Transnational Income Convergence and National Income Disparity : Europe, 1960~2012

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Abstract

This study identifies income convergence in Europe over 1960 to 2012. The Great Recession since 2008 reversed the GDP per capita convergence in the EU-15, but the ex-transition countries have mostly continued to catch up. We found this by analysing the Sigma convergence of GDP per capita in the European Union. With a few pauses, there has been convergence in the European Union since 1960. Historically, convergence has been faster when aggregate GDP growth has been faster. On top of that, we link evolvement in national income distributions with Europe-wide convergence. It is meaningful because if many people are left outside of income increases, then the general development is not in line with the spirit of the EU convergence. Generally, wealthier countries are found to have lower income disparities as measured by Gini coefficients than poorer countries. The GDP per capita convergence was not correlated with changes in income distribution over the period of 2000~2011 except for a group of six catching-

up countries, namely Cyprus, the Czech Republic, Hungary, Latvia, Lithuania, and Poland.

I. Introduction

The financial and fiscal crisis that started in Europe around 2008 has taken its toll on the convergence of GDP per capita levels in the European Union. One of the aspired aims of the EU and the single market has been a decrease in the wide income disparities among European countries. To what extent has the development now been disrupted?

We will review the long-term convergence across the EU[1] using not just GDP per capita but also GDP per hour worked which is better measurement of labour productivity. The difference between these two measures is the change in labour input relative to the population. The principal method we will use to evaluate convergence is Sigma convergence, by dividing the standard deviation of nominal purchasing-power adjusted GDP per capita figures by their average.

We will also see how relative GDP per capita developments are reflected in income disparities, that is, national Gini coefficients.[2] GDP growth and convergence among countries can occur with or without an increase in income disparity within the countries. However, if large part of the population is left outside the increase in average incomes, the development is not in line with the spirit of convergence in the EU.

Among other things, we find that convergence has been faster when aggregate GDP growth has been faster. It is thus important to get the EU back on a sustainable and robust growth path. Convergence can be supported through market-oriented reforms both at the level of the EU single market and at the national level.

We will take a glance at literature in Section II. This is followed by our analysis of Sigma convergence using GDP per capita in Section III. Section IV compares the convergence of GDP per capita and convergence of GDP per hour worked. Section V

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[1] Luxembourg is removed from the analysis because its inclusion twists the calculations dramatically, as we will also show.

[2] The Gini coefficients of equivalised disposable incomes are taken from the Eurostat database. There are some breaks in the time series for the Gini coefficients.

links the GDP per capita convergence with the development in income distribution as measured by the Gini coefficient. Finally, Section VI concludes.

II. Literature Review

There are two main approaches when measuring economic convergence, namely Beta and Sigma convergence. Beta convergence measures growth and GDP per capita convergence as a function of the GDP per capita level observed in the first period. Convergence is found when there is a negative relationship between the two. We will not use this method, however. Our preferred method is Sigma convergence which is a simple, unambiguous in way of measuring convergence, and not tied to any particular growth model. Sigma convergence is calculated as the evolution in the variation coefficient of GDP per capita, which we get by dividing the standard deviation of the GDP per capita figures by their average. We witness a convergence process if the coefficient of variation declines over time.

Recent work on GDP per capita convergence in the EU includes Apergis, Panopoulou, and Tsoumas (2010) who analyse purchasing power-adjusted GDP per capita in the EU-15 area (without Luxembourg) in 1980~2004 using a panel convergence methodology developed by Phillips and Sul (2007). According to their results, the EU-15 is divided into two convergence clubs. The last year of the dataset places Germany in the weaker group with Greece, Italy, Portugal, and Spain. Fritsche and Kuzin (2011) uses the same methodology and find three different per capita income convergence clubs for the EU-15, with Italy and Germany not converging with any one of them. Also Monfort, Cuestas, and Ordonez (2013) analyse whether there is club convergence in GDP per worker in the EU. They find two convergence clubs in the EU-14 region, which are not related to the countries' membership in the euro area. They also find that Eastern European countries are divided into two clubs.

Using the Solow growth model, Cavenaille and Dubois (2010) analyse income convergence in the EU-27. They argue that the new member countries and the EU-15 countries belong to different groups of convergence. Vojinović, Oplotnik, and Próchniak (2010) use both Beta and Sigma convergence to review the development up to 2006. Halmai and Vásáry (2012) analyse how convergence and potential growth rates were disrupted after the start of the Great Recession. They cluster the EU countries into

four groups: developed, Mediterranean, catch-up, and vulnerable countries. According to their estimates, a longer period of divergence may ensue in Europe.

It should be noted that convergence in GDP per capita does not take into account individual or regional income disparity within countries. Consequently, more convergence in GDP per capita levels may or may not be accompanied by changes in average income disparity. In the new member countries, the most dynamic regions, such as around the capital city, have grown much faster than rural and peripheral regions. The same applies to the development in wages in different professions. In convergence literature, these issues are left aside but we will take a look at this issue in Section V.

Furthermore, the convergence research tends to imply that convergence with lower average GDP per capita growth is better than divergence with faster GDP per capita growth, even with all countries growing faster than in the scenario with convergence. According to our results, however, convergence in the EU has historically been faster when aggregate GDP growth has been faster.

III. Sigma Convergence

Next we will review how convergence has proceeded in the EU. We will analyse the development in three groups of EU countries: the EU-15, EU-27, and EU-33. The countries in the EU-33 group include those that were candidate countries at the end of 2012, i.e., Croatia, Iceland, Macedonia Former Yugoslav Republic, Montenegro, Serbia, and Turkey. Also, the development in the Euro area-17 will be reviewed. The groups of countries and the timeline of European integration are summarized in Table 1.

Table 1. Timeline of European Integration

Year	EEC/EU	Euro Area	Founding or New Members
1957	EEC-6		Belgium, France, Germany, Italy, Luxembourg, Netherlands
1973	EEC-9		Denmark, Ireland, United Kingdom
1981	EEC-10		Greece
1986	EEC-12		Portugal, Spain
1995	EU-15		Austria, Finland, Sweden
2004	EU-25		Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.
2007	EU-27		Bulgaria, Romania
****	EU-33		Croatia, Iceland, Macedonia Former Yugoslav Republic, Montenegro, Serbia, Turkey
1999		EA-11	Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain
2001		EA-12	Greece
2007		EA-13	Slovenia
2008		EA-15	Cyprus, Malta
2009		EA-16	Slovakia
2011		EA-17	Estonia

(Note) **** Croatia joined the EU on 1 July 2013, and Latvia joined the Euro Area on 1 January 2014. EEC = European Economic Community, EU = European Union, EA = Euro Area. The table does not include other economic integration, such as EFTA and their free trade agreements with the EEC/EU, or the former Europe Agreements between the EU and the Central and Eastern European countries.

Whether economic integration affects growth or not is not explicitly analysed here. The topic has been discussed in the European context by Kaitila (2005), Crespo Cuaresma, Ritzberger-Grünwald and Silgoner (2008), Niebuhr and Schlitte (2009), and Vojinović, Oplotnik, and Próchniak (2010). Dismantling trade and investment barriers, unifying regulation and standards, and improving institutions generally have a positive impact on trade and growth.

Data from this study cover the years 1960~2012. Eurostat data were used for

gross domestic product per capita at current market prices adjusted for purchasing power.[3] Figure 1 shows how nominal GDP per capita has developed relative to the EU-15 weighted average. The German reunification can be seen as a drop in the German curve. Germany's relative descent lasted until 2002, since then its GDP per capita has been growing faster than in the EU-15 on average. France has lost a little in relative terms during the past 30 years, and the Netherlands has gained after the late 1980s.

We also observe that some of the EU countries seem to have fallen into a long-term relative decline that is not related to the phase of the business cycle. The obvious candidate is Italy, where GDP per capita adjusted for purchasing power relative to the EU-15 average rose steadily up until 1995, then exceeding the average by almost 5 percent. Since then, its growth has continuously fallen behind the EU-15 average. In 2012, relative GDP per capita was the same as it was in 1961, over 11 percent below the average.
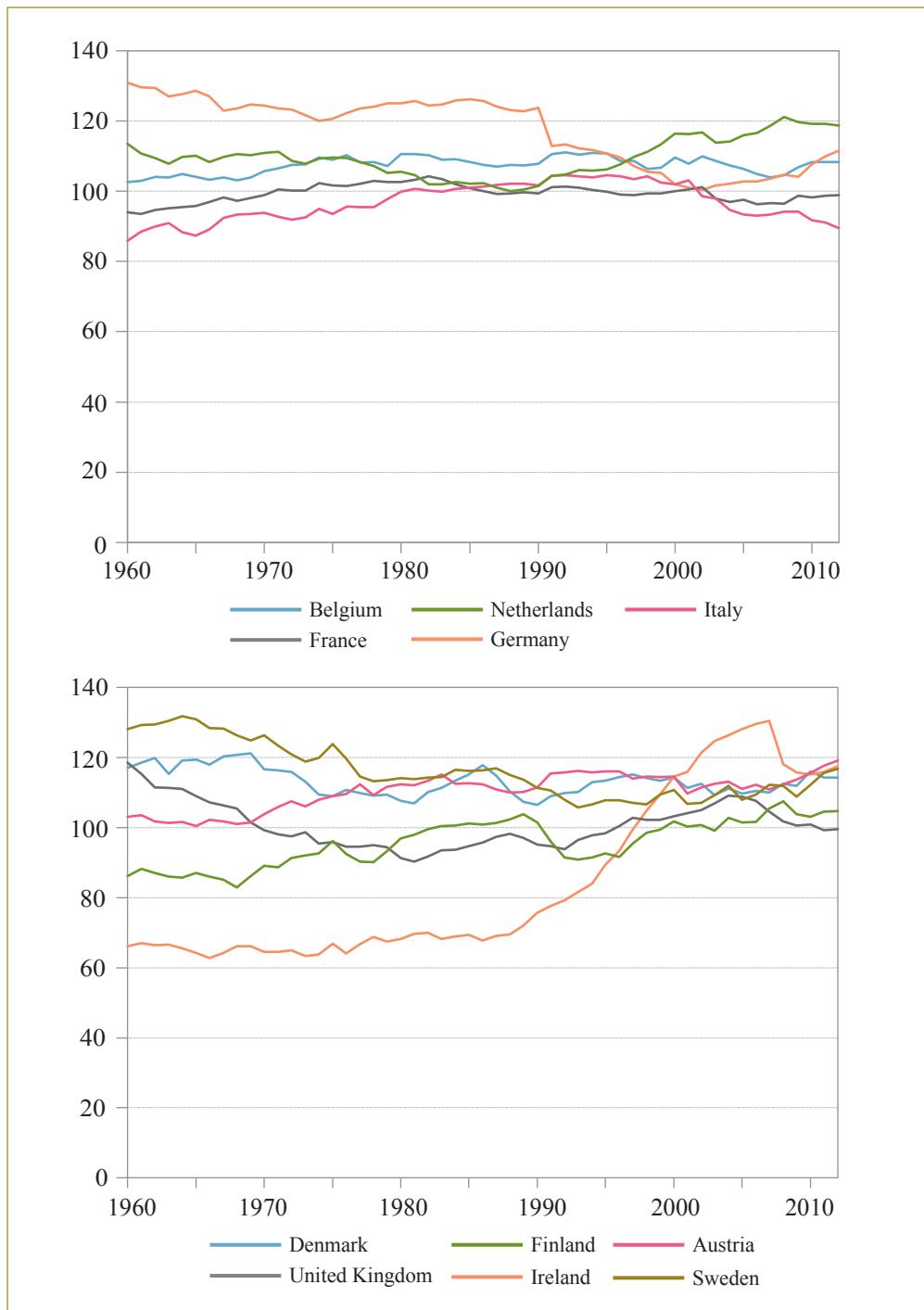
Ireland's rapid growth can be seen in the continued graph in Figure 1. While Finland has gained in the long term, the UK has lost ten points after 2004. Portugal and Spain in the third graph have gained significantly in relative terms over the course of time. Greece lost 17 points in 2009~2012.

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[3] The year 1991 is the first with data for the reunified Germany. Before this the German data only include West Germany. The data were downloaded on June 3, 2013.
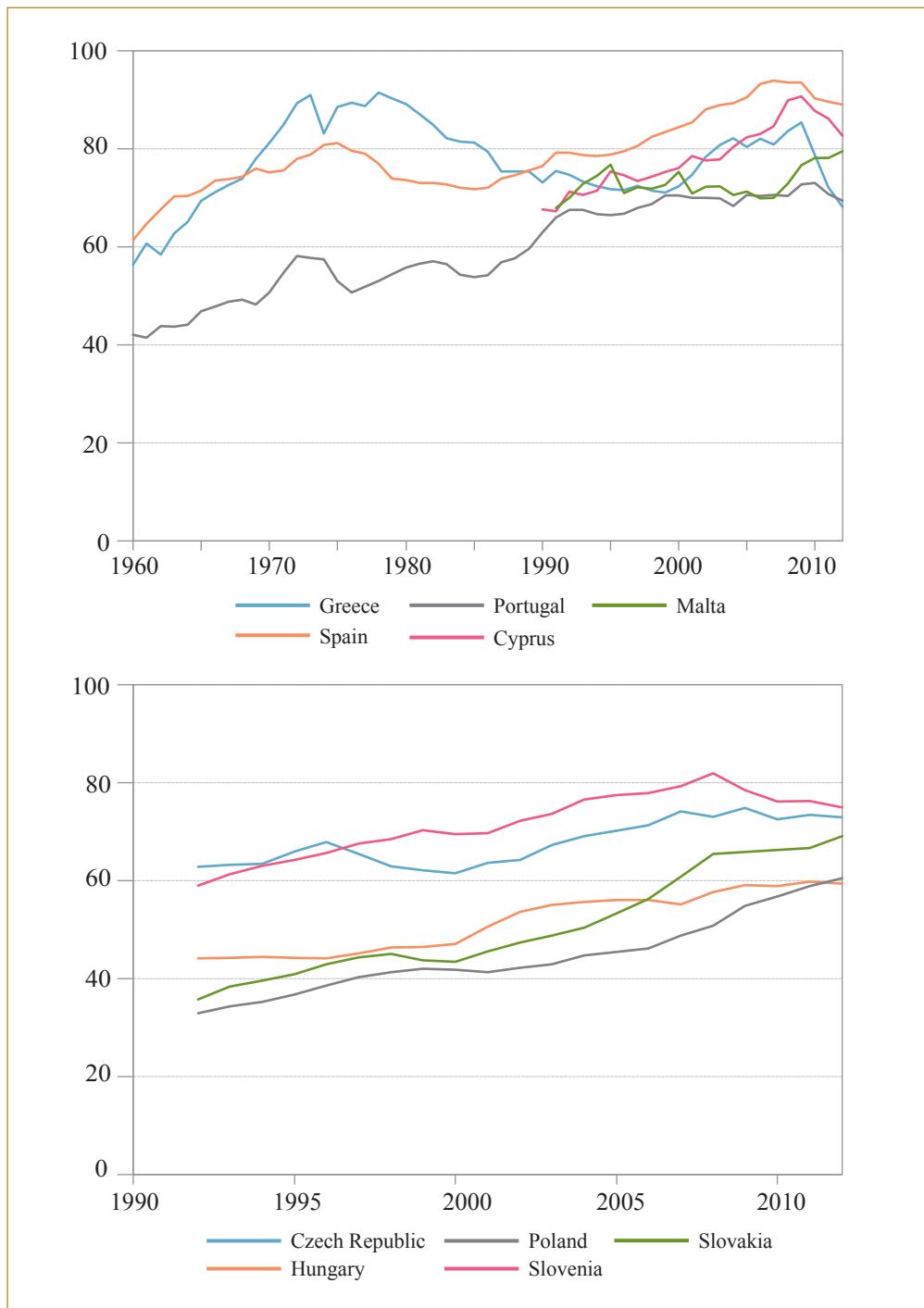
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Figure 1. Nominal GDP per capita

(EU-15 average = 100)

Belgium | Netherlands | Italy
France | Germany

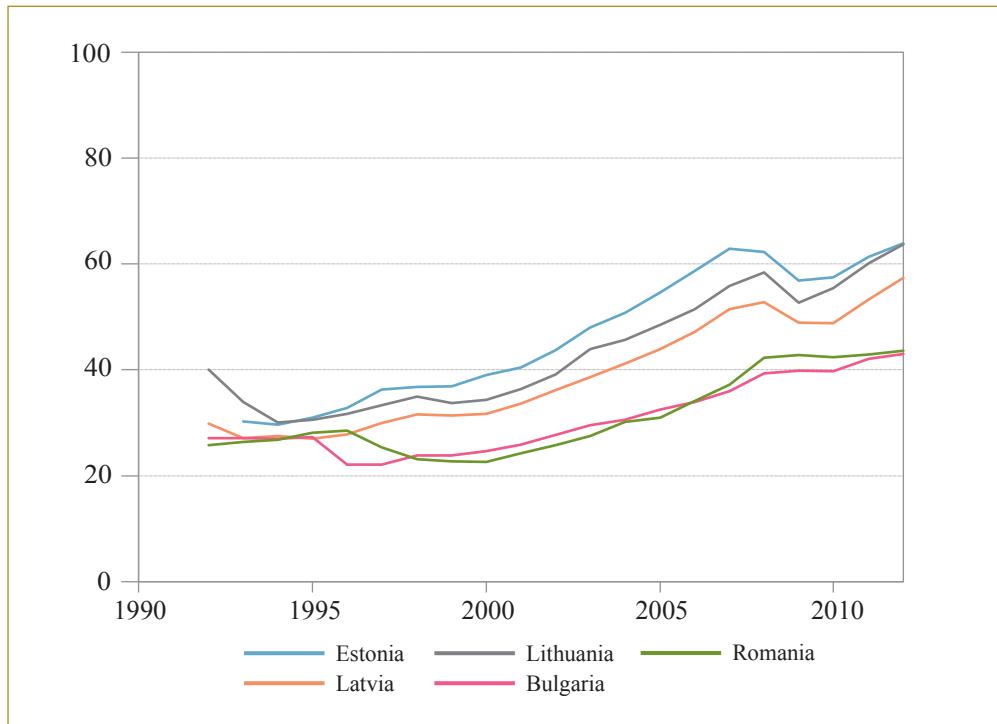Denmark | Finland | Austria
United Kingdom | Ireland | Sweden

Figure 1. Nominal GDP per capita

~ Continued
(EU-15 average = 100)

Figure 1. Nominal GDP per capita

~ Continued
(EU-15 average = 100)

The ex-transition countries' data are shown with 1992 or 1993 as the first year. There, we witness considerable catching up over time. Slovenia has suffered the most in relative terms during the Great Recession, while catching up has levelled off in the Czech Republic, Hungary, and Romania. In the other countries, catching up has continued unabated or after a temporary respite.

Sigma convergence is calculated as the coefficient of variation of GDP per capita; i.e., after dividing the standard deviation of the GDP per capita figures by their average. A rise in the index implies divergence in GDP per capita levels while a decline implies their convergence. Let us first take a look at some methodological issues already referred to above. We need to exclude Luxembourg because its inclusion twists the results radically (see Figure 2). GDP per capita in Luxembourg is now 2.4 fold the EU-15 average.

Another issue is whether the denominator should be the simple, unweighted

average or the readily available EU-15 or EU-27 weighted average. This makes a small difference, especially for the enlarged EU. We could calculate a weighted standard deviation for the nominator, but the spirit of convergence advocates the use of simple averages. This means that it is equally unwanted whether it is Malta or Italy that lags behind the EU average despite the 146-fold difference in their populations. We will use this principle throughout our analysis. However, we do recognise that for the functioning of the euro area and the single monetary policy, weighted data could be more appropriate.

## Figure 2. Sigma Convergence of GDP per capita
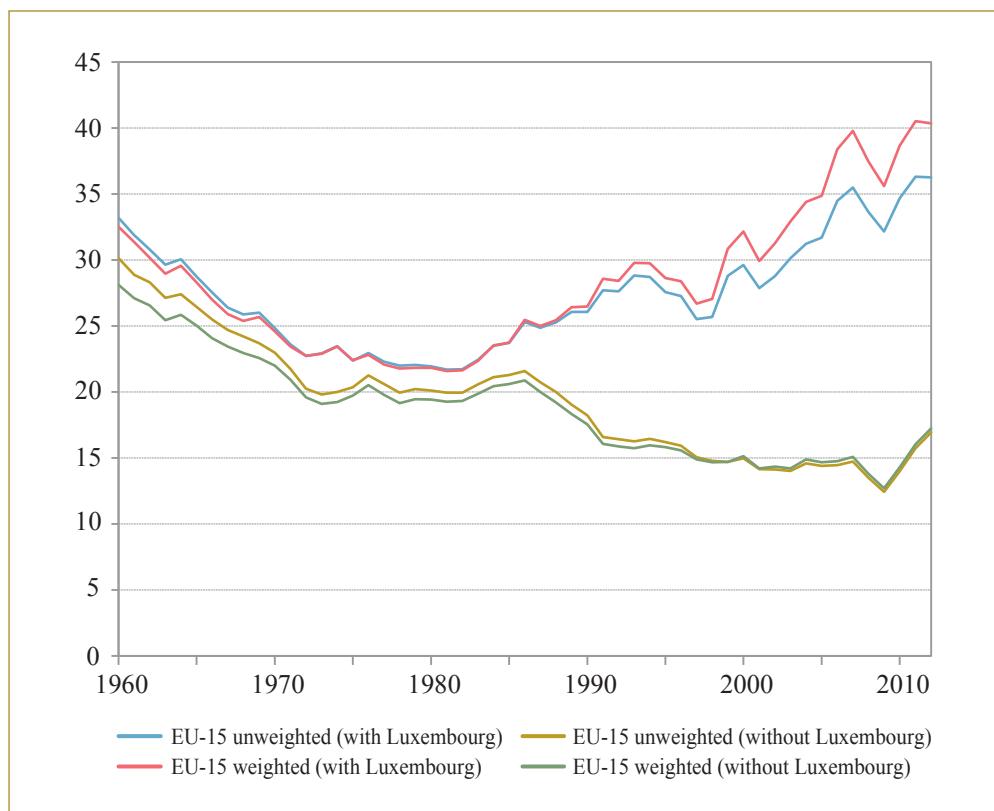
(Note) When calculating the EU-15 weighted Sigma Values, the averages in the denominators are calculated with Luxembourg. Due to the small size of Luxembourg's GDP, this does not affect the results.

(Sources) Eurostat, own calculations.

Figure 3 shows how GDP per capita in 1999 relative to the EU-27 countries' GDP per capita correlates with its relative development up until 2012. The lower the first-period GDP per capita was in 1999, the faster the countries have been catching up with the average. The R^2 value is 0.77 for the whole EU-27 (not shown in the graph). For the Euro area-17 countries, the R^2 value is 0.57 and for the non-EA countries 0.88.

Figure 3. GDP per capita in 1999 and Its Changes in 1999~2012
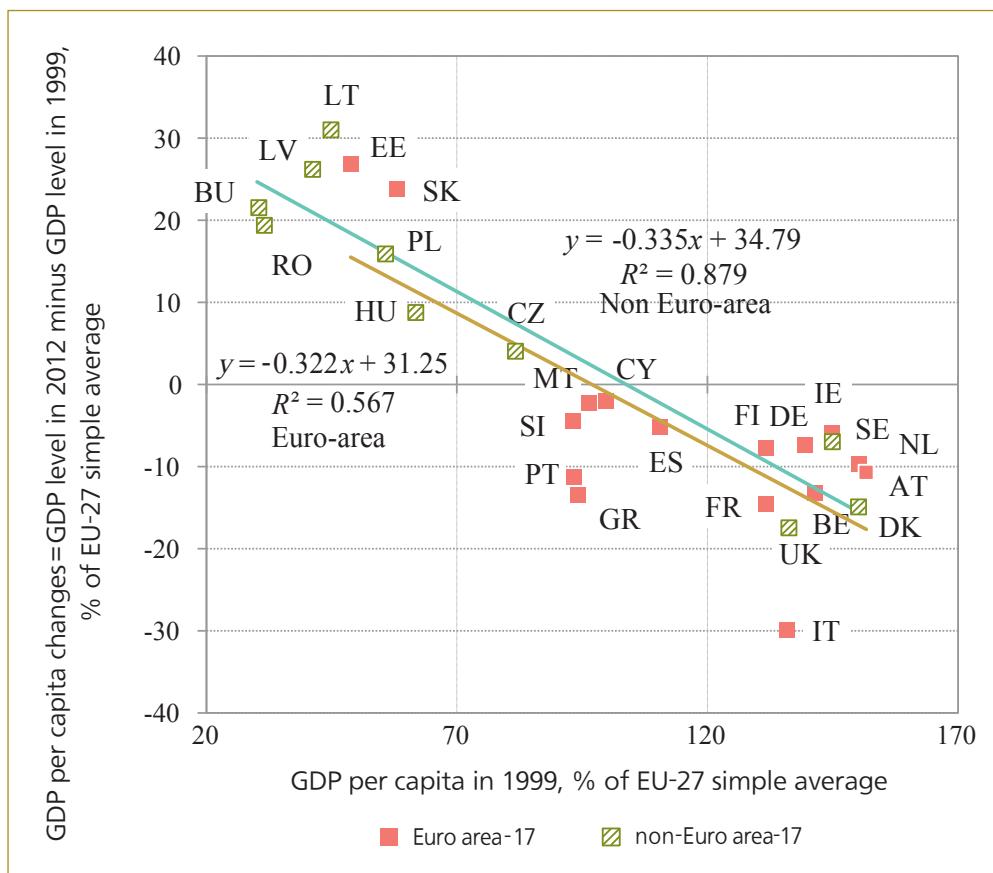
(Notes) (i) Euro area-17 countries are shown with solid dots, while non-Euro area-17 countries have slashed boxes lines.

(ii) Euro area-17: Austria(AT), Belgium(BE), Cyprus(CY), Estonia(EE), Finland(FI), France(FR), Germany(GE), Greece(GR), Ireland(IE), Italy(IT), Malta(MT), Netherlands(NL), Portugal(PT), Slovakia(SK), Slovenia(SI), and Spain(ES)

non-Euro area-17: Bulgaria(BU), Czech Republic(CZ), Denmark(DK), Hungary(HU), Latvia(LV), Lithuania(LT), Poland(PL), Romania(Ro), Sweden(SE), and United Kingdom(UK).

(Sources) Eurostat, own calculations.

Figure 4 shows how Sigma convergence has developed. In the EU-15, we find convergence in 1960~1973, followed by levelling off up until 1986, and then a further period of convergence that came to an end around 2001. This was again followed by a levelling off in the development. The Great Recession and the economic and fiscal crisis in Europe have been a considerable shock to the development. As GDP per capita has fallen more in many of the poorer EU-15 countries, the convergence process had been scaled back by a little over twenty years by 2012.

The EU-27 has data from 1993 onwards. Here, we see very little convergence in 1993~2000. Thereafter, convergence was rapid up until 2008, followed by a levelling off in the development. Because we see divergence in the EU-15 recently, we may expect there to have been continued convergence in the new member countries on average. We will look at this below. The EU-33 has data from the year 2000 onwards. We can see that the development is similar to the development in the EU-27.

Figure 4. Sigma Convergence of GDP per capita
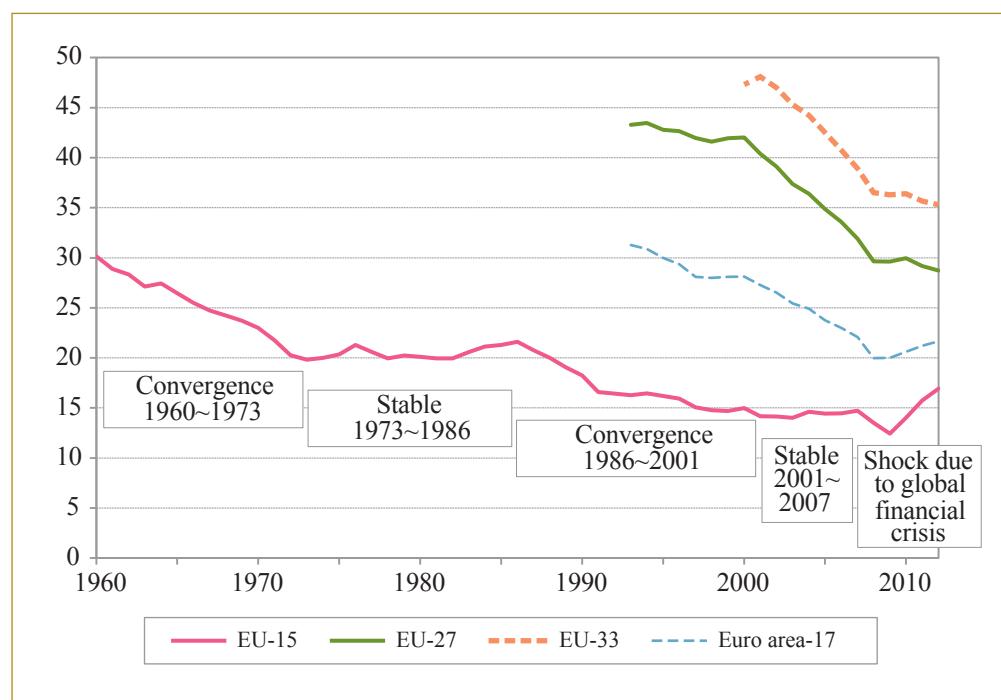
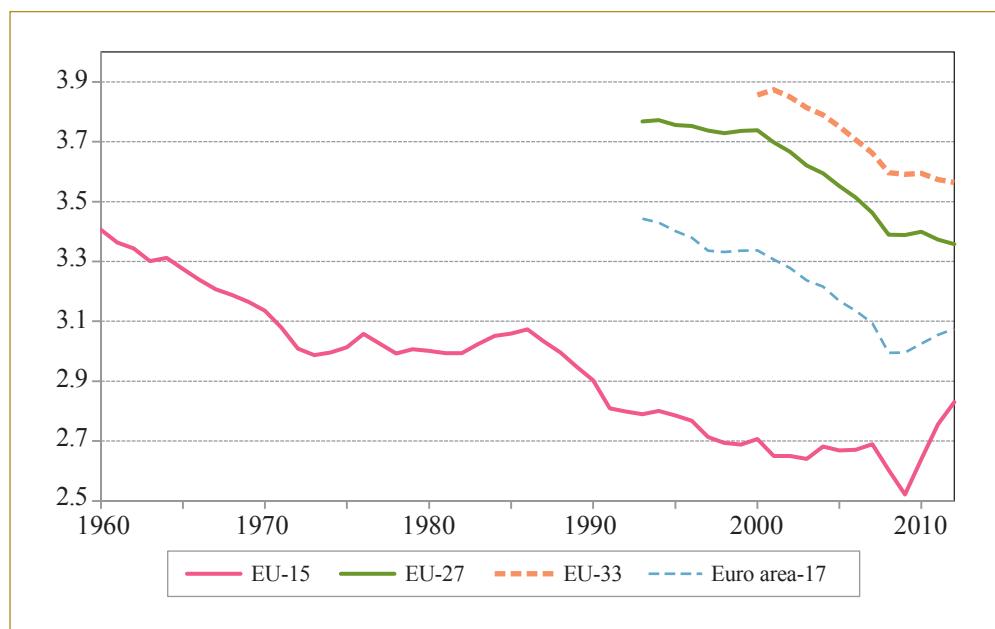

(Note) Without Luxembourg.

(Sources) Eurostat, own calculations.

The euro area is a combination of the developments in the EU-15 and EU-27 as the curve moves slightly up in the Great Recession. The continuing convergence during the euro era is however a positive development from the point of view of the single currency, even if the reversal during the Great Recession is obvious.

If we use the forecasts of the European Commission from the spring of 2013, we will find that the Sigma convergence curves depicted in Figure 4 will continue in the same direction during 2013~2014, as they did in 2011~2012. Consequently, there will be further divergence in the EU-15 and the Euro area-17, but continuing convergence in the EU-27 and EU-33.

Overall, we witness long-term convergence in the EU-15. Convergence seem to have slowed down if we look at its historical developments. However, if we take logs of the Sigma values presented in Figure 4, the second convergence phase (1986~2001) was, on average, as steep as the convergence that took place by 1973 (see Figure 5). In log terms, convergence in the euro area has been steeper than in the EU-15. It should further be noted that, Ireland raised the value of Sigma before the Irish real estate bubble started to deflate in 2007.

Figure 5. Logs of Sigma Convergence of GDP per capita


(Note) Without Luxembourg.

(Sources) Eurostat, own calculations.

Convergence may be a simpler task when the aggregate economy is growing faster. We see this in Figure 6, where rolling average GDP growth over five-year periods is compared with the average change in Sigma values over the same five years. In the case of the EU-15 with data starting in 1960, we have a clear correlation with faster GDP growth associated with larger advances in convergence. A prolonged period of suppressed growth in Europe may therefore be detrimental to convergence.

Figure 6. GDP Growth and Sigma Convergence in the EU-15

(1960~2012)

$$y = -0.187x + 0.121$$
$$R^2 = 0.364$$
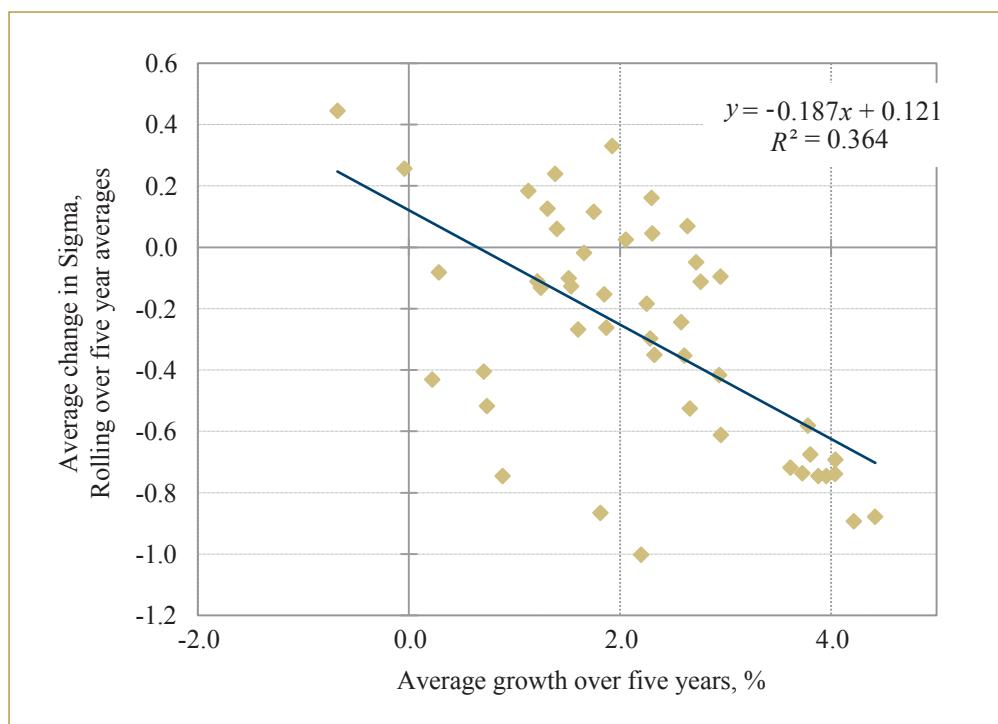
(Note) A decrease in Sigma implies convergence.

(Sources) Eurostat, own calculations.

Another way of looking at the phenomena is to compare the lowest and highest GDP per capita levels relative to the average in the region. This is an important addition because Sigma convergence can show increasing convergence even if one country, for some reason, is left behind.

Over the long term, we thus confirm that purchasing power-adjusted GDP per capita levels have been converging. Among the EU-15 countries (without Luxembourg), the ratio of the highest GDP per capita to the lowest declined from 3.1 in 1960 to 1.8 in 1991. Among the EU-27 countries, the ratio declined from a peak of 5.2 in 2000 to 2.8 in 2012. In the Euro area-17, the ratio declined from 3.1 in 1999 to 1.9 in 2012.

Figure 7 shows this development. The narrowing of the minimum-maximum spread in the EU-15 has been more a bottom-up development than *vice versa* with the poorest countries catching up with the average. This development continued until about 1992. By that time, the minimum value rose from 0.45 to 0.70.[4] Meanwhile, the maximum declined from 1.40 to 1.20. After the early 1990s, the spread has remained rather stable (see Figure 7).

In the EU-27, the minimum declined relative to the average up until the year 2000 and then started to catch up. This development has continued despite the Great Recession. On the other hand, the catching up by the minimum in the EU-33 has levelled off.

In the Euro area-17, the minimum value has been catching up with the average much faster than in the other three regions. This is a positive sign for the monetary union at least from the data description. Note that the Euro area-17 includes all 17 countries that were members in 2012 even before they joined the monetary union. If we take the euro area with its true membership each year, the minimum does not change but the maximum rises because the new euro countries have always had below average GDP per capita.

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[4] In 1960, Portugal–the poorest country–was not a member of the EU (then EEC). On the other hand, Portugal was a founding member of EFTA in 1960 so economic integration can be thought to have influenced the country's development in the 1960s.

Figure 7. Minimums and Maximums of GDP per capita

(Relative to the Simple average in the respective region)
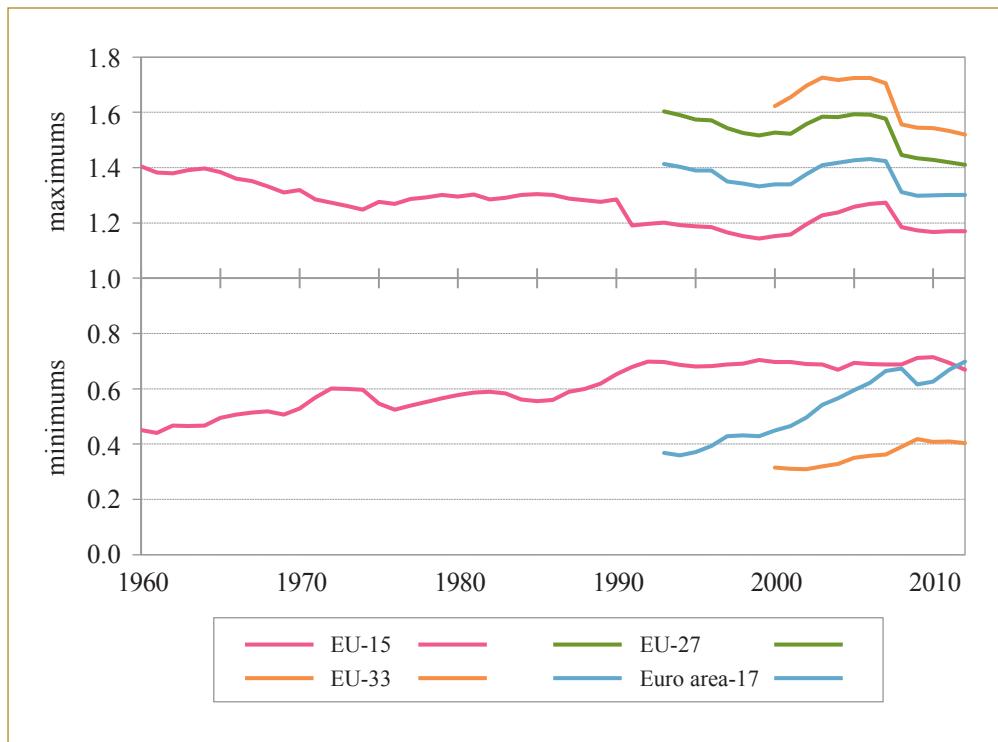
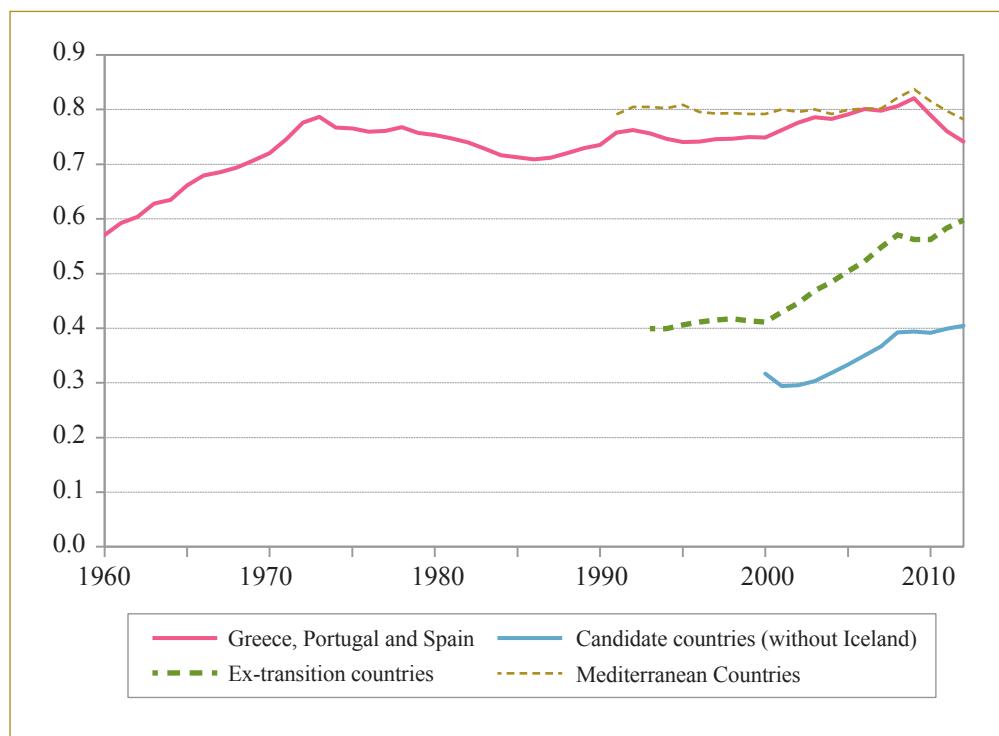

(Note) Without Luxembourg.

(Sources) Eurostat, own calculations.

Figure 8 shows the simple averages of GDP per capita in four additional groups of countries as a percentage of the simple average of GDP per capita across the EU-15. Greece, Portugal, and Spain were catching up with the EU-15 average up until 2009, but the recession has since then pushed the development back by 0.1 points to its 2000 level. If we enlarge this group with Cyprus, Italy, and Malta, and rename it the Mediterranean countries, we see a similar but less dramatic development.

On the other hand, the ex-transition countries of Central and Eastern Europe have continued to converge with the EU-15 after a short pause in 2008~2010. The candidate countries' convergence has levelled off.

Figure 8. Simple Averages of GDP per capita

(% of EU-15 Simple Average)

(Note) Without Luxembourg. Ex-transition countries = Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia; Candidate countries (without Iceland) = Croatia, Macedonia Former Yugoslav Republic, Montenegro, Serbia and Turkey; Mediterranean Countries = Cyprus, Greece, Italy, Malta, Portugal and Spain.
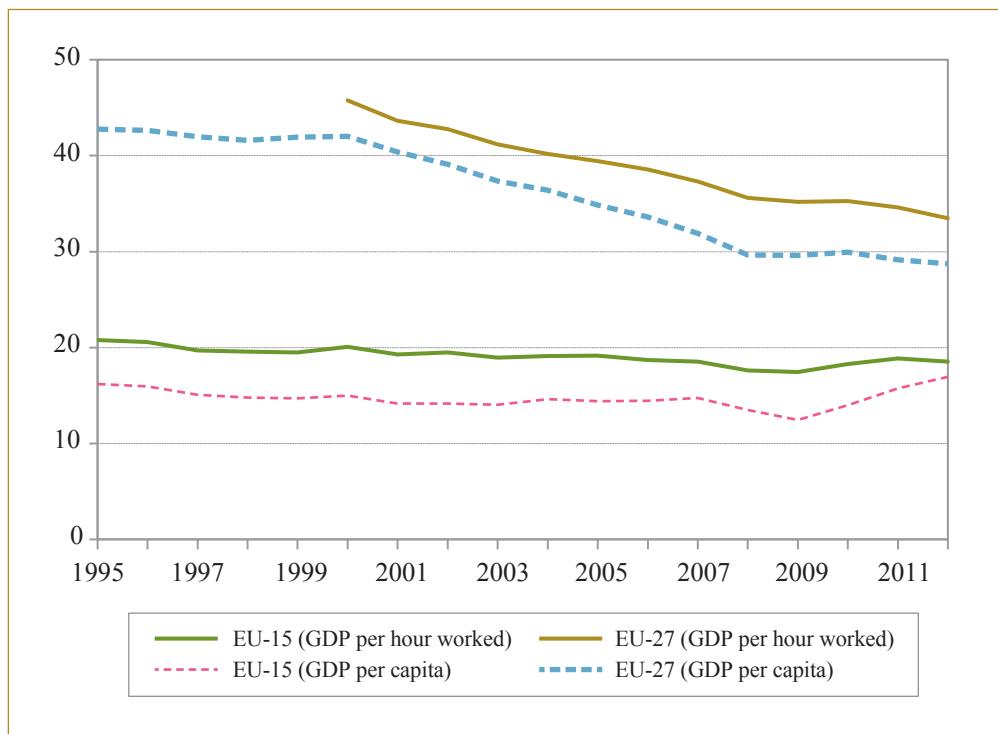
(Sources) Eurostat, own calculations.

IV. Convergence of Productivity

The GDP per capita of a country catching up may occur either through faster productivity growth and/or an increase in labour input relative to the population. In the long term, GDP per capita development is largely, if not solely, determined by the development of productivity. In the short to medium term, however, labour input may be important because in many of the poorer countries in the Southern Europe, the employment rate is lower than the EU average. This is largely because women participate in the labour market less than in the northern Europe. In the aftermath of the Great Recession, huge unemployment is, of course, another source of further labour input.

Figure 9 traces the differences between convergence of GDP per capita and GDP per hour worked (labour productivity) in the EU-15 and the EU-27. We see that the sigma convergence lines for GDP per capita are below the ones for productivity, GDP per hour worked. Consequently, there are smaller differences among the countries in terms of GDP per capita than in terms of productivity. This indicates that more hours are worked per total population in poorer countries than in wealthier ones.

We can also see that in the EU-27 the difference between the blue and the brown lines increases after the year 2000. There has thus been more convergence in GDP per capita than in labour productivity. The opposite happens in the EU-15. After the year 2000, there has been more convergence in productivity than in GDP per capita.

Figure 9. Sigma Convergence of GDP per capita and per hour Worked

(Note) A decline in the curves imply convergence. Without Luxembourg.

(Sources) Eurostat, own calculations.

V. Convergence and Income Distribution

GDP growth and convergence among countries can occur with or without an increase in income disparity within the countries. If a large part of the population is left outside the increase in average incomes, the development is not in line with the spirit of convergence in the EU. In this section, we will analyse whether GDP per capita convergence has been accompanied by a change in Gini coefficients. A rise in Gini implies an increase in income disparities within the countries. However, note that correlation does not imply causality here.

Desli (2009) finds that the degree of income inequality does not have a statistically

significant effect on growth convergence, but that it increases the convergence of productive efficiency.

Ezcurra (2007) uses data from the European Community Household Panel for 1993~2002 to analyse the relationship between income inequality and economic growth in the NUTS-1 region of eight EU countries (the old EU-12 less Denmark, Ireland, Luxembourg, and the Netherlands). He finds that the degree of income dispersion is negatively associated with regional growth. Also, Malinen (2012) finds that income inequality is associated with lower long-run economic growth in developed countries.

We use the OLS regression with the percentage point convergence towards the EU-27 GDP per capita level in 2000~2011 as the independent variable, while the GDP per capita level in 2000 and the Gini coefficient in 2000 are put as the dependent variables. There were no data for Bulgaria and Slovakia. The initial GDP per capita level explains convergence but the coefficient on the initial Gini level is not statistically significant.

Furthermore, we find that within the group of EU-15 countries, EU-27 countries, and ex-transition countries, GDP per capita is negatively correlated with the national Gini coefficients; i.e., the wealthier the country, the smaller the internal income disparity, on average (see Figure 10). This relation was stronger in 2011 than in 2000. For 2011, the R^2 is much higher in the EU-15 group (0.54) and especially the ex-transition countries' group (0.68) than in the aggregate EU-27 scatter (0.14).

Figure 10. GDP per capita and the Gini Coefficient
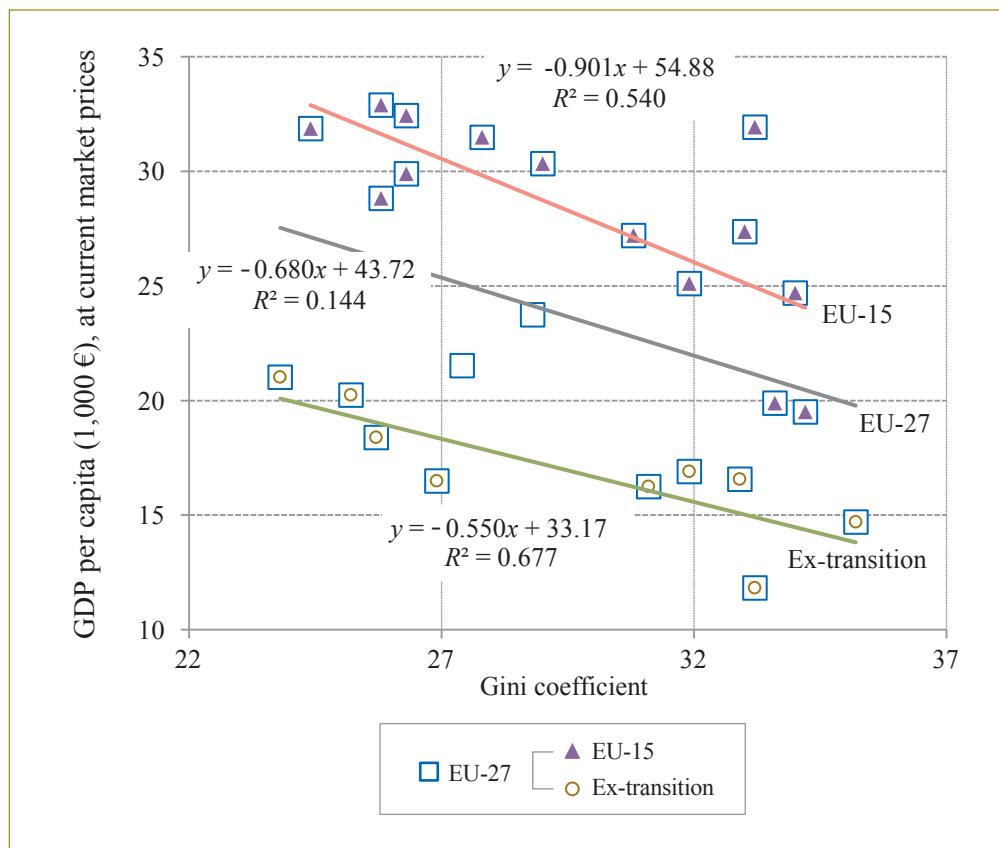
(Note) Higher Gini coefficients imply higher income disparities. The member countries not included in the EU-15 or the group of ex-transition countries are Cyprus and Malta. Ireland's Gini coefficient is from 2010. Data without Luxembourg and Bulgaria

(Sources) Eurostat, own calculations.

For the EU-15 as a whole, Eurostat statistics show that the Gini coefficient increased from 29.0 at the end of the 1990s to 30.8 in 2011. In the EU-27 the Gini coefficient stayed flat at about 30.5 in 2005~2011. In the Euro area, the Gini coefficient increased from 29.2 in 2005 to 30.5 in 2011. However, the EU-level Gini coefficients hide large differences in levels and changes among individual member countries as can be seen from the graphs.

Let us now compare the development in Gini coefficients with the development in GDP per capita convergence. Here, we measure convergence by first calculating what

individual countries' GDP per capita was in 2011 as a percentage of the EU-27 simple average and then compare that with specific situations in 2000 by subtracting. Thus, the measurement is a percentage point change relative to the average. The change in the Gini coefficient has been calculated by subtracting the values for those two years (2000 and 2011) from each other.

In Figure 11, it can be seen that the Gini coefficient has risen in all but five countries, namely Belgium, Estonia, Malta, the Netherlands, and Portugal. In the three countries (Denmark, Germany, and Romania), the Gini coefficient has risen by at least four percentage points. The countries are then divided into two groups depending on whether they grew faster than the average ("relative winners") or slower ("relative losers"). No correlation is found between the development in the Gini coefficient and convergence in GDP per capita. Whether losing/gaining from a high level (above the average) is different from losing/gaining from a low level (below the average) is checked, but such evidence is not found.

In the upper right-hand corner, Romania registers a large increase in its Gini coefficient and catching up in GDP per capita. On the other hand, in the upper left-hand corner, Estonia displays a large decline in its Gini coefficient and catching up in GDP per capita. Estonia and Romania thus flatten the trend for the group of relative winners. If these two countries were to be removed, the linear trend would be steep with a high R^2 value of 0.78. This indicates a clear positive relationship between a rise in income disparities and catching up in a group of six new member countries, namely Cyprus, the Czech Republic, Hungary, Latvia, Lithuania, and Poland.

Figure 11. GDP per capita Convergence and Changes in the Gini Coeffient

(in 2000~2011 in the EU-27)
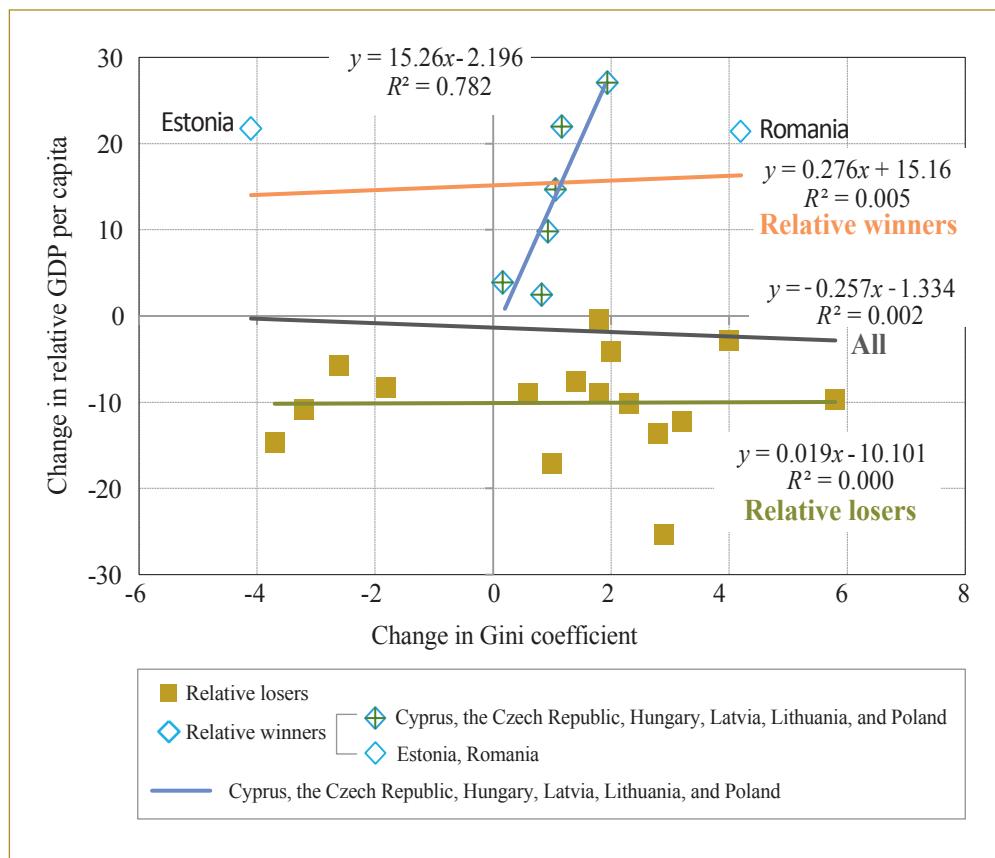
(Note) Without Bulgaria, Luxembourg, and Slovakia. For Cyprus the Gini coefficient in 2000 is the average of 1997 and 2003, for Sweden the average of 1999 and 2001. The Czech Republic and Denmark in 2001~2011; Ireland in 2000~2010. Refer to text for an explanation as to how the data have been calculated.
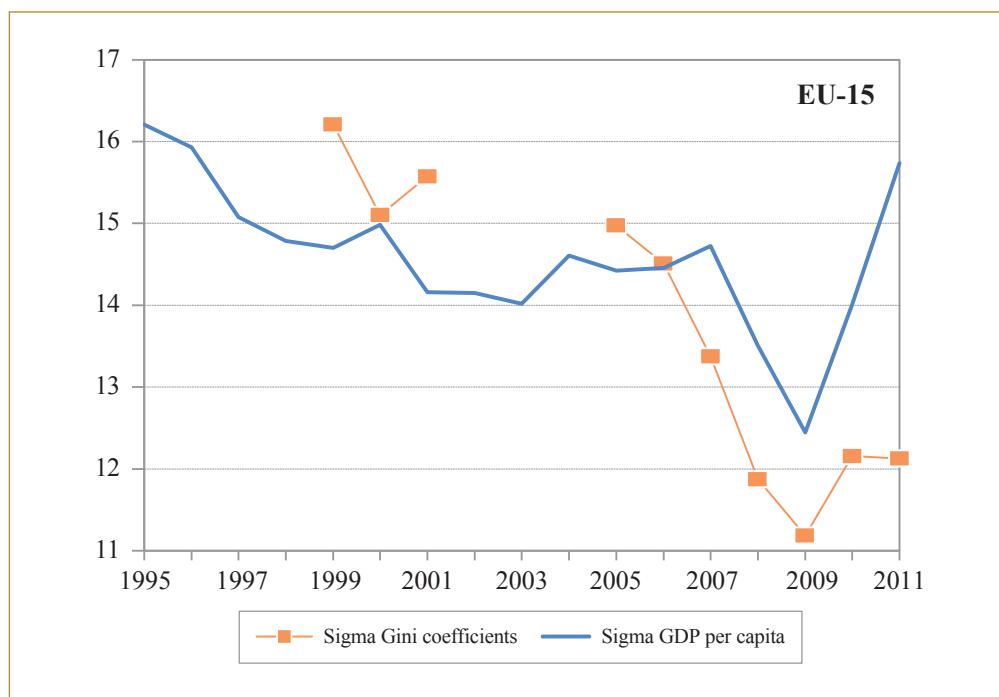
(Sources) Eurostat, own calculations.

It can be seen above that the Gini coefficients and thus income disparities have tended to rise both at the aggregate EU level and in most individual member countries. However, whether there has been any convergence in the Gini coefficients across the region has to be ascertained. To examine it, the Sigma convergence of the national Gini coefficients is calculated. For the EU-15 (without Luxembourg), there occurred considerable convergence from 19.0 in 1997 to 11.2 in 2009 followed by a rise to 12.2 in 2010. This means that the national Gini coefficients have converged considerably

during these years.

In the EU-27 region, the Sigma convergence value of the national Gini coefficients declined from 15.0 in 2005 to 13.4 in 2010.[5] Consequently, the national Gini coefficients converged a little. For the Euro area-17 countries, the Sigma convergence value declined from 13.3 in 2005 to 11.4 in 2010. If Slovakia is disregarded, the decline from the year 2000 is from 14.3 to 11.3.

Figure 12 traces the national Gini coefficients for the EU-15, EU-27, and EA-17 regions alongside with the GDP per capita convergence. We can see that there is a considerable correlation between the two measures.

Figure 12. Sigma Convergence of Gini Coefficients and GDP per capita

(Note) Without Bulgaria, Luxembourg, and Slovakia. Ireland in 2011 is assumed to be the same as in 2010.

(Sources) Eurostat, own calculations.

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[5] If the 2001 figures for the Czech Republic and Denmark are used and those of Slovakia are disregarded to get a longer time period, the Sigma value for EU27 Gini coefficients will decline from 14.4 in 2000 to 13.4 in 2010.

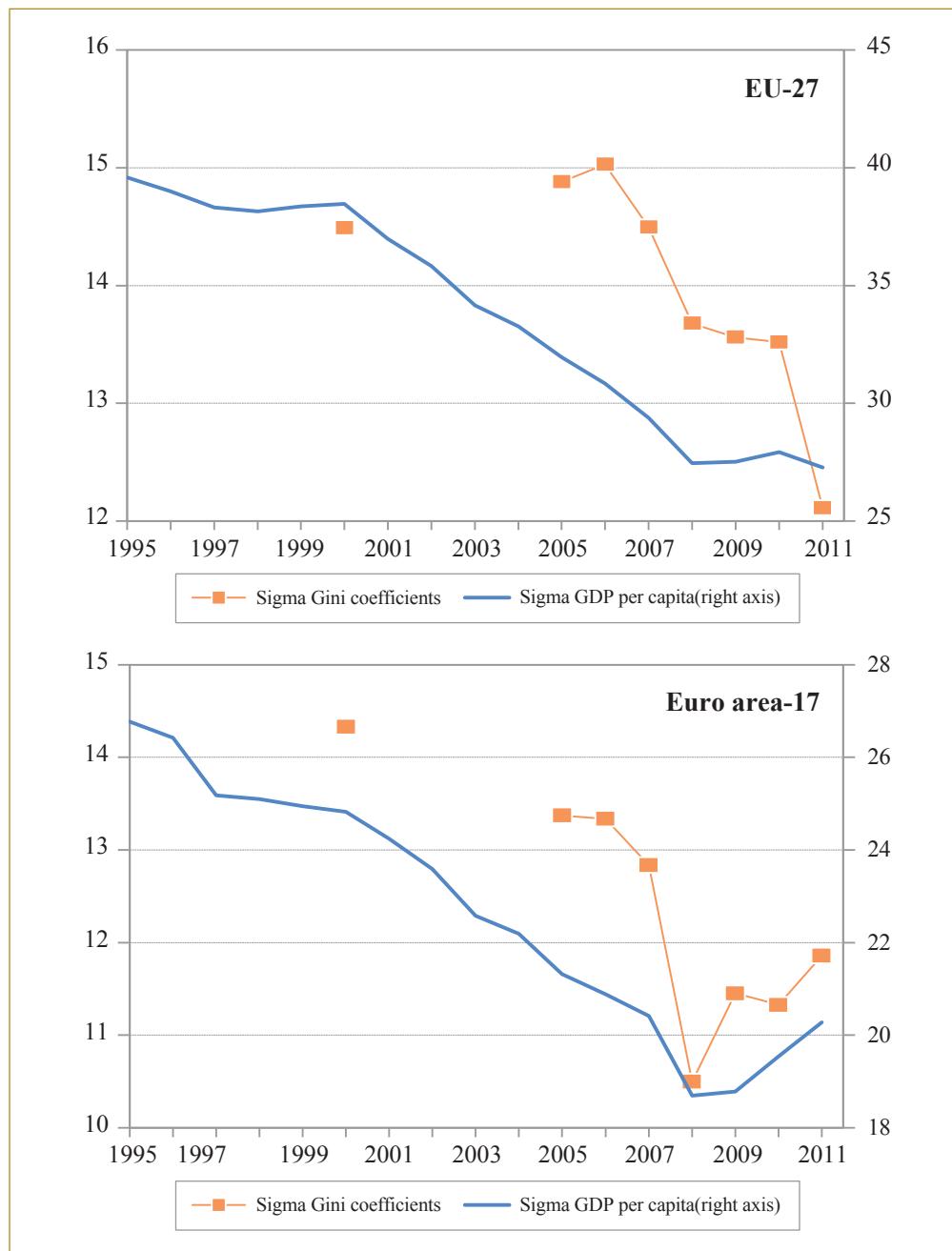## Figure 12. Sigma Convergence of Gini Coefficients and GDP per capita

~Continued

(Note) Without Bulgaria, Luxembourg, and Slovakia. Ireland in 2011 is assumed to be the same as in 2010.

(Sources) Eurostat, own calculations.

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Finally, we can see the convergence in Gini coefficients in Figure 13 where we have a scatter diagram of the coefficients in 2000 and their change in 2000~2011. The lower the coefficient was in 2000, the more it has risen on average. There are many factors, including social benefits and tax policies, which affect income distribution. The only countries with a decline in Gini coefficients are new members in the Euro area.

Figure 13. Gini Coefficients in 2000 and their Changes in 2000~2011
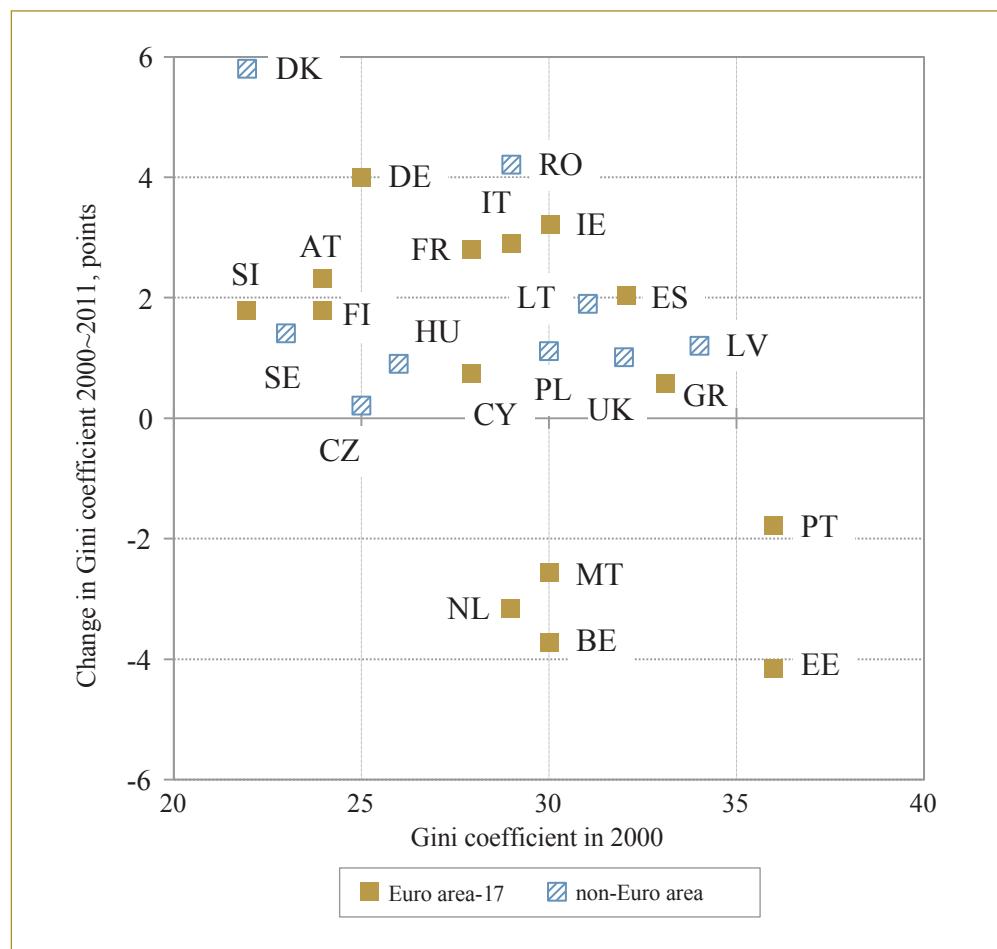
(Notes) (ⅰ) Bulgaria, Luxembourg and Slovakia not included. For Cyprus the Gini coefficient in 2000 is the average of 1997 and 2003, for Sweden the average of 1999 and 2001. For Ireland the change is for 2000~2010. The EA-17 countries are with solid squares and the other countries with diagonal lines. The R^2 for the linear trend for all the countries is 0.25.

(ⅱ) Euro area: Austria(AT), Belgium(BE), Cyprus(CY), Estonia(EE), Finland(FI), France(FR), Germany(GE), Greece(GR), Ireland(IE), Italy(IT), Malta(MT), Netherlands(NL), Portugal(PT),

Slovenia(SI), and Spain(ES)

non-Euro area: Czech Republic(CZ), Denmark(DK), Hungary(HU), Latvia(LV), Lithuania(LT), Poland(PL), Romania(Ro), Sweden(SE), and United Kingdom(UK).

(Sources) Eurostat, own calculations.

VI. Conclusion

There has been a long-term trend of GDP per capita convergence in the European Union. Using Sigma convergence, the nominal purchasing power-adjusted GDP per capita levels in the EU-15 countries (less Luxembourg) are found to have converged in 1960~1973, levelled off in 1973~1986, converged again in 1986~2001, and levelled off again until 2007. The second convergence phase is, in relative terms, about as steep as the first. The Great Recession was a considerable shock to the development with clear divergence in GDP per capita levels by 2012. This does not mean that convergence could not continue in due time. Convergence in the EU has been faster when aggregate GDP growth has been faster. It is thus important to get the EU back on a sustainable and robust growth path.

In the EU-27 region, only a slight convergence in 1993~2000 was observed. Thereafter, convergence was rapid up until 2008, followed by a levelling off in the development. The convergence process in the EU-15, EU-27, and Euro area-17 was confirmed by an analysis of minimum and maximum values and their ratios.

The new member countries that joined in 2004 and 2007 converged rapidly up until 2007, after which the development levelled off but picked up again in 2011~2012. The simple average of the ex-transition countries' GDP per capita was 41 percent of the EU-15 simple average in 2000, but already 60 percent in 2012. The ex-transition countries' convergence towards the EU-15 countries has slowed down but it has not stopped.

The Gini coefficients are analysed in order to see whether GDP per capita convergence has been accompanied by changes in income disparities. If a large part of the population is left outside income increases, the development is not in line with the spirit of convergence in the EU. First, we see that the Gini coefficients are negatively related to GDP per capita levels in the member countries. Thus, in general, wealthier countries have lower income disparities than poorer countries. Second, at the aggregate levels, such as EU-15, Euro area-17, and EU-27, the Gini coefficients have risen a little, indicating an increase in region-wide income disparities. At the national level, there are

only five countries where the Gini coefficients declined in 2000~2011. However, GDP convergence has not been correlated with national changes in income distribution. As an exception, we do find a positive relationship between the two measures in 2000~2011 for a group of six catching-up countries, namely Cyprus, the Czech Republic, Hungary, Latvia, Lithuania, and Poland. Third, calculating the Sigma convergence for the national Gini coefficients, we find that their levels converged significantly in 2000~2011.

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