovenia, Wostner (2002) noted that while regional disparities in terms of economic activity were increasing, the overall level of dispersion in personal income (measured by the personal income tax base per capita) had not changed.

alternative to migration.[9] Commuting, like migration, leads to regional concentration of production and σ-divergence in the level of per capita GDP. However, unlike migration, commuting does not increase regional disparities in disposable income as this income accrues in the place of residence. In fact, if commuting is more prevalent among skilled workers, regional disparities in disposable income are likely to diminish. Because of increased commuting, the increase in the clustering of population in Slovenia has been less than that of production.

A large volume of economic activity is concentrated in Osrednjeslovenska, the capital region, and the concentration has increased over time, albeit to a limited extent. The share of Osrednjeslovenska in Slovenia's GDP increased from 33.7 percent in 1996 to 36.1 percent in 2008 (Table 5).[10] This mainly reflects growing concentration of business services activities, while the share of this region in manufacturing value added declined. Manufacturing facilities have tended to cluster toward Jugovzhodna Slovenija in recent years.

In order to gain more insight into the gaps in GDP per capita across regions, we can decompose GDP per capita as follows:

$$\frac{Y}{P} = \frac{Y}{L} \times \frac{L}{P}$$

where Y is gross domestic product, P is population, and L is total employment. The first term on the right-hand side is labor productivity and the second term is labor utilization.

In Slovenia, productivity levels are generally higher in regions with higher levels of per capita GDP. However, the regional differentials in productivity are smaller than in the case of per capita GDP and have narrowed. The data indicate σ -convergence of labor productivity levels

[9] A regression equation shows that inter-regional commuting is negatively related to distance and positively related to difference in average wages. Higher highway road density (highway roads per square kilometers) in a region has a positive effect on commuting.

[10] OECD (2011, p. 40) interprets the increase in concentration of economic activity against the backdrop of little change in population shares as evidence of low labor force mobility and strong connections to local economics. But, this interpretation is not correct. As we have noted, the observed outcome can be explained by the large and increasing incidence of commuting.

during 1996–2005 and a slight reversal of this trend during 2006–2008. As Table 6 shows, the coefficient of variation of labor productivity declined in the first period, but settled at a somewhat higher level in the second period. The relative performances in productivity varied substantially between regions. Productivity levels relative to the national average fell in the two richest and, to a lesser extent, in the two poorest regions (in terms of per capita GDP). However, in two intermediate-production regions, Jugovzhodna Slovenija and Spodnjeposavska, relative productivity levels increased markedly.

Regional disparities in labor utilization in Slovenia have widened over time, especially since 2000, as inter-regional commuting to work has increased. σ-divergence in labor utilization more than offset the σ -convergence of labor productivity levels, and caused the σ-divergence in per capita GDP. In the country as a whole, the ratio of employment to total population edged up only slightly during 1996–2006, and rose sharply thereafter during 2007–2008. However, there were differences in the regional patterns (Table 7). Labor utilization fell or increased by only a small extent in regions from which the increase in commuting to other regions was greater (Figure 2). In particular, three regions (Zasavska, Spodnjeposavska, and Pomurska) that figured among those with the largest increase in commuting to other regions experienced a decline in labor utilization. In contrast, labor utilization increased markedly in Osrednjeslovenska and Obalno-kraška in the central and western part of the country and in Podravska in the east—regions which attracted increasing number of commuters from other regions or recorded a low increase in commuting to other regions.

III. Analysis of β–convergence

The growth path of per capita GDP in Slovenia was broadly U-shaped during 1996–2007, but turned downward in 2008 with the onset of the global financial crisis. As Figure 3 shows, growth fluctuated around an average of about 4¼ percent during1996–2000, slowed down to about 3 percent during 2001–03, but recovered quickly and continued at brisk pace before slowing down in 2008. The U-shaped growth path was common to all regions except for Osrednjeslovenska, where growth fluctuated around a relatively flat trajectory. Labor productivity growth followed a cyclical path: it was on a declining trend during 1997–2001, followed by a recovery during 2002–05 and a downward slide once again thereafter.

Being a small open economy, Slovenia's economic growth was highly sensitive to the external economic environment. Thus, the slowdown in growth during 2001–03 and in 2008 coincided with unfavorable external conditions and restrictive monetary policy after inflationary shocks in 1999. A fall in government investment and weak business confidence were additional factors that contributed to the slowdown in activity during 2001–03. The subsequent rebound in economic growth was stimulated by buoyant foreign demand and a domestic demand boom following Slovenia's EU accession in May 2004 and entry into the Exchange Rate Mechanism II in June 2004.[11] Abundant availability of credits, stable macroeconomic conditions, a gradual reduction in the payroll tax[12], and motorway construction stimulated investment during 2004–07.

As such, the regional pattern of per capita GDP growth does not provide clear support for β-convergence. Contrary to expectations, Osrednjeslovenska, Jugovzhodna Slovenija and Podravska—regions in the top half of per capita GDP rankings—generally grew at a faster pace than Slovenia as a whole. Moreover, growth in the two regions with the lowest per capita GDP—Pomurska and Zasavska—lagged the national average for most of the period. As for growth of labor productivity, the three richest regions as well as the two poorest regions lagged the national average. The results of more rigorous testing of β-convergence through an econometric exercise are presented below.

[11] Slovenia adopted the Euro as its currency in January 2007.

[12] The payroll tax was completely phased out in January 2009.

The presence of unconditional β-convergence is typically tested by regressing the growth rate of any variable (e.g. output per capita or productivity) on the initial level of that variable:

$$\Delta \ln y_{it} = \gamma_0 + \gamma_1 \ln y_{it-1} + \varepsilon_{it} \tag{1}$$

If the growth rate is negatively related to the initial level of the variable—i.e., the sign for γ_1 is negative—there is said to be β-convergence. Conditional β-convergence is tested by regressing the growth rate on the initial level of the variable and other structural variables. In its simplest form, conditional β-convergence is estimated via a two-way fixed-effects (FE) method:

$$\Delta \ln y_{it} = \gamma_i + \gamma_1 \ln y_{it-1} + \gamma_t + \varepsilon_{it} \tag{2}$$

where γ_i represents region-specific effects and γ_t captures time effects. The region-specific fixed effect allows for heterogeneity in steady-states across regions. The time-fixed effects capture the impact of changes in the external environment, technology, and policies over time. A more rigorous method of testing conditional β-convergence is to estimate the growth models of Solow (1956) and Mankiw, Romer and Weil (1992). The econometric specification of the Solow model, with two-way fixed effects, is as follows:

$$\Delta \ln y_{it} = \gamma_i + \gamma_1 \ln y_{it-1} + \gamma_2 \left[\ln s_{it} + \ln\left(n_{it} + g + \delta\right)\right] + \gamma_t + \varepsilon_{it}. \tag{3}$$

where s_{it} is the share of output invested in physical capital in region i at time t, n_{it} is the growth rate of employment in region i at time t, g is the rate of increase in technological progress, and δ is depreciation of capital. Similarly, the Mankiw-Romer-Weil model, which extended the Solow model to incorporate the influence of human capital on output, can be specified as:

$$\begin{aligned} \Delta \ln y_{it} &= \gamma_i + \gamma_1 \ln y_{it-1} + \gamma_2 \left[\ln s_{it}^K + \ln\left(n_{it} + g + \delta\right)\right] \\ &+ \gamma_3 \left[\ln s_{it}^H + \ln\left(n_{it} + g + \delta\right)\right] + \gamma_t + \varepsilon_{it}, \end{aligned} \tag{4}$$

where s_{it}^K and s_{it}^H represent the shares of output invested in physical and human capital in region i at time t, respectively. In the specifications of both the Solow model and the Mankiw-Romer-Weil model, it is assumed that the initial level of technology is heterogeneous across regions but

that growth of technology, g, is homogenous across regions. It is further assumed, following the literature (e.g. Bernanke and Gurkaynak, 2001 and Bosworth and Collins, 2003), that $g+\delta=0.05$.

To test the hypothesis of β-convergence, we estimated growth-initial level regressions separately for the full sample period (1996–2008) and two sub-periods (1996–2003 and 2004–2008). β-convergence is tested for per capita GDP and labor productivity. The regressions are based on annual data because of the small sample size.[13] Although results of several specifications are presented, the estimations that use both fixed effects and control variables derived from the Solow model and its extension by Mankiw *et al* are of particular interest. The region-specific fixed effects allow for heterogeneity in steady states across regions. The time-fixed effects capture the impact of changes in the external environment, technology, and policies over time.

In the specification for 1996–2008 where the initial level of per capita GDP is the only explanatory variable (Table 8, column 1), the coefficient on this variable is positive and statistically significant, suggesting the presence of absolute or *unconditional divergence*. However, too much should not be made of this result as the overall explanatory power of the equation is extremely low. When fixed effects for region and time are included in the specification (column 4), the coefficient on the initial level of per capita GDP turns negative and is statistically significant. There is also a substantial improvement in the goodness of fit. The findings of this specification can be seen as evidence of *conditional convergence* to steady state growth rates that differ across regions.

There is no evidence of unconditional convergence or divergence of per capita GDP growth in the estimated equations for the two sub-periods. In the specifications without fixed effects (columns 2 and 3), the coefficients on the initial level of per capita income are not statistically significant. However, with the inclusion of fixed effects for region and time (columns 5 and 6),

[13] A standard methodology for the analysis of β-convergence of GDP and labor productivity growth rates is to use data averaged over an interval of several years to reduce the influence of short-term business fluctuations. However, the use of interval data would reduce the already small sample size even further. In any event, an alternative econometric exercise based on 2-year interval data yielded similar results to that based on annual data, confirming the robustness of the results presented in Tables 8–10. Results of the alternative exercise based on interval data are available from the corresponding author.

the evidence swings in favor of conditional convergence during both 1996–2003 and 2004–2008, as in the case of the entire sample period.

While the econometric exercise indicates evidence of unconditional β-convergence of labor productivity for the full sample and the two sub-periods (Table 9, columns 1, 2, and 3), the evidence of conditional β-convergence is stronger. In the specifications with fixed effects (columns 4, 5, and 6), the goodness of fit is better and the coefficients on the initial level of productivity variable are more negative than in the corresponding equations without fixed effects, suggesting faster convergence. F-tests indicate that region- and time-fixed effects are individually and jointly statistically significant at the 1 percent level.

The estimates of the Solow model for labor productivity growth with region- and time-fixed effects for 1997–2008 as well as the two sub-periods also reinforce the evidence on conditional β-convergence (Table 10, columns 1, 2, and 3). The coefficients on the initial level of labor productivity are similar in size during the two sub-periods, suggesting similar pace of convergence. F-tests indicate that region- and time-fixed effects are individually and jointly statistically significant at the 1 percent level. In accordance with expectations, in all the three sample periods, the results show that the faster is the growth in employment the slower is the growth in productivity. However, the coefficient on the investment ratio is not statistically significant in any of the equations, suggesting that investment played little role in productivity growth. A similar result was obtained in studies on transition and EU candidate countries by Banerjee and Jarmuzek (2010), Havrylyshyn and Wolf (2001), and Borys et al. (2008). One reason for the lack of a significant relationship for overall investment may be that during the economic restructuring process new investment was accompanied by a lot of disinvestment. Another reason could be the relatively short sample period. As the growth literature emphasizes, investment is a major engine of growth in the medium to long term.

In the Mankiw–Romer–Weil model (columns 4, 5, and 6), the initial level of productivity variable and employment growth have negative signs and are statistically significant, as in the Solow model. However, the estimates do not show the expected result on the impact of human capital on productivity growth. The coefficient on the variable education measuring the number of graduates over 1000 residents of a region is not statistically significant.

Since an examination of the data series indicated a strong correlation between education and time controling region ($\rho = 0.88$), an alternative specification was estimated without time-specific and region-specific fixed effects. In this equation, the education variable has the expected positive sign and is statistically significant (column 7).[14]

Following Marelli and Signiorelli (2010b), in a separate specification (not reported in table 10), we also included a variable—Krugman's specialization index (KSI)—to take into account the influence of regional differences in the structure of employment.[15] However, the coefficient on the KSI variable was not statistically significant.[16]

IV. Growth accounting

A supplementary perspective on the driving forces of growth can be obtained by utilizing the growth accounting framework. The decomposition of growth of total output can be expressed by the following equation:

$$\frac{\Delta Y}{Y} = \frac{\Delta y}{y} + \frac{\Delta L}{L}, \qquad (5)$$

[14] In a study cross-country study on EU–27 countries, Marelli and Signiorelli (2010b) obtained a positive and statistically significant relationship between education and productivity. However, their specification included only education and dummy variables for eight NMS as the explanatory variables. Marelli and Signiorelli suggest caution when using formal education measures as a proxy for human capital as these measures do not capture the effect of other factors in accumulation of human capital.

[15] Krugman's specialization index (KSI) is computed as
$KSI_j = \sum_i |s_{i,j} - s_{i,0}|$

where $s_{i,j}$ is the share of sector i out of total employment in region j, and $s_{i,0}$ is the corresponding share for the country as a whole. Its numerical value may range from 0 (the region has the same structure as the country average) to 2 (the sector structure is totally different).

[16] In a cross-country study on EU-27 countries, Marelli and Signiorelli (2010b) obtained a negative and statistically significant coefficient on the KSI variable. However, their explanatory variables were limited to education, a global competitiveness index, KSI, and country fixed effects.

where $\frac{\Delta Y}{Y}$ is growth of total output, $\frac{\Delta y}{y}$ is growth of labor productivity, and $\frac{\Delta L}{L}$ is growth of labor input. In turn, growth of labor productivity can be decomposed as follows:

$$\frac{\Delta y}{y} = \alpha \frac{\Delta k}{k} + \frac{\Delta A}{A}, \tag{6}$$

where $\frac{\Delta k}{k}$ is growth of capital[17] per worker and $\frac{\Delta A}{A}$ is growth of total factor productivity (TFP).

As Table 11 shows, GDP growth in all regions was driven primarily by labor productivity growth throughout the period under consideration. The contribution of employment growth was negative during 1997–98 and in two or more years during 2002–05 in all regions except Osrednjeslovenska. These episodes mainly reflected job losses associated with the restructuring process in agriculture and industry and not so much an increased tendency for inter-regional commuting, since the contribution of employment growth for Slovenia as a whole also was negative during these two periods. The influence of employment growth on GDP growth picked up substantially in all regions from 2006 onward (in line with the business cycle and partly in response to the gradual easing of payroll tax), with the exception of Zasavska where the contribution continued to be negative. In Osrednjeslovenska, the contribution of employment growth on GDP growth rose over time, reflecting progressive increase in employment in construction, business services, and public administration that more than offset a decline in industrial employment. As noted earlier, a sizeable proportion of the increase in employment in Osrednjeslovenska was owing to workers commuting from other regions.

The growth of labor productivity was driven by both capital deepening and TFP growth, but their relative importance changed over time and there were notable regional differences. The contribution of capital deepening was significant throughout the period in all regions. It followed a U-shaped or L-shaped path in eight of the twelve regions, fluctuated around a horizontal path

[17] Capital stock was calculated by the authors following the perpetual inventory method, assuming a depreciation coefficient of 0.04. For a comprehensive discussion of the perpetual inventory method see OECD (2001).

in three regions (Zasavska, Notranjsko-kraška, and Podravska), and rose over time in Pomurska. In contrast, gains in TFP were generally small or negative in all regions during 1997–2003, and its contribution to productivity growth during this period was much smaller than that of capital deepening, except in Koroška. TFP growth gained momentum during 2004–07, with utilization of superior production and organization techniques as Slovenia's integration into the global economy deepened (OECD, 2011, pp. 28–29). As the process of structural change intensified, the importance of high- and medium-high technology activities increased and the share of labor-intensive activities in value added continued to decline. Thus, the contribution of TFP growth to productivity growth exceeded that of capital deepening in six regions (Osrednjeslovenska, Goriška, Savinjska, Podravska, Gorenjska, and Zasavska) but continued to remain below in the other six regions. However, with the onset of the global financial crisis in 2008, the contribution of TFP growth fell sharply, turning negative in nine of the twelve regions, and capital deepening became the dominant driver of productivity growth in all regions.

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V. Sectoral patterns of productivity growth

Further insight into labor productivity growth can be gained by examining whether it was driven by sectoral shifts or by within-sector productivity gains. Following Timmer and Szirmai (2000) and World Bank (2008), aggregate labor productivity growth can be decomposed as follows:

$$\frac{\Delta y_t}{y_{t-1}} = \frac{\sum_{i=1}^{n} \Delta y_{it} S_{it-1}}{y_{t-1}} + \frac{\sum_{i=1}^{n} \Delta S_{it} y_{it-1}}{y_{t-1}} + \frac{\sum_{i=1}^{n} \Delta S_{it} \Delta y_{it}}{y_{t-1}} \qquad (7)$$

where i denotes sector (i=1, …n, with n number of sectors), t-1 and t are time subscripts denoting the beginning and end of period (t-1,t), S_i is the share of sector i in total employment. The first component of equation (7) is the *within*-sector effect, which captures the impact of productivity growth within individual sectors on overall productivity growth. The second component is the *static reallocation* or *between* effect, which reflects the impact of changes in the sectoral composition of employment; i.e., the impact of employment shift from less productive to more productive sectors. The third component, is the *dynamic reallocation* or *cross* effect, which captures the joint effect of changes in employment shares and sectoral productivity; i.e.,

contribution arising from whether expanding sectors have above-average or below-average productivity growth.

In all regions, *within-sector* productivity improvements were the most important driver of aggregate productivity growth during 1997−2008 and their relative importance increased over time in ten of the twelve regions[18] (Table 12). Productivity improvements were associated with labor shedding as well as adoption of new technologies and managerial techniques. Entry of new firms, which tend to show higher productivity, were also a likely contributory factor. Although the *within-sector* effect was the dominant driver, the *static reallocation* or *between* effect accounted for a sizeable amount of productivity improvements during 1997–2003. In six regions that included the richest and the two poorest regions (Osrednjeslovenska, Gorenjska, Podravska, Spodnjeposavska, Zasavska, and Pomurska), the *static reallocation* or *between* effect initially accounted for as much as one fourth to one half of productivity improvements, reflecting a shift of labor away from agriculture and industry toward services.[19] However, subsequently during 2004–08 the importance of *static reallocation* or *between* effect declined markedly. The *dynamic reallocation* or *cross* effect was negative in all regions throughout the period, since services had below-average productivity growth but higher productivity level than in agriculture and manufacturing.

VI. Conclusions

[18] Within-sector productivity improvements fell in Obalno-kraška and Goriška.

[19] The calculations shows in table 12 are based on a broad level of aggregation of NACE industrial classification (e.g., AB, CD , E, F, G, H and so on). Thus, the estimates of within-sector effect are subject to upward bias and the estimates of between-sector effect are subject to downward bias, because they do not capture the structural shifts that took place within manufacturing. Within manufacturing, there was a pronounced decrease in employment in labor intensive sectors and sectors most affected by entry to the EU (textiles, wood, leather products, and food processing), while an increase in employment occurred in sectors where sales to foreign markets grew significantly (vehicle manufacturing, machinery, rubber and plastic products). Unfortunately, data constraints do not allow us to calculate sectoral productivity decomposition at the regional level using a more disaggregated NACE industrial classification.

This paper finds that regional disparities in the levels of GDP per capita and labor utilization have widened in Slovenia since 1999, mainly reflecting greater dynamism of the capital region and underperformance of the two poorest regions. However, the widening dispersion in per capita GDP has not been accompanied by a widening of household income inequalities. Because of higher social transfers to the poorest regions and the growing incidence of inter-regional commuting to work, regional gaps in per capita household disposable income have declined. Econometric analysis shows that there has been conditional β-convergence in the growth rates of GDP per capita and labor productivity. There is heterogeneity in steady-states across regions, and regional growth is converging to these region-specific steady states. Labor productivity growth has been driven by both capital deepening and growing importance of TFP improvement. Within-sector effects have been the key driver of labor productivity gains throughout the period. Static reallocation effects were initially sizeable but have faded in recent years.

According to the OECD (2011), based on international comparison, there is scope for further increase in geographic concentration of economic activity in Slovenia. The increase in concentration of value added in the capital region thus far has taken place against a backdrop of increasing incidence of commuting to work. However, increase in traffic congestion and infrastructural bottlenecks to commuting could slow down the process of further concentration of economic activity. Improving within-region and inter-region rail and road networks will help to fully exploit the potential for agglomeration economies and enhance Slovenia's aggregate growth performance. Such a pattern of development would likely further widen the regional disparities in per capita GDP but it would not worsen regional inequalities in household disposable income.

Despite the increase in concentration of value added in the capital region, a substantial part of Slovenia's growth has been generated in the non-capital regions. This is likely the result of Slovenia's long-standing policy focus on ensuring balanced regional development, and suggests the presence of multiple growth poles in the country. The challenge ahead is to ensure that each region develops and reaps its growth potential by boosting investment to spur an increase in the labor utilization rate, improving the structural and policy determinants of productivity, and by

strengthening competitiveness. It would be important to direct efforts to increase efficiency in the services sector, where productivity growth in recent years has been limited.

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Figure 1. Slovenia: Regional Map

Figure 2. Slovenia: Changes in net commuting flows and labor utilization rate

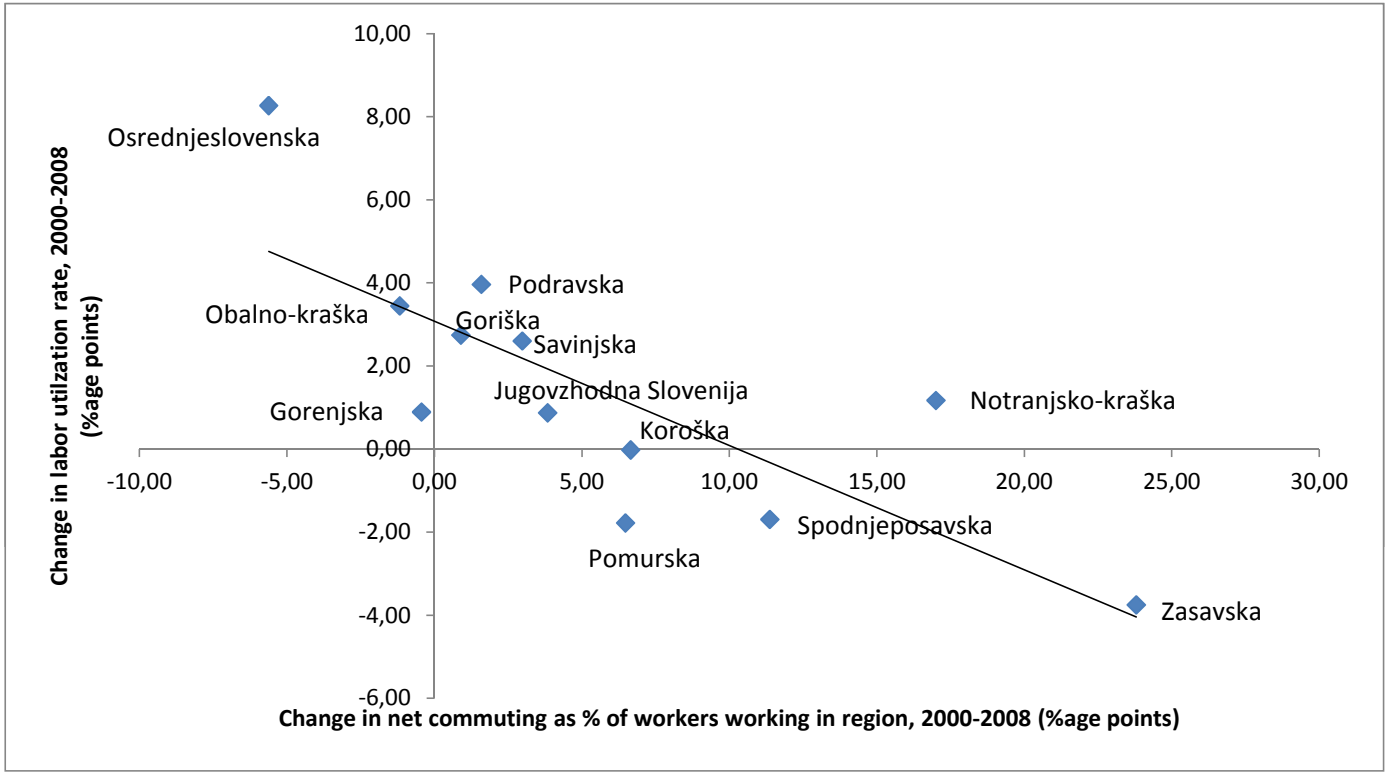
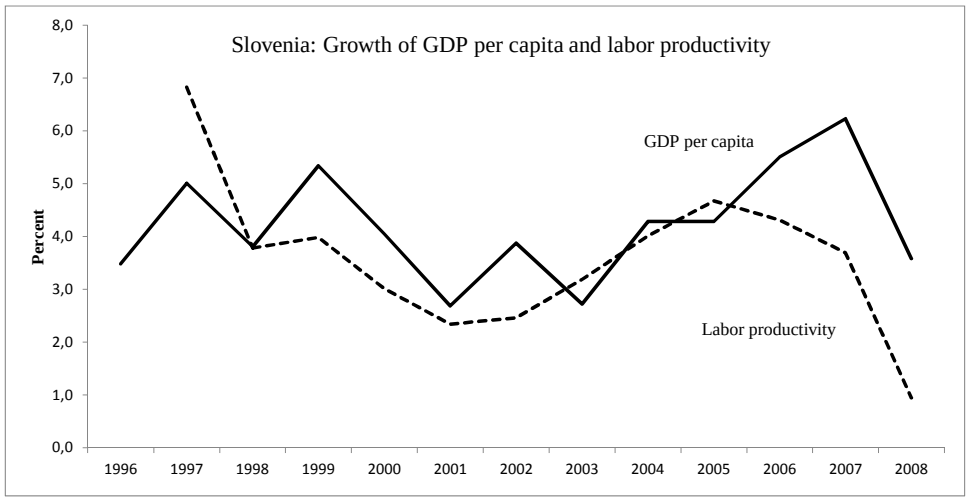
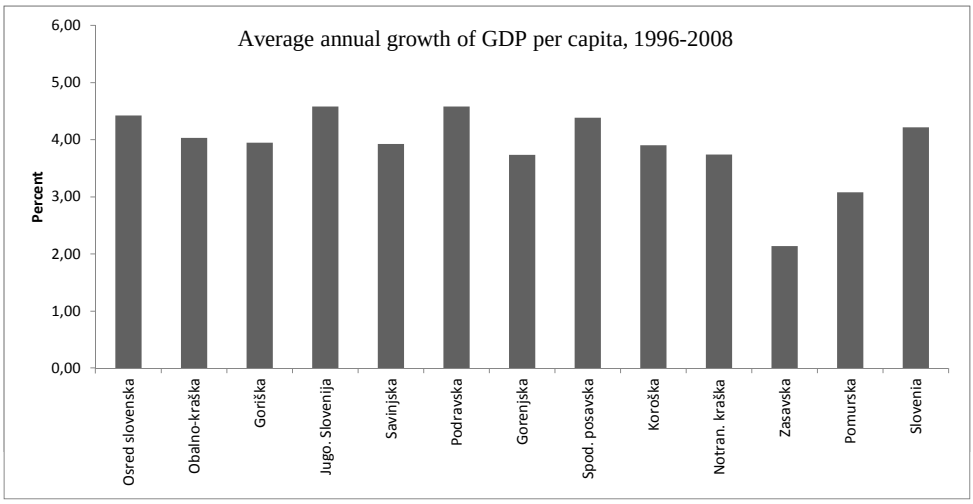


Figure 3. Regional Patterns in growth of GDP per capita and labor productivity





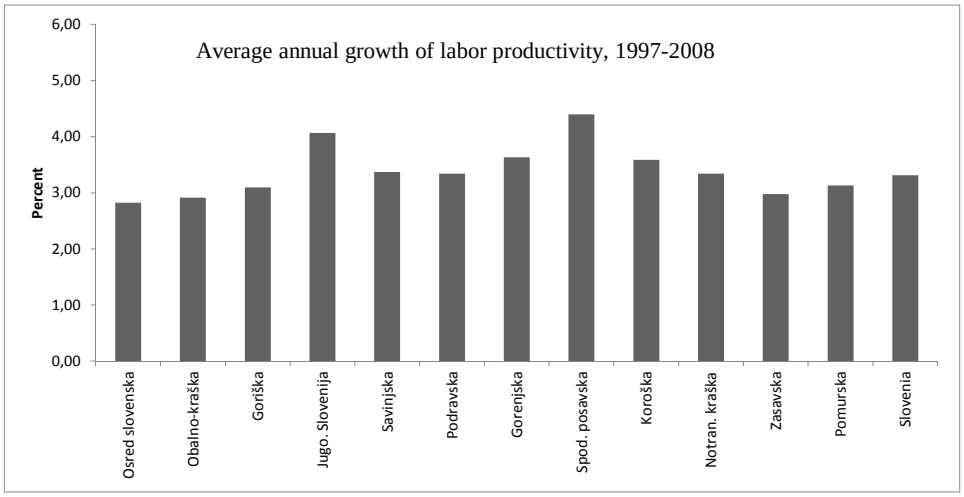


Table 1. Slovenia: Regional differences in real GDP per capita

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
						Regional GDP per capita in percent of Slovenia average							
Osrednjeslovenska	138	137	137	139	139	140	140	144	143	143	144	144	142
Obalno-kraška	109	108	108	106	105	104	105	104	103	102	102	104	106
Goriška	100	101	99	100	99	99	97	96	96	96	96	96	96
Jugovzhodna Slovenija	89	90	91	91	92	92	91	90	92	93	93	93	93
Savinjska	92	92	92	92	91	89	90	89	89	90	89	88	90
Podravska	82	82	82	83	84	83	84	84	84	84	84	85	85
Gorenjska	89	90	90	88	88	89	88	87	86	85	84	85	84
Spodnjeposavska	81	82	86	83	85	85	84	80	80	83	81	80	82
Koroška	80	79	80	80	83	82	80	78	77	79	77	77	77
Notranjsko-kraška	79	80	81	79	80	80	80	78	77	76	75	75	74
Zasavska	84	84	83	82	79	75	73	71	71	70	68	66	65
Pomurska	75	74	74	71	70	70	69	68	68	67	66	65	65
Slovenia	100	100	100	100	100	100	100	100	100	100	100	100	100
Memorandum item:													
Coefficient of variation[a] (annual)													
All regions	0,188	0,182	0,180	0,192	0,19	0,198	0,204	0,222	0,221	0,222	0,231	0,232	0,230
Excluding Osrednjeslovenska	0,110	0,107	0,104	0,109	0,107	0,110	0,115	0,119	0,120	0,122	0,131	0,137	0,144
Coefficient of variation[a] (3-year moving average)													
All regions			0,183	0,185	0,187	0,193	0,197	0,208	0,216	0,222	0,225	0,228	0,231
Excluding Osrednjeslovenska			0,107	0,107	0,107	0,109	0,111	0,115	0,118	0,120	0,124	0,130	0,137

[a] Coefficient of variation is defined as standard deviation of the regional distribution divided by Slovenia average.

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 2. Slovenia: Regional differences in per capita household disposable income

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Regional per capita household disposable income in percent of Slovenia average									
Osrednjeslovenska	120	114	113	112	112	111	111	111	110	112
Obalno-kraška	103	103	103	102	103	103	104	105	106	106
Goriška	104	106	106	105	107	109	106	105	105	105
Jugovzhodna Slovenija	85	97	99	98	98	99	100	99	99	98
Savinjska	97	96	97	97	99	99	97	96	96	96
Podravska	87	88	88	90	90	90	90	91	91	90
Gorenjska	99	102	102	101	101	102	101	100	101	100
Spodnjeposavska	93	94	100	95	91	91	93	95	96	95
Koroška	100	99	99	98	97	97	98	99	99	96
Notranjsko-kraška	95	95	96	96	98	100	101	99	99	101
Zasavska	100	99	100	105	103	98	96	97	97	96
Pomurska	80	80	80	81	79	79	80	83	83	82
Slovenia	100	100	100	100	100	100	100	100	100	100
Memorandum item										
Coefficient of variation[a] (annual)										
All regions	0,103	0,085	0,081	0,078	0,083	0,084	0,078	0,071	0,069	0,076
Excluding Osrednjeslovenska	0,080	0,074	0,075	0,071	0,077	0,079	0,071	0,063	0,064	0,067
Coefficient of variation[a] (3-year moving average)										
All regions			0,090	0,081	0,081	0,082	0,082	0,078	0,073	0,072
Excluding Osrednjeslovenska			0,076	0,073	0,074	0,076	0,076	0,071	0,066	0,065

[a] Coefficient of variation is defined as standard deviation of the regional distribution divided by Slovenia average.

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 3. Slovenia: Regional differences in expenditures on social benefits and other transfers

	1999	2004	2008
(In percent of regional GDP)			
Osrednjeslovenska	16,0	14,9	13,5
Obalno-kraška	19,7	19,2	17,2
Goriška	20,1	20,3	19,2
Jugovzhodna Slovenija	18,9	19,6	17,7
Savinjska	20,4	22,1	20,5
Podravska	20,9	21,3	19,5
Gorenjska	21,7	21,8	20,7
Spodnjeposavska	19,6	21,5	19,6
Koroška	22,7	24,4	23,3
Notranjsko-kraška	23,9	24,7	24,0
Zasavska	24,9	30,2	30,6
Pomurska	20,5	23,1	24,5
Slovenia	19,1	19,2	17,8

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 4. Slovenia: Inter-regional commuting to work

	Outflow of commuters to other regions (in percent of workers living in the region)		Inflow of commuters from other regions (in percent of workers working in the region)		Net commuting from region[a] (in percent of workers working in the region)	
	2000	2008	2000	2008	2000	2008
Osrednjeslovenska	4,4	6,7	16,0	23,2	-12,1	-17,7
Obalno-kraška	10,5	14,8	8,4	13,8	2,4	1,3
Goriška	8,0	12,4	5,0	8,8	3,3	4,2
Jugovzhodna Slovenija	17,9	26,3	6,9	13,6	13,4	17,2
Savinjska	7,4	13,0	7,9	10,9	-0,6	2,4
Podravska	8,3	12,6	6,5	9,5	1,9	3,5
Gorenjska	17,4	20,1	7,4	10,8	12,1	11,6
Spodnjeposavska	16,3	28,2	7,2	12,3	10,9	22,2
Koroška	11,0	20,5	12,3	16,4	-1,4	5,2
Notranjsko-kraška	22,5	33,7	13,1	14,4	12,2	29,2
Zasavska	21,4	38,1	7,8	12,7	17,3	41,1
Pomurska	10,1	17,3	3,1	5,5	7,7	14,2

[a] A negative number means that outflow of commuters to other regions was less than inflow of commuters from other regions.

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 5. Slovenia: Concentration of population and economic activity in four richest regions

		1996	2003	2008
	Share of region in national aggregate (in percent)			
Osrednjeslovenska	Population	24,5	24,7	25,5
	GDP	33,7	35,7	36,1
	Agriculture value added	13,7	13,9	14,2
	Manufacturing value added	26,3	24,6	23,9
	Business Services value added	39,3	43,4	42,7
Obalno-kraška	Population	5,2	5,3	5,3
	GDP	5,6	5,5	5,6
	Agriculture value added	2,8	3,3	3,4
	Manufacturing value added	3,0	3,3	3,1
	Business Services value added	4,6	4,9	4,8
Goriška	Population	6,1	6,0	5,9
	GDP	6,0	5,7	5,6
	Agriculture value added	6,8	6,7	6,9
	Manufacturing value added	6,2	6,4	6,4
	Business Services value added	5,0	4,2	4,8
Jugovzhodna Slovenija	Population	6,9	7,0	6,9
	GDP	6,1	6,3	6,4
	Agriculture value added	11,2	11,1	10,8
	Manufacturing value added	8,4	9,7	10,7
	Business Services value added	5,0	5,0	5,8

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 6. Slovenia: Regional differences in labor productivity

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Regional productivity in percent of Slovenia average												
Osrednjeslovenska	122	121	120	121	121	122	119	120	118	116	116	115	115
Obalno-kraška	115	112	110	109	109	109	109	107	107	107	106	107	109
Goriška	101	102	100	100	100	100	99	98	100	99	100	100	98
Jugovzhodna Slovenija	88	89	89	90	91	91	92	93	94	95	96	97	97
Savinjska	89	90	90	90	88	88	90	89	90	90	90	89	89
Podravska	90	90	90	91	90	89	89	88	90	91	91	91	91
Gorenjska	95	98	99	98	99	99	99	98	97	99	99	100	100
Spodnjeposavska	84	84	89	87	88	90	91	89	91	92	92	94	96
Koroška	84	84	85	84	88	87	88	88	88	89	87	87	87
Notranjsko-kraška	87	90	91	89	91	90	92	90	89	88	87	89	88
Zasavska	97	98	99	98	95	93	94	95	94	92	92	92	93
Pomurska	79	78	77	74	73	74	75	75	76	77	76	76	77
Slovenia	100	100	100	100	100	100	100	100	100	100	100	100	100
Memorandum item													
Coefficient of variation[a] (annual)													
All regions	0,136	0,129	0,122	0,130	0,127	0,129	0,117	0,122	0,115	0,108	0,112	0,110	0,110
Excluding Osrednjeslovenska	0,104	0,100	0,092	0,096	0,093	0,093	0,086	0,084	0,081	0,077	0,081	0,085	0,085
Coefficient of variation[a] (3-year moving average)													
All regions			0,129	0,127	0,126	0,129	0,124	0,123	0,118	0,115	0,112	0,110	0,111
Excluding Osrednjeslovenska			0,099	0,096	0,094	0,094	0,091	0,088	0,084	0,081	0,080	0,081	0,084

[a] Coefficient of variation is defined as standard deviation of the regional distribution divided by Slovenia average.

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 7. Slovenia: Regional differences in labour utilization

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
	Labor utilization rate [a] by regions, in percent												
Osrednjeslovenska	51,0	50,3	50,5	51,5	51,9	52,4	54,6	55,2	56,1	56,9	57,9	59,4	60,2
Obalno-kraška	43,0	42,7	43,3	43,8	44,1	43,5	44,7	44,9	44,6	43,7	44,9	46,2	47,5
Goriška	44,7	43,8	44,3	45,0	45,0	45,4	45,3	44,7	44,3	44,7	44,7	45,8	47,7
Jugovzhodna Slovenija	45,3	45,0	45,5	45,5	45,9	46,1	45,6	44,7	45,2	45,0	45,0	45,6	46,8
Savinjska	47,0	45,7	45,5	46,0	46,5	46,2	46,1	45,7	45,5	45,6	46,1	47,1	49,1
Podravska	40,9	40,4	40,4	41,2	42,1	42,6	43,6	43,6	43,4	42,3	43,0	44,6	46,0
Gorenjska	42,1	40,9	40,2	40,4	40,4	40,8	41,0	40,7	40,6	39,8	39,8	40,5	41,3
Spodnjeposavska	43,7	43,4	43,0	43,0	43,8	43,0	42,7	41,2	40,7	41,1	40,7	40,5	42,2
Koroška	42,8	42,2	41,9	42,8	43,0	43,0	42,3	41,0	40,8	40,5	41,0	42,1	42,9
Notranjsko-kraška	40,9	39,7	39,4	39,8	40,1	40,2	40,1	39,7	39,8	39,5	39,8	40,3	41,3
Zasavska	39,0	38,0	37,3	37,8	38,1	36,7	35,9	34,5	34,8	34,8	34,3	34,2	34,4
Pomurska	43,2	42,6	42,6	42,8	43,1	43,1	42,1	41,8	41,2	39,8	40,0	40,8	41,4
Slovenia	45,2	44,4	44,4	45,0	45,5	45,6	46,3	46,0	46,2	46,0	46,5	47,7	48,9
Memorandum item													
Coefficient of variation[b] (annual)													
All regions	0,075	0,078	0,083	0,085	0,085	0,093	0,108	0,120	0,125	0,131	0,139	0,145	0,146
Excluding Osrednjeslovenska	0,050	0,052	0,059	0,057	0,058	0,063	0,068	0,075	0,073	0,074	0,080	0,087	0,095
Coefficient of variation[b] (3-year moving average)													
All regions			0,079	0,082	0,084	0,088	0,095	0,107	0,118	0,125	0,132	0,138	0,143
Excluding Osrednjeslovenska			0,054	0,056	0,058	0,059	0,063	0,069	0,072	0,074	0,076	0,080	0,087

[a] Labor utilization rate measured as total employment (ESA definition) divided by total population.

[b] Coefficient of variation is defined as standard deviation of the regional distribution divided by Slovenia average.

Sources: Statistical Office of the Republic of Slovenia; and authors' calculations.

Table 8. Regression analysis of β(beta)-convergence of GDP per capita growth (Dependent variable: Δln(GDP per capita))

	Unconditional convergence			Conditional convergence		
	Coefficient (standard error)[a] 1996 - 2008 (1)	Coefficient (standard error)[a] 1996 - 2003 (2)	Coefficient (standard error)[a] 2004 - 2008 (3)	Coefficient (standard error)[a] 1996 - 2008 (4)	Coefficient (standard error)[a] 1996 - 2003 (5)	Coefficient (standard error)[a] 2004 - 2008 (6)
Constant	-0.0684 (0.0537)	0,1121 (0.0827)	-0.0744 (0.0937)	0.7358 (0.3412)**	1.1087 (0.6445)*	2,7718 (1.1379)**
ln(GDP per capita$_{t-1}$)	0,0118 (0.0059)**	-0,0087 (0.0092)	0,0130 (0.0102)	-0.0778 (0.0380)**	-0.1196 (0.0717)*	-0.2941 (0.1231)**
Region fixed effects	No	No	No	Yes	Yes	Yes
Time fixed effects	No	No	No	Yes	Yes	Yes
R-squared	0,0200	0.0071	0.0338	0,5640	0,5520	0.5976
F	3.95**	0,90	1,60	8.07***	4.61***	6.62***
F-statistic to test significance of						
Region fixed effects				2.78***	1.97**	4.10***
Time fixed effects				10.08***	5.76***	8.27***
Region and time fixed effects				7.16***	4.81***	5.95***
N	156	96	60	156	96	60

[a] Standard errors are robust standard errors.

*** Significant at the 1 percent level; ** Siginificant at the 5 percent level; * Significant at the 10 percent level.

Table 9: Regression analysis of β(beta)-convergence of labour productivity growth (Dependent variable: Δln (labor productivity))

	Unconditional convergence			Conditional convergence		
	Coefficient (standard error)[a] 1997 - 2008 (1)	Coefficient (standard error)[a] 1997 - 2003 (2)	Coefficient (standard error)[a] 2004 - 2008 (3)	Coefficient (standard error)[a] 1997 - 2008 (4)	Coefficient (standard error)[a] 1997 - 2003 (5)	Coefficient (standard error)[a] 2004 - 2008 (6)
Constant	0.4371 (0.1063)***	0.7131 (0.1695)***	0.6451 (0.1496)***	2,4700 (0.6039)***	4.3743 (0.9211)***	4.907 (0.9065)***
ln(labour productivity$_{t-1}$)	-0.0405 (0.0107)***	-0,0690 (0.0172)***	-0.0607 (0.0150)***	-0.2445 (0.0613)***	-0,4380 (0.0934)***	-0,4830 (0.0900)***
Region fixed effects	No	No	No	Yes	Yes	Yes
Time fixed effects	No	No	No	Yes	Yes	Yes
R-squared	0.1159	0.2022	0.1738	0.6642	0.7203	0.8182
F	14.36***	16.13***	16.47***	9.19***	8.29***	15.17***
F-statistic to test significance of						
Region fixed effects				2.59***	4.39***	6.51***
Time fixed effects				15.88***	5.47***	16.79***
Region and time fixed effects				9.09***	7.11***	13.94***
N	144	84	60	144	84	60

[a] Standard errors are robust standard errors.

*** Significant at the 1 percent level; ** Siginificant at the 5 percent level; * Significant at the 10 percent level.

Table 10. Regression analysis of β(beta)-convergence of labour productivity growth using Solow model and Mankiw-Romer-Weil model (Dependent variable: Δln (labor productivity))

	Solow model			Mankiw-Romer-Weil model			
	Coefficient (standard error)[a] 1997 - 2008 (1)	Coefficient (standard error)[a] 1997 - 2003 (2)	Coefficient (standard error)[a] 2004 - 2008 (3)	Coefficient (standard error)[a] 1999 - 2008 (4)	Coefficient (standard error)[a] 1999 - 2003 (5)	Coefficient (standard error)[a] 2004 - 2008 (6)	Coefficient (standard error)[a] 1999 - 2008 (7)
Constant	2,6743 (0.5943)***	4,5154 (0.9179)***	4,5818 (0.8859)***	2,6543 (0.7950)***	6,2104 (1.6535)***	4,6070 (0.9002)***	0,6491 (0.1912)***
ln(labour productivity$_{t-1}$)	-0,2210 (0.0595)***	-0.4139 (0.0922)***	-0.4262 (0.0888)***	-0.2265 (0.0785)***	-0,5910 (0.1579)***	-0.4275 (0.0901)***	-0,0396 (0.0212)*
ln(investment ratio)[b]	0.0025 (0.0051)	0.0004 (0.0076)	-0.0053 (0.0071)	0.0048 (0.0055)	0.0012 (0.0141)	-0.0047 (0.0076)	0,0093 (0.0056)*
ln(employment growth)[c]	-0,4140 (0.0934)***	-0.3627 (0.1570)**	-0.2421 (0.1012)**	-0.3525 (0.0994)***	-0.2996 (0.1921)	-0.2411 (0.1023)**	-0,2455 (0.1074)**
ln(share of higher educated persons in total population)[d]				0.0074 (0.0189)	0.0107 (0.0324)	-0.0062 (0.0262)	0,0282 (0.0145)*
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
R-squared	0.7074	0.7463	0.8395	0.6036	0.5312	0.8397	0,1244
F	11.25***	14.06***	16.84***	6.89***	3.31***	15.97***	3.21**
F-statistic to test significance of							
Region fixed effects	3.44***	4.02***	7.28***	2.56***	2.17**	7.05***	
Time fixed effects	15.26***	3.89***	16.16***	11.42***	2,07	16.22***	
Region and time fixed effects	9.10***	8.33***	16.28***	6.47***	3.84***	15.21***	
N	144	84	60	120	60	60	120

[a] Standard errors are robust standard errors.

[b] Investment ratio measured as nominal gross fixed capital formation divided by nominal GDP.

[c] Employment growth measured as ((employment$_t$ / employment$_{t-1}$) + 0.05), where 0.05 represents the sum of rate of technological progess and depreciation of capital.

[d] Education is defined as the number of graduates over 1000 residents of a region

*** Significant at the 1 percent level; ** Siginificant at the 5 percent level; * Significant at the 10 percent level.

Table 11. Slovenia: Sources of growth of GDP and labour productivity by regions

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1997-2003	2004-2007
													Average	
						(In percentage points, except where indicated otherwise)								
Osrednjeslovenska														
GDP growth (percent)	3,73	3,90	6,88	4,75	4,07	4,58	5,68	4,18	4,79	6,99	6,76	3,95	4,80	5,68
Contribution of labor	-1,11	0,31	1,28	1,22	0,87	3,20	0,91	1,40	1,32	1,76	2,53	2,26	0,95	1,75
Contribution of productivity	4,84	3,59	5,60	3,53	3,20	1,39	4,77	2,77	3,47	5,23	4,23	1,69	3,85	3,92
Contribution of capital	1,94	2,08	2,88	3,29	2,62	2,64	2,57	1,86	1,50	1,75	2,08	1,77	2,57	1,80
Contribution of TFP	2,90	1,51	2,72	0,24	0,58	-1,25	2,21	0,92	1,97	3,47	2,15	-0,08	1,27	2,13
Obalno-kraška														
GDP growth (percent)	3,84	3,16	4,21	4,08	1,95	4,94	2,38	3,64	3,00	6,83	8,97	6,18	3,51	5,61
Contribution of labor	-0,57	0,85	1,11	0,85	-0,73	2,21	0,73	-0,54	-1,11	2,38	2,65	2,49	0,64	0,85
Contribution of productivity	4,42	2,31	3,10	3,23	2,69	2,73	1,66	4,18	4,10	4,45	6,32	3,69	2,87	4,76
Contribution of capital	6,49	4,86	2,38	2,02	2,61	2,02	1,77	3,94	1,74	2,41	2,19	3,05	3,16	2,57
Contribution of TFP	-2,07	-2,55	0,72	1,21	0,08	0,71	-0,12	0,24	2,37	2,03	4,13	0,64	-0,29	2,19
Goriška														
GDP growth (percent)	5,62	2,08	6,25	3,04	2,78	2,00	0,57	4,36	4,84	5,66	6,59	1,89	3,19	5,36
Contribution of labor	-1,49	0,49	1,08	0,15	0,64	-0,16	-1,17	-0,70	0,52	0,13	1,87	2,18	-0,06	0,46
Contribution of productivity	7,11	1,59	5,17	2,89	2,14	2,16	1,74	5,06	4,32	5,53	4,72	-0,30	3,25	4,91
Contribution of capital	2,63	3,44	3,70	2,78	2,94	1,20	1,43	1,98	2,05	1,74	2,40	1,83	2,59	2,04
Contribution of TFP	4,48	-1,86	1,47	0,11	-0,80	0,96	0,31	3,08	2,27	3,80	2,31	-2,12	0,67	2,87
Jugovzhodna Slovenija														
GDP growth (percent)	7,18	4,80	5,47	4,77	3,10	2,71	2,18	6,44	5,76	6,23	7,25	2,85	4,32	6,42
Contribution of labor	-0,47	0,65	0,33	0,71	0,52	-0,75	-1,09	0,79	0,01	0,26	1,52	1,34	-0,01	0,64
Contribution of productivity	7,65	4,15	5,14	4,06	2,58	3,45	3,27	5,65	5,75	5,97	5,74	1,51	4,33	5,78
Contribution of capital	7,62	3,69	2,22	2,59	2,00	1,78	2,70	3,58	5,20	4,99	2,61	2,74	3,23	4,10
Contribution of TFP	0,03	0,46	2,92	1,47	0,57	1,68	0,57	2,07	0,55	0,98	3,12	-1,23	1,10	1,68
Savinjska														
GDP growth (percent)	4,97	2,72	5,44	3,06	0,67	5,16	1,57	4,46	5,27	5,18	5,59	4,97	3,37	5,12
Contribution of labor	-2,07	-0,65	0,91	0,99	-0,40	-0,09	-0,65	-0,30	0,18	1,04	2,05	2,45	-0,28	0,74
Contribution of productivity	7,04	3,37	4,53	2,08	1,07	5,26	2,22	4,75	5,08	4,13	3,55	2,52	3,65	4,38
Contribution of capital	3,77	2,44	6,36	5,31	3,50	3,77	4,47	1,28	1,31	1,45	1,75	1,55	4,23	1,45
Contribution of TFP	3,27	0,93	-1,83	-3,23	-2,43	1,49	-2,25	3,48	3,77	2,69	1,80	0,97	-0,58	2,93
Podravska														
GDP growth (percent)	5,21	3,58	6,25	5,20	2,24	5,01	1,82	5,21	3,30	6,37	7,84	3,88	4,19	5,68
Contribution of labor	-1,05	-0,11	1,40	1,52	0,90	1,76	-0,21	-0,39	-1,77	1,34	2,89	2,21	0,60	0,52
Contribution of productivity	6,26	3,70	4,85	3,68	1,35	3,25	2,02	5,60	5,07	5,03	4,95	1,67	3,59	5,16
Contribution of capital	3,23	2,52	2,53	2,24	2,56	2,60	2,31	1,90	2,04	2,91	3,02	2,92	2,57	2,47
Contribution of TFP	3,03	1,18	2,32	1,44	-1,21	0,66	-0,29	3,70	3,03	2,13	1,94	-1,25	1,02	2,70
Gorenjska														
GDP growth (percent)	6,59	3,19	3,57	3,84	4,08	3,33	1,44	3,17	4,19	4,74	7,19	2,93	3,72	4,82
Contribution of labor	-1,95	-1,24	0,50	0,12	0,87	0,54	-0,47	0,07	-1,31	0,36	1,66	1,38	-0,23	0,19
Contribution of productivity	8,54	4,42	3,07	3,73	3,20	2,79	1,91	3,10	5,50	4,39	5,53	1,56	3,95	4,63
Contribution of capital	2,85	4,11	2,83	2,43	2,87	1,98	2,61	1,80	2,11	1,88	2,58	1,97	2,81	2,09
Contribution of TFP	5,68	0,31	0,25	1,30	0,34	0,81	-0,70	1,30	3,39	2,50	2,95	-0,41	1,14	2,54
Spodnjeposavska														
GDP growth (percent)	5,95	8,10	2,05	5,58	2,66	3,31	-2,50	4,83	6,95	3,39	5,77	5,91	3,59	5,24
Contribution of labor	-1,32	-0,77	-0,06	1,07	-1,30	-0,28	-2,29	-0,95	0,54	-0,65	-0,21	2,55	-0,71	-0,32
Contribution of productivity	7,27	8,88	2,11	4,51	3,96	3,59	-0,21	5,77	6,42	4,04	5,98	3,36	4,30	5,55
Contribution of capital	3,41	5,27	10,78	7,87	2,92	3,47	4,29	5,49	3,08	1,91	1,85	2,44	5,43	3,08
Contribution of TFP	3,86	3,60	-8,66	-3,36	1,04	0,12	-4,51	0,29	3,33	2,13	4,13	0,92	-1,13	2,47
Koroška														
GDP growth (percent)	4,43	4,37	5,15	8,10	2,06	1,40	-0,44	3,56	6,02	2,61	6,38	1,92	3,58	4,64
Contribution of labor	-1,12	-0,46	1,52	0,36	0,10	-1,19	-2,40	-0,35	-0,38	0,64	1,77	0,70	-0,46	0,42
Contribution of productivity	5,56	4,84	3,63	7,73	1,96	2,59	1,96	3,90	6,41	1,97	4,61	1,22	4,04	4,22
Contribution of capital	3,05	2,79	1,85	2,05	1,50	1,13	1,20	2,00	2,33	2,28	3,03	2,82	1,94	2,41
Contribution of TFP	2,50	2,05	1,78	5,69	0,46	1,46	0,76	1,90	4,08	-0,31	1,58	-1,60	2,10	1,81
Notranjsko-kraška														
GDP growth (percent)	6,51	3,84	3,08	6,58	1,94	4,89	-0,15	3,46	3,14	4,34	7,93	1,79	3,81	4,72
Contribution of labor	-2,28	-0,82	1,04	0,73	0,32	0,10	-0,68	0,37	-0,32	0,83	1,53	1,68	-0,23	0,60
Contribution of productivity	8,79	4,66	2,03	5,85	1,62	4,80	0,54	3,09	3,47	3,51	6,40	0,11	4,04	4,12
Contribution of capital	4,51	4,49	2,46	2,49	4,42	3,68	2,65	2,47	2,80	4,30	2,97	3,86	3,53	3,14
Contribution of TFP	4,29	0,17	-0,43	3,36	-2,80	1,11	-2,11	0,62	0,67	-0,78	3,43	-3,75	0,51	0,98
Zasavska														
GDP growth (percent)	4,74	2,06	4,01	-0,22	-3,15	0,31	-0,06	3,38	2,42	2,68	3,06	1,36	1,10	2,88
Contribution of labor	-2,21	-1,76	0,79	0,34	-2,81	-1,70	-3,02	0,35	-0,37	-1,35	-0,20	-0,28	-1,48	-0,39
Contribution of productivity	6,96	3,81	3,22	-0,56	-0,35	2,01	2,96	3,04	2,78	4,02	3,26	1,64	2,58	3,28
Contribution of capital	1,52	1,96	1,44	1,01	2,27	1,04	1,00	1,21	1,50	1,05	0,66	1,71	1,46	1,10
Contribution of TFP	5,44	1,85	1,78	-1,57	-2,61	0,97	1,96	1,82	1,29	2,97	2,60	-0,07	1,12	2,17
Pomurska														
GDP growth (percent)	3,83	2,72	0,23	2,35	2,32	2,18	1,25	3,82	2,12	3,51	5,25	1,88	2,12	3,67
Contribution of labor	-1,13	-0,25	0,05	0,43	-0,46	-1,70	-0,89	-1,15	-2,59	0,19	1,29	-0,04	-0,56	-0,57
Contribution of productivity	4,96	2,98	0,18	1,91	2,78	3,87	2,14	4,97	4,71	3,32	3,96	1,92	2,69	4,24
Contribution of capital	3,67	4,24	2,48	2,64	2,28	2,48	3,46	3,41	3,17	3,73	3,90	3,49	3,04	3,55
Contribution of TFP	1,29	-1,26	-2,30	-0,73	0,49	1,39	-1,32	1,56	1,53	-0,41	0,06	-1,58	-0,35	0,69
SLOVENIA														
GDP growth (percent)	4,82	3,60	5,41	4,35	2,82	4,04	2,79	4,34	4,47	5,88	6,81	3,74	3,97	5,38
Contribution of labor	-1,32	-0,13	0,96	0,91	0,33	1,07	-0,27	0,22	-0,14	1,05	2,11	1,94	0,22	0,81
Contribution of productivity	6,14	3,73	4,45	3,45	2,49	2,96	3,06	4,12	4,61	4,83	4,71	1,81	3,75	4,57
Contribution of capital	2,48	2,37	2,78	2,79	2,40	2,27	2,45	1,93	1,77	2,00	2,16	2,06	2,51	1,97
Contribution of TFP	3,66	1,35	1,67	0,66	0,09	0,70	0,61	2,20	2,84	2,82	2,55	-0,26	1,25	2,60

Source : Authors' calculations based on data from the Statistical Office of the Republic of Slovenia

Table 12. Slovenia: Sectoral patterns of labour productivity growth by region

	Labour productivity growth	Of which, contribution of:		
		Within-sector effect	Reallocation effects	
			Between effect	Cross effect
	(Annual average, percent)	*(Percentage points)*		
Osrednjeslovenska				
1997-2003	3,50	2,88	0,86	-0,24
2004-2007	3,17	3,29	-0,06	-0,05
2008	0,37	0,27	0,14	-0,03
Obalno-kraška				
1997-2003	2,68	2,42	0,42	-0,15
2004-2007	4,43	3,69	0,76	-0,03
2008	2,20	1,62	0,57	0,01
Goriška				
1997-2003	3,39	2,77	0,76	-0,14
2004-2007	4,77	3,61	1,23	-0,08
2008	-1,51	-2,27	0,95	-0,19
Jugovzhodna Slovenija				
1997-2003	4,43	3,61	0,97	-0,15
2004-2007	5,53	4,82	0,74	-0,02
2008	0,59	0,13	0,59	-0,13
Savinjska				
1997-2003	3,90	3,31	0,73	-0,15
2004-2007	4,11	3,62	0,54	-0,06
2008	1,10	1,01	0,22	-0,13
Podravska				
1997-2003	3,40	2,56	0,98	-0,14
2004-2007	5,01	4,51	0,53	-0,04
2008	0,37	0,10	0,33	-0,06
Gorenjska				
1997-2003	4,18	3,25	1,17	-0,24
2004-2007	4,62	4,70	0,10	-0,18
2008	0,62	0,41	0,24	-0,03
Spodnjeposavska				
1997-2003	4,74	3,63	1,43	-0,31
2004-2007	5,79	5,21	0,67	-0,08
2008	1,86	1,00	1,09	-0,23
Koroška				
1997-2003	4,36	3,76	0,64	-0,05
2004-2007	4,10	4,16	0,08	-0,14
2008	0,59	0,52	0,11	-0,03
Notranjsko-kraška				
1997-2003	4,28	3,66	1,00	-0,38
2004-2007	3,90	3,60	0,37	-0,08
2008	-0,91	-2,73	2,84	-1,02
Zasavska				
1997-2003	3,39	2,66	1,13	-0,40
2004-2007	3,55	3,96	-0,28	-0,14
2008	1,45	1,11	0,39	-0,05
Pomurska				
1997-2003	3,06	1,71	1,59	-0,24
2004-2007	4,62	4,08	0,59	-0,05
2008	1,61	0,84	0,84	-0,07
SLOVENIA				
1997-2003	3,75	2,95	0,97	-0,17
2004-2007	4,25	3,92	0,37	-0,04
2008	0,63	0,37	0,30	-0,05

Source : Authors' calculations.