WORKING PAPER

Eurofound

Monitoring convergence in the European Union

Convergence analysis in employment and socioeconomic indicators

Upward convergence in employment and socioeconomic factors

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Introduction

This working paper accompanies the report on *Progress on convergence in employment and the socioeconomic area* and provides a detailed analysis of upward convergence patterns on 21 indicators on employment and socio-economic area.

The working paper is organised in independent fiches, one for each indicator. The indicators are related to all the dimensions of employment (income and poverty, access to services and gender equality) and of socioeconomic area (participation, exclusion and dynamics of labour market participation) as described in the report. The full list of indicators investigated is presented below:

Employment area	1 Activity rate	Socioeconomic area	11 Monthly national minimum wages in PPS
	2 Employment rate		12 Disposable income of private households
	3 Weekly hours of work		13 Income inequality: income quintile share ratio
	4 Young people not in employment or in education and training (NEETs rate)		14 Early school leavers
	5 Unemployment rate		15 Tertiary education attainment
	6 Long-term unemployment rate		16 Unmet needs for medical care
	7 Involuntary temporary work		17 Children in formal care
	8 Involuntary part-time work		18 Gender employment gap
	9 Labour transitions from temporary to permanent contracts		19 Gender gap in national parliaments
			20 Gender gap in early school leavers
Other	10 Real GDP per capita in PPS		21 Gender gap in AROPE

Using the methodological tool developed by Eurofound[1] for each indicator the analysis is carried out using the measures of: sigma, delta and beta convergence at Member States level.

Sigma convergence, which shows the overall increase or decrease of variation between Member States, opens the discussion. Where data are available, the analysis of sigma convergence is also performed for various demographic groups. Each fiche includes also an analysis on delta convergence, where the latter shows the overall decrease or increase of distance from the best performing country. Furthermore, an analysis of unconditional beta

[1] Eurofound (2018), Upward convergence in the EU: Concepts, measurements and indicators, Publications Office of the European Union, Luxembourg.

convergence, a measure that shows the overall catching up of Member States, complements the previous ones. Where data are available, the analysis of sigma and beta convergence is also pursued at the regional level, hence considering the catching-up process of the less-performing regions towards the best performing ones.

The analysis of sigma, delta and beta are performed with reference to the 28 European countries, the Euro Area and non-Euro Area at the national level. In addition, in order to look at the different effects of specific subgroups, the beta analysis considered also different cluster of countries, in particular the Eastern Member States and EU15, the member countries in the European Union prior to the accession of ten candidate countries on 2004. The analysis investigates the longest time frame available, which ranges between 1995 and 2017, while also looking at different time spans within the period considered.

The data presented in this working paper give a detailed and comprehensive analysis monitoring the latest converging and diverging trends and performances among Member States. The purpose of this working paper is to contribute a deeper description of the employment and socioeconomical conditions to enable a more targeted approach in fostering upward convergence.

1. Activity rate

Definition: Percentage of economically active population aged 15-64 on the total population of the same age group

Data source: Eurostat [lfsa_argaed]

Time: 2000-2017

The **analysis of upward convergence** of the activity rates in the EU28 shows a weak upward convergence process among the EU countries consistent over the whole period 2000-2017 and apparently not influenced by the economic crisis.

Euro and Non-Euro area show similar patterns: the reduction of the variation was larger in the Non-Euro area as compared to the Euro area, although it should be noted that in terms of absolute levels the variation outside the Eurozone is higher compared to the Euro area in throughout the period.

Sigma convergence (coefficient of variation) shows differences in convergence patterns for different groups of workers: women, starting with high levels, presents higher reductions in national differences, as do older workers. For young people instead, differences in activity rates increase between 2000 and 2017, being the group most affected by the effects of the recession.

Delta convergence shows also an overall reduction between 2000 and 2017 of the differences in the activity rates with respect to the best performing countries (Denmark and Sweden).

The analysis of **unconditional Beta convergence** over the period 2000-2017 shows convergence and the pace of convergence is similar in the Euro and Non-Euro zone (around 2% a year); whereas the pace of convergence is higher among new accession countries (4% a year). When distinguishing by periods, the rate of convergence in the EU28 is higher in the period following the launch of the EU 2020 Agenda with respect to the previous period (2000-2010). However, there are differences between the EU13 and the EU15: among EU15 countries a convergence process is observed only before 2010; whereas among new accession countries a convergence process in activity rates is evident only after 2010.

At regional level, sigma convergence shows that convergence/divergence patterns are similar at both regional and nation level during the period 2004-2013, with convergence pattern starting since 2009 (more pronounced at national level compared to the regional level). Moreover, in the Euro area variations among regions are higher in 2017 than in 2000. On the contrary, regions of Non-Euro countries present a convergent trend.

The analysis of **unconditional Beta convergence** shows a converging pattern of activity rates among EU regions during the period 2004-2016 (at 1% a year). However, the convergence process is more evident in the period 2010-2016, while in the 2004-2016 period no convergence pattern emerges. Furthermore, convergence pace is higher among regions of new MSs and Non-Euro area countries, while no catching-up processes is observed among regions of the Eurozone.

Finally, the **Theil index** shows a reduction of differences among EU regions mainly due to a reduction of differences between MSs rather than among regions within MSs.

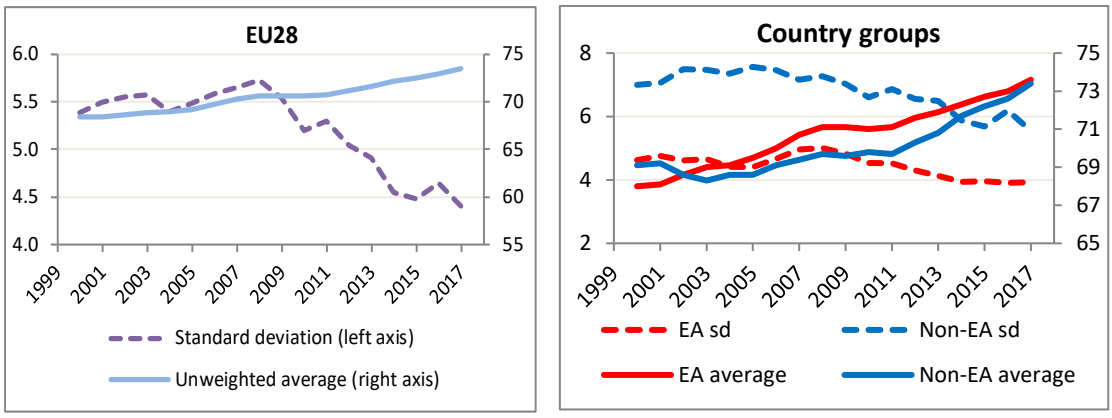
Upward convergence

During the 2000-2017 period, the activity rate in the EU28 registered a **weak upward convergence**: on average the activity rate increased from 68.4% to 73.5% in the EU28 and the variation among Member States decreased. The convergence process is weak since in some countries (Denmark; Finland, Romania) the activity rate decreased over the period considered.

No different patterns emerge when looking at **sub-periods**. In fact, the overall increase in the activity rate has been consistent over the period 2000-2017, not being influenced by the economic crisis. Moreover, the variation of the activity rate among the EU28 countries remained rather constant until the beginning of the crisis, with some minor fluctuations; then it started to decline after 2008.

For the **Euro and Non-Euro area** similar patterns of the average activity rate were observed during the period. However, the reduction of the variation among Member States was larger in the Non-Euro area as compared to the Euro area. Although it should be noted that in terms of absolute levels the variation outside the Eurozone is higher compared to the Euro area throughout the period.

Figure 1: Activity rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017



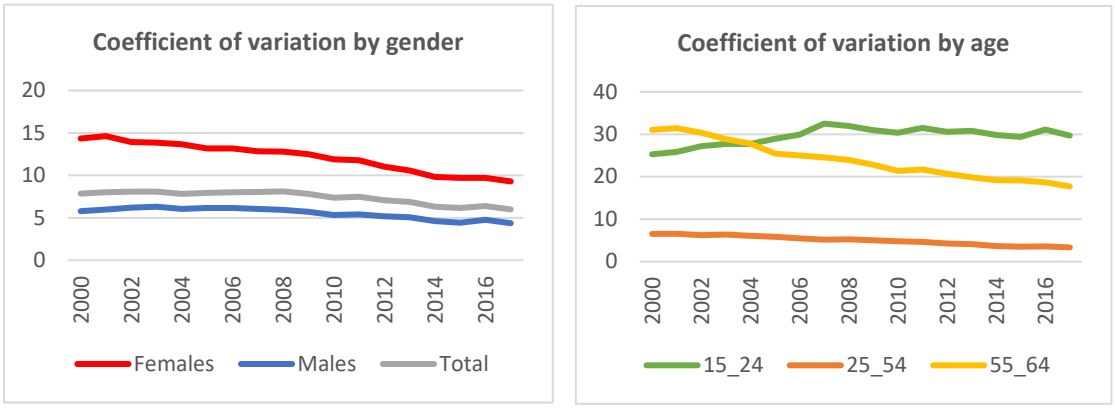
Behind these overall changes **interesting trajectories** can be observed at the country level. From 2008 there was a catch-up with the EU average for Hungary, Malta and Poland. Among these countries, Malta and Hungary recorded a remarkable improvement, reducing the gap with the EU average, respectively, from 11.5 and 9.4 percentage points in 2008 to 3.1 and 2.3 pp in 2017. Finland and Denmark instead, experienced a worsening situation in terms of labor market participation. In fact, despite having an activity rate higher than the EU average, this has been steadily declining for the entire period.

Sigma convergence by demographic groups

In this section we use the coefficient of variation to measure convergence among EU MSs in the activity rate by demographic groups. Convergence in activity rates in the EU28 is particularly relevant among **women**, who presents higher levels of variations among countries. On the contrary, the convergence process is less pronounced for males, for whom the variations among MSs are lower during the entire observed period.

When looking at the different component of **employment by age**, it is evident the divergence process in activity rates experienced by 15-24 people as opposed to the convergence process observed by the 55-64. In many countries, the young population has been hit the most by the effects of the recession. While the convergence process of activity rates of older workers has probably been driven by reforms to the pension systems enforced by EU countries.

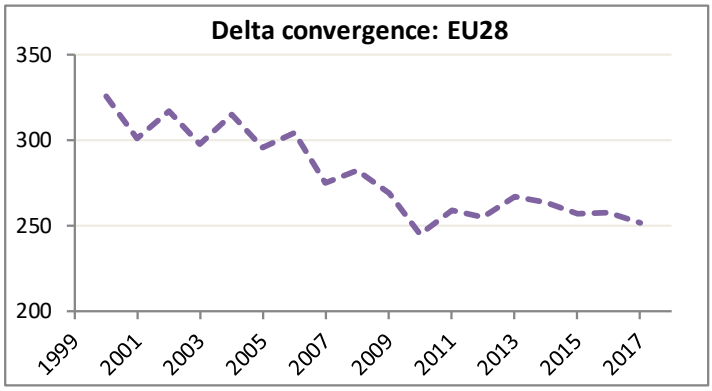
Figure 2: Sigma convergence in the EU28 by demographic groups, 2000-2017



Delta convergence

The analysis of convergence in the activity rates show also **an overall reduction between 2000 and 2017 of the distance with respect to the best performing country**. Despite some oscillations, on average European countries converge towards the activity rates of the best performer (i.e. a reduction in the sum of the distances from the best performer is observed).

Figure 3: Delta convergence in the EU28, 2000-2017



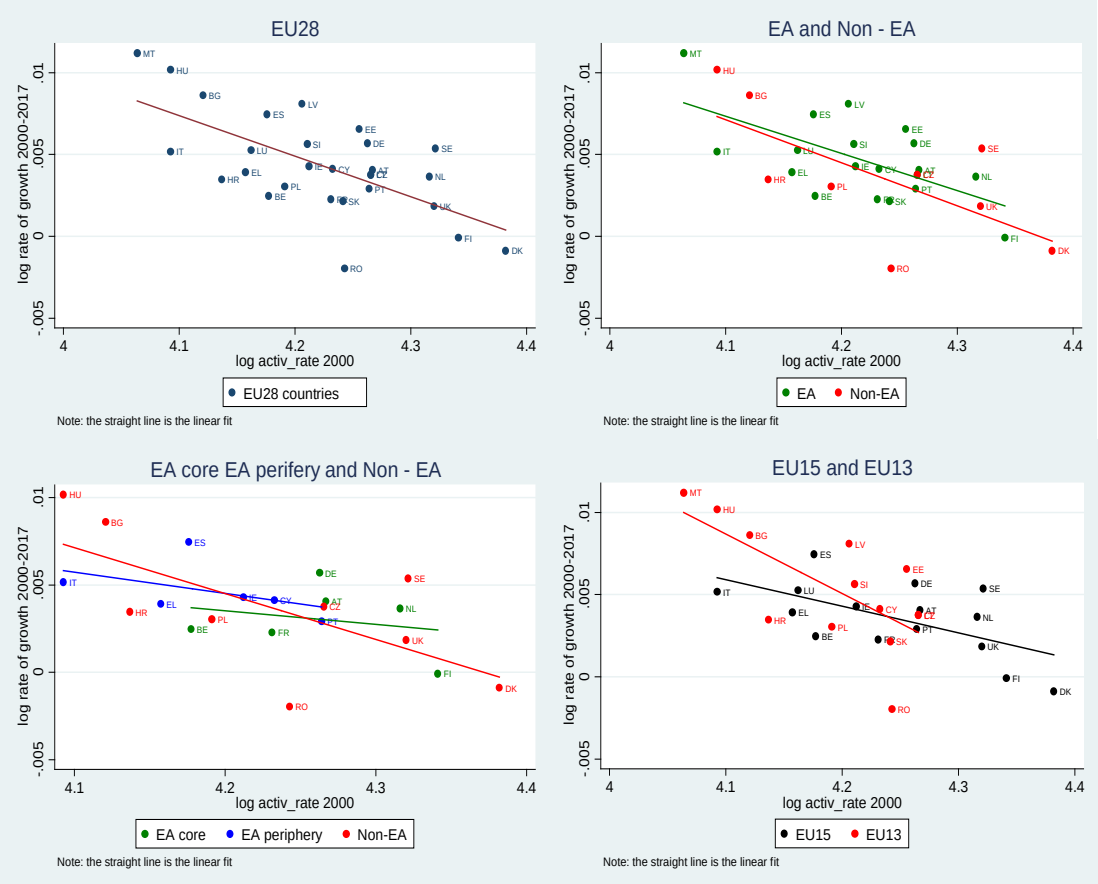
As can be seen from figure 4, the best performing countries over the period 2000-2017 are the Scandinavian countries (i.e. Denmark from 2000 to 2010 and then Sweden from 2011 onwards). Compared to 2000 there are several EU countries that significantly reduced the gap: Austria, Germany, Spain, Malta, Bulgaria, Hungary and the Baltic Republics. In particular, Germany shows a growing convergence towards the highest levels of activity rates; Malta and Hungary- starting with very low activity rates levels- also presents a continuing growth, although the levels remain much lower if compared to the best performer. On the contrary, a number of countries maintained a large gap in the activity gap with respect to the best performers; these are: Greece, Italy, Poland and Romania.

Figure 4: Activity rate of EU28 MSs *versus* Best performance line, 2000-2017

Unconditional Beta convergence

The analysis of the unconditional Beta convergence of the activity rate over the period 2000-2017 shows that the pace of convergence is similar in the Euro and Non-Euro zone. Instead, significant differences emerge in the pace of convergence between EU15 countries and countries of more recent EU accession (EU13). The latter present in fact a higher rate of convergence.

Figure 5: Unconditional Beta convergence by groups of countries, 2000-2017



Among the EU 28 countries convergence in activity rates **is higher in the period following the launch of the EU 2020 Agenda** with respect to the previous period (2000-2010). In particular, after 2010 the convergence process is observed both among the EA countries and among the Non-Euro area countries.

Differences in convergence patterns and rates are also evident when distinguishing between EU15 and EU13 countries. Among new accession countries a convergence process in activity rates is evident only after 2010, whereas for the EU15 countries a convergence process is observed only before 2010.

Figure 6: Unconditional Beta convergence in the EU28 by periods, 2000-2017

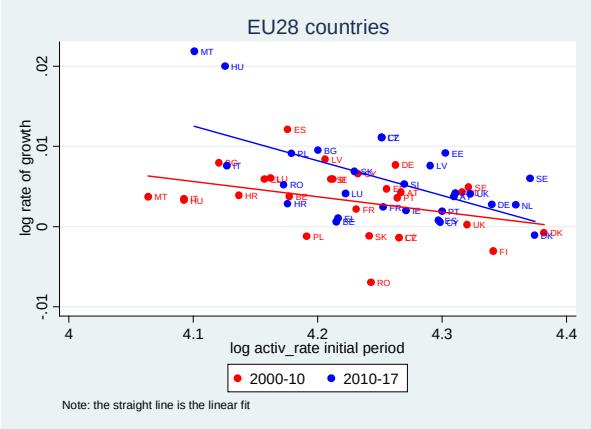
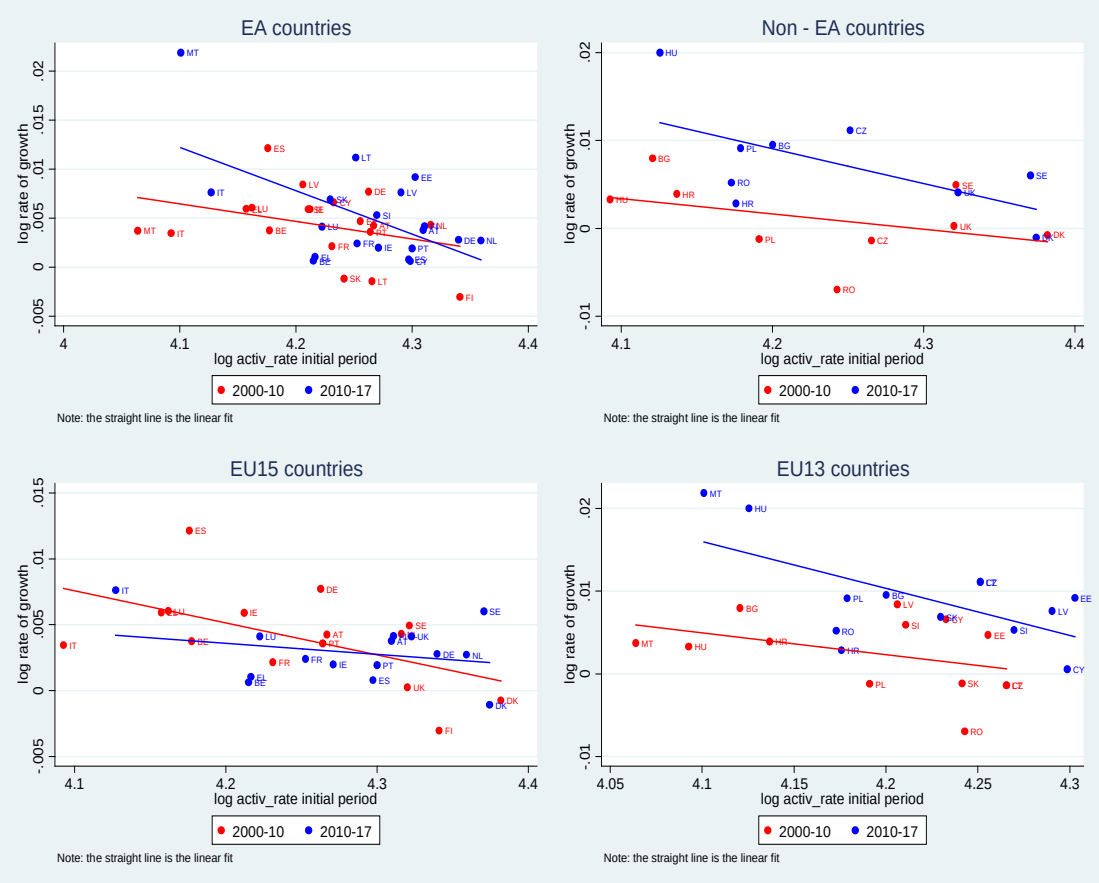


Figure 7: Unconditional Beta convergence by groups of countries and periods, 2000-2017



Regional Convergence

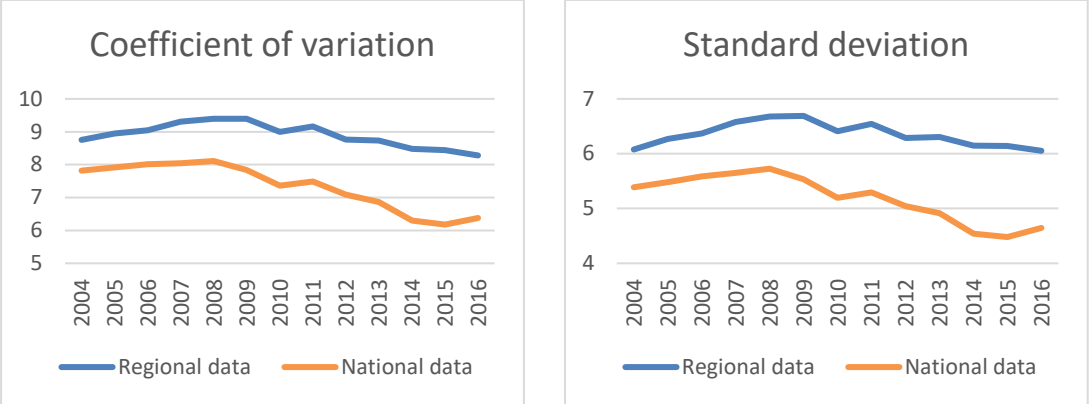
Sigma convergence

In general, **variations in activity rates are higher among EU regions than among EU countries** (this holds true when using either the standard deviation or the coefficient of

variation). Moreover, in the last period, the patterns of convergence are slightly different whether considering regional or national data. In particular, the main differences are the following:

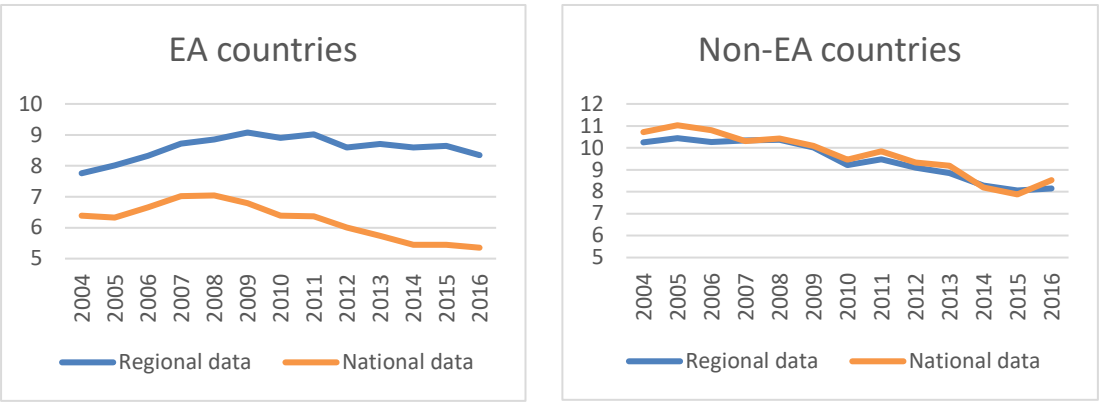
- convergence/divergence patterns are similar at both regional and national level during the period 2004-2013, with a convergence pattern starting from 2009 onwards;
- also, the convergence is more pronounced at national level compared to the regional level, although it stopped in 2015.

Figure 8: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Concerning the **Euro and Non-Euro area**, the main differences in convergence patterns of activity rates between EU countries and EU regions are observed for Euro area countries (figure 9). In particular, among Euro area countries a clear convergence process initiated in 2009, while regions showed a divergent trend at least until 2011. Therefore, variations among regions are higher in 2017 than in 2000. On the contrary, regions of Non-Euro countries present a convergent trend.

Figure 9: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016

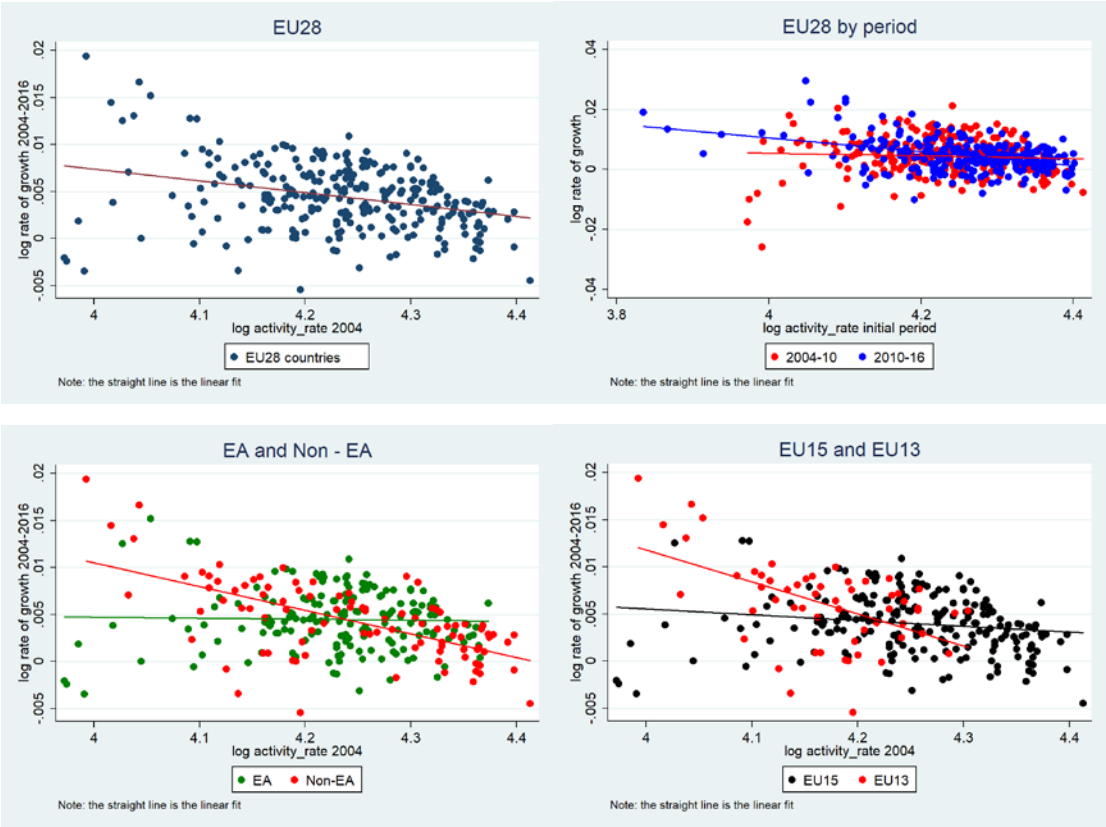


Unconditional Beta convergence

The analysis of unconditional beta convergence shows a **converging pattern of activity rates among EU regions during the period 2004-2016** (at 1% a year**)**. However, the convergence process is more evident in the period 2010-2016, while in the 2004-2016 period no convergence pattern emerges.

The investigation by groups of countries reveals a different catching-up processes among regions of **Eurozone and of the Non-Eurozone** during the period 2004-2016, as well as between old and new Member States. In particular, the convergence pace is higher among regions of new MSs and Non-Euro area countries, while no catching-up processes is observed among regions of the Eurozone.

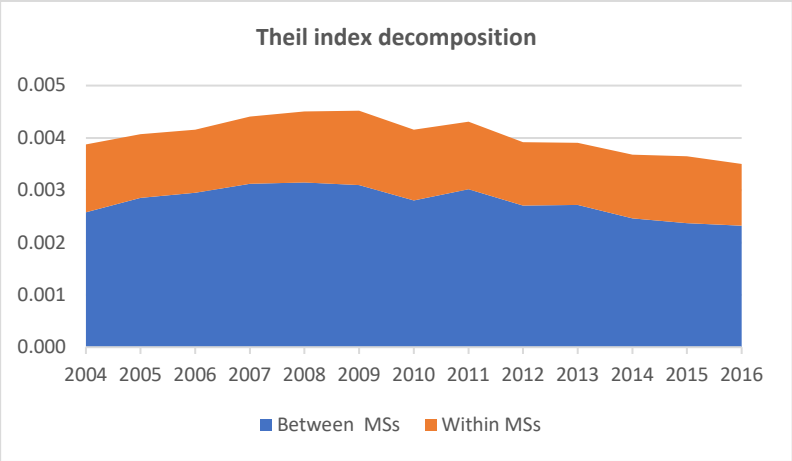
Figure 10: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



Theil index

The Theil index (another measure of sigma convergence) shows a reduction of variations among regions between 2004 and 2016; result which is in line with the ones obtained above with other measures. In particular, the observed reduction of variations in activity rates in the EU28 is mainly due to a reduction of differences between MSs rather than a reduction of differences among regions within MSs. This is positive since total differences in activity rates among EU regions are accounted for two thirds by variations between MSs and only one third by regional variations within the Member States.

Figure 11: Theil index decomposition, 2004-2016



2. Employment rate

Definition: Number of persons aged 20 to 64 in employment as a percentage of the total population of the same age group.

Data source: Eurostat [lfsa_ergaed]

Time: 2000-2017

The **analysis of upward convergence** of the employment rates in the EU28 shows a weak upward convergence process among the EU countries in the period 2000-2017, as a result of a clear upward convergence process in the period 2000-2008 interrupted by the economic and financial crisis, when a downward divergence occurred with decreasing employment rates and increasing variation across EU countries. During the following recovery period (2013-2017) an upward convergence process started again. Non-Euro area countries (as well as the EU13 countries) show a higher rate and speed of upward convergence compared to the Euro area, especially in the pre-crisis period.

Sigma convergence (coefficient of variation) shows differences in convergence patterns for different groups of workers: women presents higher reductions in national variations, as do older workers and workers with low educational levels. For young people and workers with high educational levels, instead, variations in employment rates increase between 2000 and 2017.

Delta convergence shows also an overall reduction between 2000 and 2017 of the distance in the employment rates with respect to the best performing country.

The analysis of the **unconditional Beta convergence** over the period 2000-2017 shows that the pace of convergence is higher among Non-Euro countries, which presents significant differences in initial levels of employment rates, while it tends to be lower among Euro countries, especially for core EA countries, which have similar initial levels.

At regional level, sigma convergence shows that variations in employment rates are higher among EU regions than among EU countries. At regional level divergence among EU28 regions is observed during the period 2007-2013, triggered by the economic and financial crisis. Moreover, while a divergence process is observed in the Eurozone, a convergence process among regions is taking place in the Non-Euro area. Also, **the analysis of unconditional Beta convergence** confirms the effects of the crisis: in fact, the catching-up process is only evident in the period 2004-2010 and among regions of new MSs and Non-Euro area countries. Finally, the **Theil index** shows an increase of variations among EU28 regions between 2004 and 2016, essentially determined by an increase of variations in employment rates between MSs rather than among regions within MSs. Also, differences within countries increase, but to a lesser extent.

Upward convergence

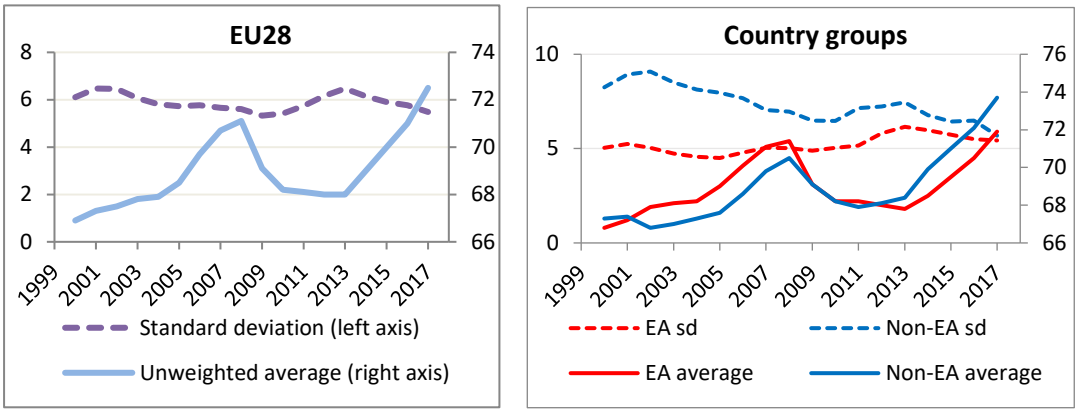
During the 2000-2017 period, the employment rate in the EU28 registered a **weak upward convergence**: on average the employment rate increased from 66.9% to 72.5% in the EU28 and the variation among Member States marginally decreased. The convergence process is

weak since in some countries (Greece, Cyprus, Denmark) the employment rate decreased over the period considered.

Different patterns emerge when looking at **sub-periods**. A process of upward convergence can be clearly identified for the period 2002-2008, and again from 2013 until 2017. From 2009 to 2013 a downward divergence occurred with decreasing averages and increasing variation.

For the **Euro and Non-Euro area** similar patterns of the average employment rate were observed during the period. However, the variation among Member States considerably declined in the Non-Euro area from 2002 until 2010, while it increased in the Eurozone from 2005 until 2013. Similar patterns were instead observed from 2013 onwards, when a decline was recorded in both areas.

Figure 12: Employment rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017



Behind these overall changes **interesting trajectories** can be observed at the country level. In the first sub-period 2002-2008 there was a catch-up with the EU average in Bulgaria, Spain, Croatia, Greece, Poland and Slovakia. Among these countries, Bulgaria recorded a remarkable improvement, reducing the gap with the EU average from 11 percentage points in 2002 to none in 2008. Italy instead, after a first initial period of catching up between 2000 and 2004, grew less than the EU in the following period.

Sigma convergence by demographic groups

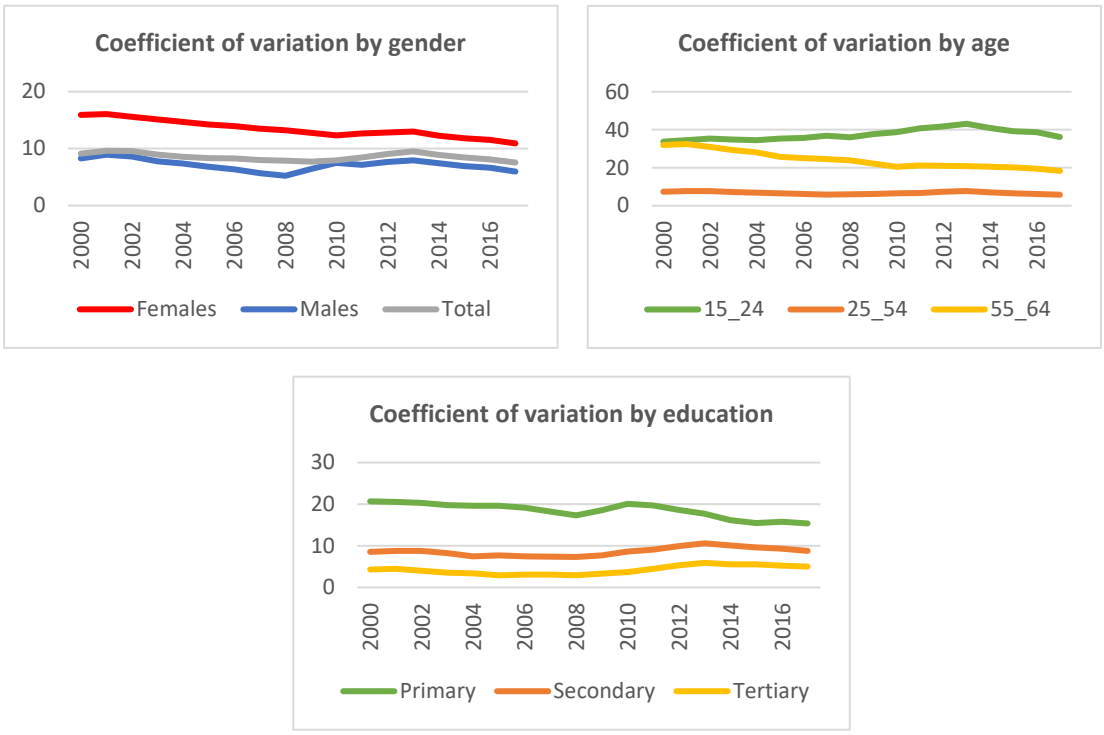
In this section we use the coefficient of variation to measure convergence by demographic groups. Convergence in employment rates is particularly relevant among **women**, which suffered less from the recession. On the other side, the male employment rates registered a significant convergence process until 2008 and suffered more of the effects of the economic recession, experiencing a significant growth of variation between 2008 and 2013.

When looking at the different component of **employment by age**, it is evident the divergence process in employment rates experienced by young people as opposed to the convergence process observed by the elderly. In many countries, the young population has been hit the most by the effects of the recession. While the convergence process of

employment rates of older workers has probably been driven by the reforms to the pension systems enforced by EU countries.

As far as concerns **educational levels**, variations in employment rates among EU countries decline with the increase in the level of educational attainment. Long-term trends show a process of convergence among EU28 MSs in the employment rates of workers with low levels of education, although interrupted by a period of divergence during the crisis between 2008 and 2010. Vice versa for workers with high educational levels the divergence process triggered by the economic and financial crisis has increased differences among EU countries.

Figure 13: Sigma convergence in the EU28 by demographic groups, 2000-2017

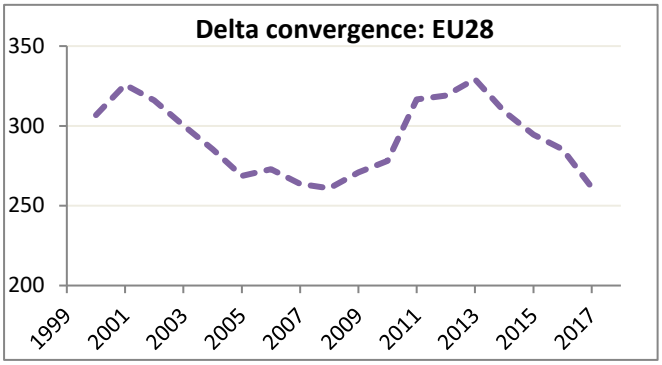


Delta convergence

The analysis of convergence in the employment rates show also an overall reduction between 2000 and 2017 of the distance with respect to the best performing country.

Both in the 2001-2008 and the 2013-2017 periods on average European countries converge towards the employment rates of the best performer (i.e. a reduction in the sum of the distances from the best performer is observed).

Figure 14: Delta convergence in the EU28, 2000-2017



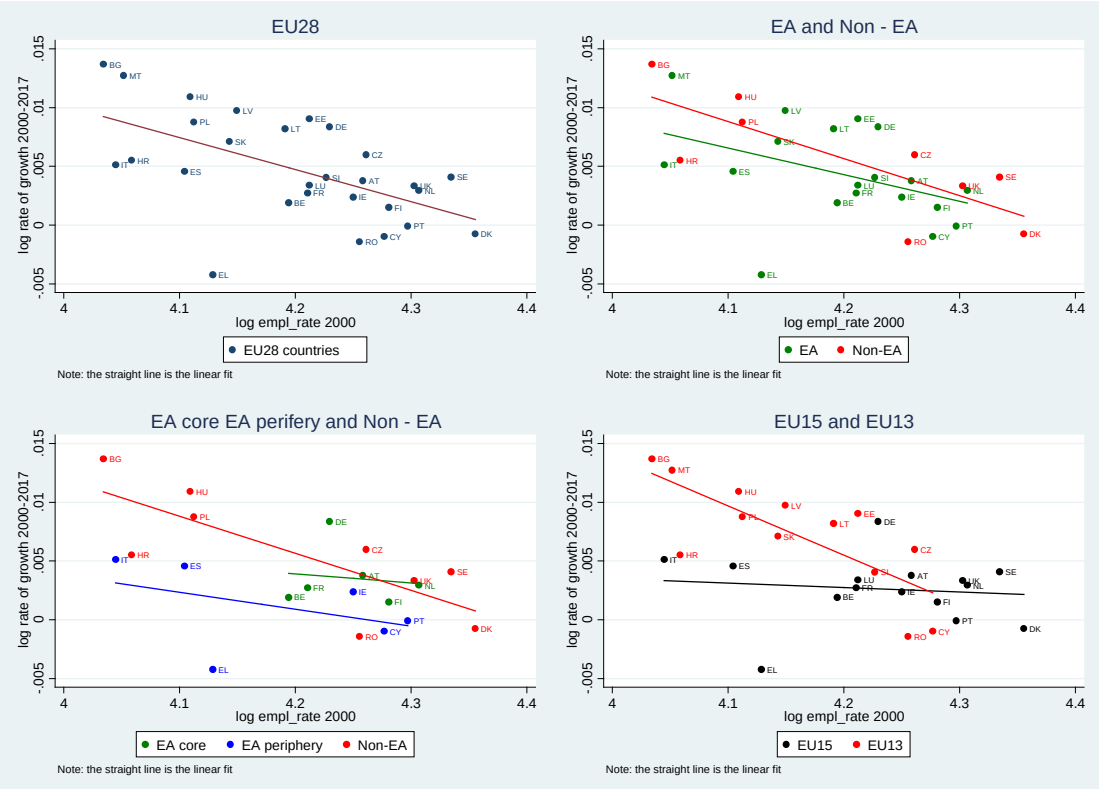
As can be seen from figure 15 the best performing countries over the period 2000-2017 are mainly the Scandinavian countries (i.e. Sweden, Denmark), less affected by the recession. Compared to 2000 there are several EU countries that significantly reduced the gap: Bulgaria, the Czech Republic, Germany, the Baltic Republics, Hungary, Poland, Slovakia, and Malta. In particular, Germany shows a growing convergence towards the highest levels of employment rates; Malta- starting with very low employment rates levels- also presents a continuing growth, although the levels remain much lower if compared to the best performer. On the contrary, a number of countries observed a significant increase of the employment gap with respect to the best performers; these are: Cyprus and Greece, Portugal, and Romania.

Figure 15: Employment rate of EU28 MSs *versus* Best performance line, 2000-2017

Unconditional Beta convergence

Overall in the EU28 the pace of convergence over the 2000-2017 period is estimated at 3% a year. The analysis of the **unconditional Beta convergence over the period 2000-2017** shows that the pace of convergence is higher among Non-Euro countries, which presents significant differences in initial levels of employment rates, while it tends to be lower among Euro countries, especially for core EA countries, which have similar initial levels. In the long term the convergence process is particularly relevant for countries of more recent accession (EU13), while it tends to be irrelevant among the EU15 countries.

Figure 16: Unconditional Beta convergence by groups of countries, 2000-2017



Convergence in employment rates **is higher in the period following the launch of the EU 2020 Agenda** with respect to the previous period (2000-2010). In particular, after 2010 the convergence process is observed both among the EA countries and among the Non- Euro area countries, while in the previous period convergence was registered only among Non-Euro area countries.

The most striking results emerge when distinguishing between old and new accession countries. Among new accession countries a convergence process is evident both before and after 2010 (with a higher pace after 2010), while for the EU15 countries a divergence process is observed since 2010 due to a fastest growth of a group of countries (IE, UK, DE, SE) as opposed to a reduced growth of Mediterranean countries (IT, ES; negative growth for EL).

Figure 17: Unconditional Beta convergence in the EU28 by periods, 2000-2017

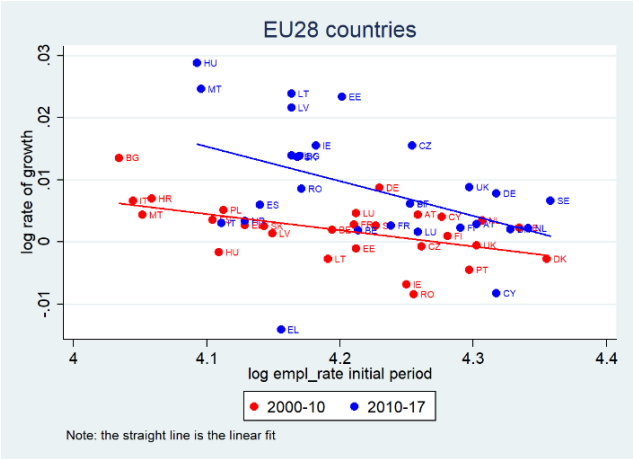
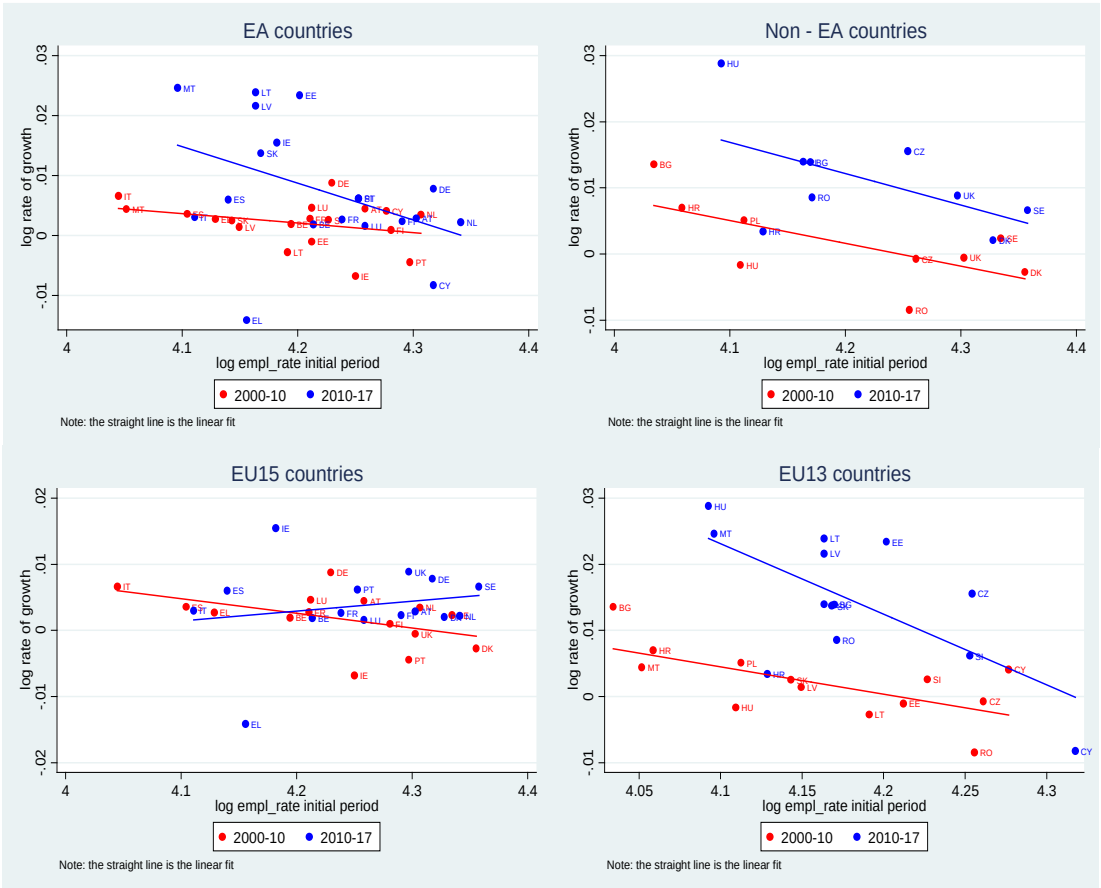


Figure 18: Unconditional Beta convergence by groups of countries and periods, 2000-2017



Regional Convergence

Sigma convergence

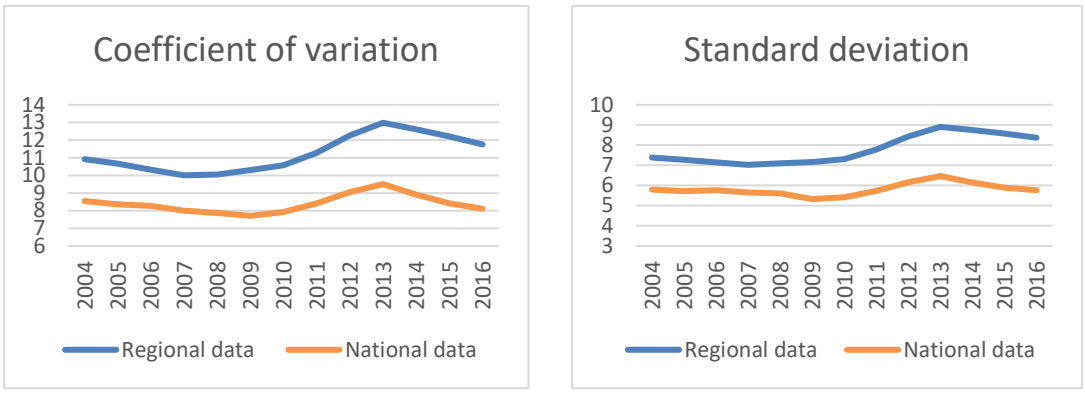
In general, **variation in employment rates is higher among EU regions than among EU countries** (this holds true when using either the standard deviation or the coefficient of variation). Moreover, the patterns of convergence are slightly different whether considering regional or national data. In particular, the main differences are the following:

at regional level divergence among EU28 regions is observed during the period 2007-2013;

the divergence pattern triggered by the economic and financial crisis is more pronounced and starts earlier at regional level compared to the national level (2009);

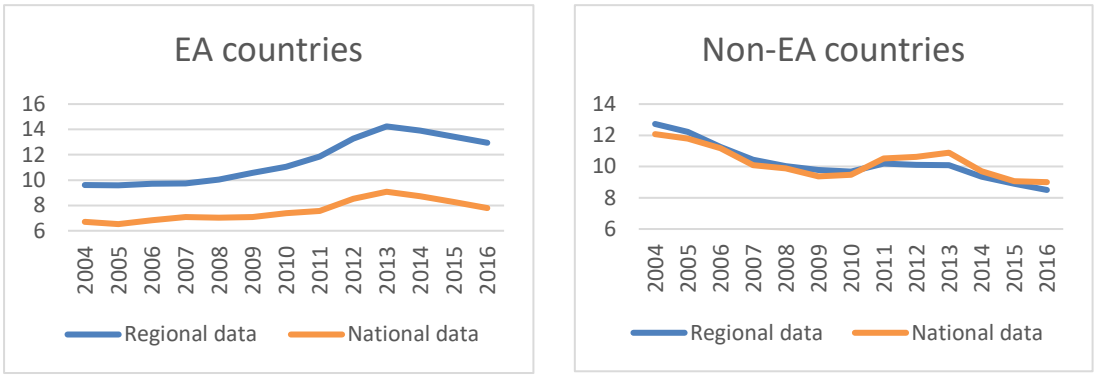
the convergence process initiated in 2013 is less pronounced at regional level compared to the national level.

Figure 19: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Concerning the **Euro and Non-Euro area**, some difference emerge. In particular, in the Non-Euro area variation registered at regional level are similar to variation registered at national level. Whereas, in the Eurozone regional disparities are higher than national disparities and tend to enlarge since the beginning of the economic and financial crisis.

Figure 20: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016

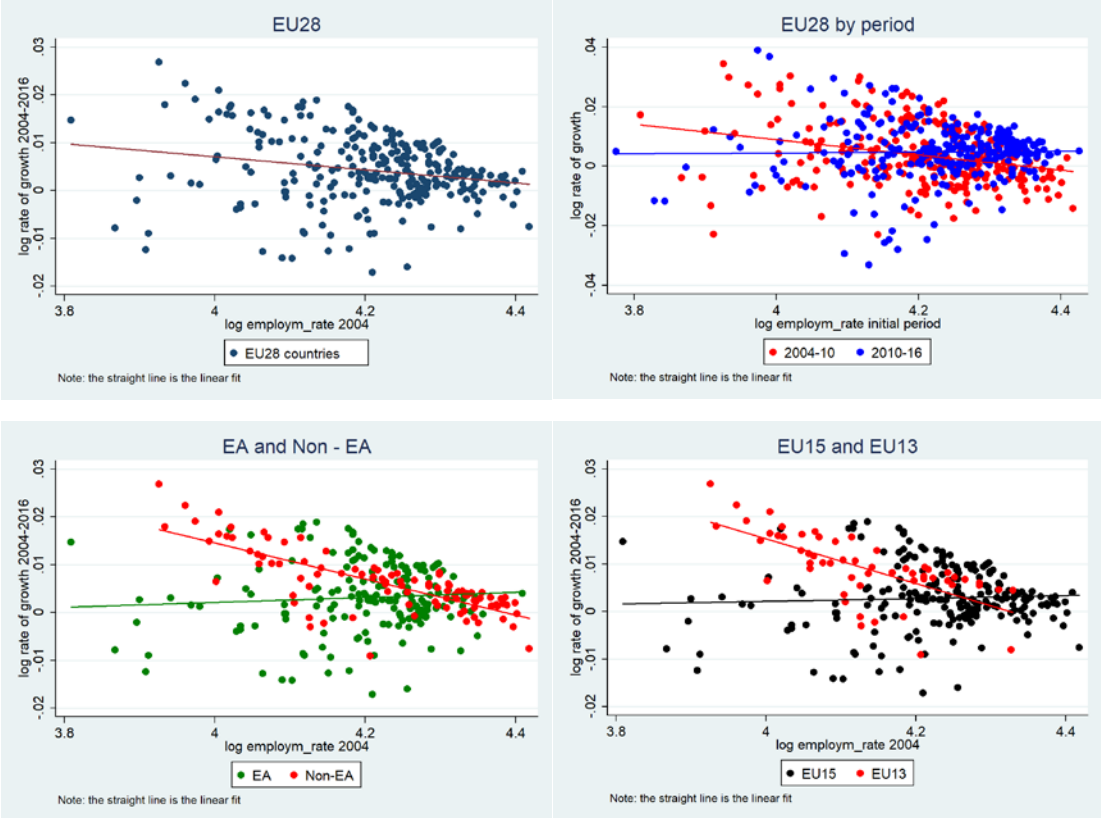


Unconditional Beta convergence

The analysis of Beta convergence shows a **converging pattern of employment rates among EU regions during the period 2004-2016** (at 1% a year). However, the convergence process is only evident in the period 2004-2010.

The investigation by groups of countries reveals a different pattern of convergence among regions of **EA and of Non-EA countries** during the period 2004-2016, as well as when distinguishing by old and new Member States. In particular, the convergence pace is higher among regions of new MSs and Non-EA countries, while no convergence is detected among regions of EU15 countries and in the Eurozone.

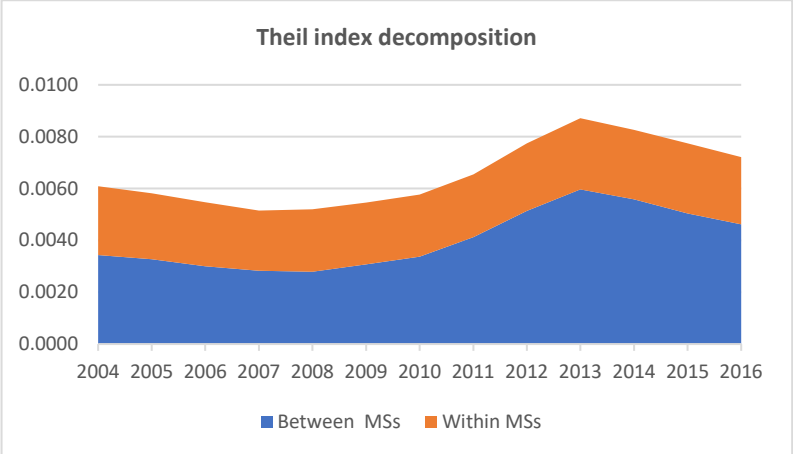
Figure 21: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



Theil index

The Theil index (another measure of sigma convergence) shows an increase of variation among EU28 regions between 2004 and 2016. The increase is essentially determined by an increase of variation in employment rates between MSs rather than an increase of variation among regions within MSs. It has to be noted that also differences within countries increase, but to a lesser extent.

Figure 22: Theil index decomposition, 2004-2016



3. Weekly hours of work

Definition: Average number of actual weekly hours of work in the main job of employed persons (both employees and self-employed).

Data source: Eurostat – LFS [lfsa_ewhais]

Time: 2000-2017

The **analysis of upward convergence** of the average weekly hours of works shows a weak downward convergence pattern in the EU in the period 2000-2017: the average weekly hours of work in the EU28 register a steady reduction, as well as the variation among countries. Similar pattern emerges in the Euro and Non-Euro areas, although differences in working hours are higher outside the Eurozone.

Sigma convergence, as measured by the **coefficient of variation**, shows differences in convergence patterns for different groups of workers. In particular, the convergence process in hours worked among MSs is stronger when considering only full time dependent employment. This implies that persist a significant variation among countries in terms of part-time work. As regards gender, differences among MSs in weekly hours worked in total employment are very high for women compared to men, due to the high incidence of part-time among women in some countries. However, when considering only full-time employees differences among countries registered for women reduce significantly.

Delta convergence shows also an overall reduction between 2000 and 2017 of the distance with respect to the country with the highest weekly hours, which results to be Greece.

The analysis of the **unconditional beta convergence** over the period 2000-2017 shows a pattern of convergence in the EU28 at 2% a year, although the analysis by sub-period register a convergence process only in the 2000-2010 period; in particular among EU13 countries, which converge at a high speed.

(Downward) convergence

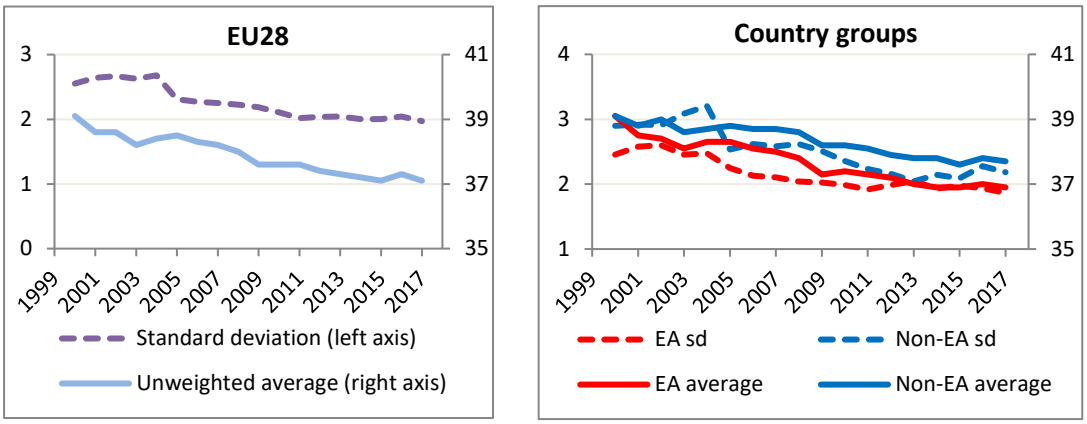
During the 2000-2017 period, the average weekly hours of work in the EU28 registered a steady reduction: on average, in the EU28 the hours of work per week decreased from 38.6 to 37.1. Moreover, also the variation (standard deviation) among Member States decreased. Therefore, if considering desirable an increase in the working hours[2], a case of **weak downward convergence** can be detected. The convergence process is weak since in the Netherlands the hours of work did not decreased.

Looking at **sub-periods** no different patterns emerge, despite some oscillations.

[2] It is normatively unclear how to interpret this result as a reduction in working hours doesn't necessarily indicate deterioration in labour market performance, especially when associated with increasing employment rates.

For the **Euro and Non-Euro area** similar patterns emerge in the averages, although the decrease in working hours is more pronounced in the Euro area. Instead, some differences emerge in terms of variation.

Figure 23: Weekly hours of work (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017

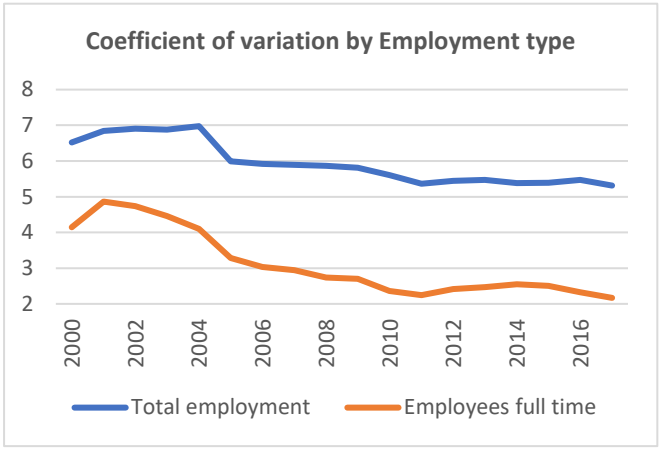


At the country level **interesting trajectories** can be observed. For example, a number of countries (Belgium, Denmark, Finland, Sweden, the Netherlands, the UK) with lower working hours in 2000 converged towards the EU average. Whereas, other countries (e.g. the Czech Republic, Hungary, Latvia, Slovakia, Slovenia) above EU average but converged with the EU overall in the observed time span.

Sigma convergence by type of employment and by gender

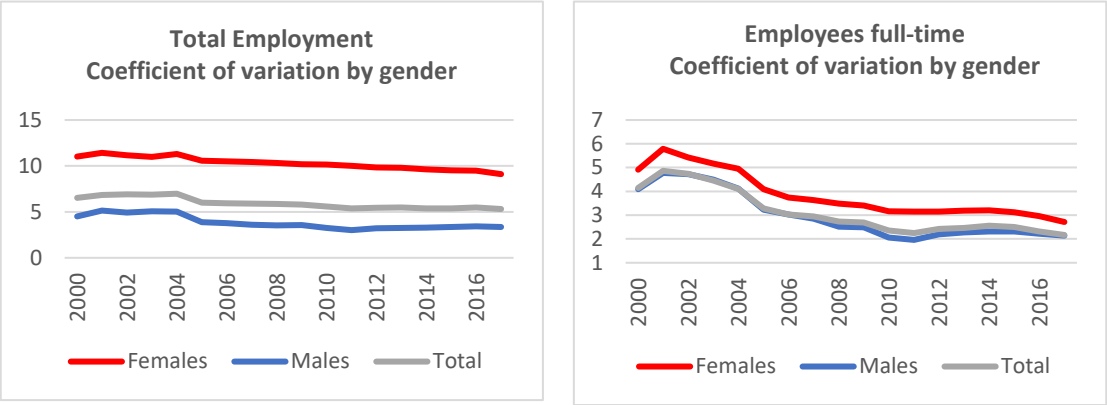
In this section we use the coefficient of variation to measure convergence among EU MSs in the average weekly hours of work by type of employment and by gender. As regards the **type of work**, figure 24 shows that the convergence process in hours worked among MSs is stronger when considering only full time dependent employment. This implies that persist significant differences among countries in terms of part-time work.

Figure 24: Sigma convergence in the EU28 by type of work, 2000-2017



When analysing sigma convergence by gender it emerges that disparities among EU countries in the average weekly hours worked are higher for women than for men. This is in part due to the high incidence of part-time among women in some countries. In fact, when considering only full-time employees, variation among countries in the hours worked by women reduces as well as the gap with respect to men.

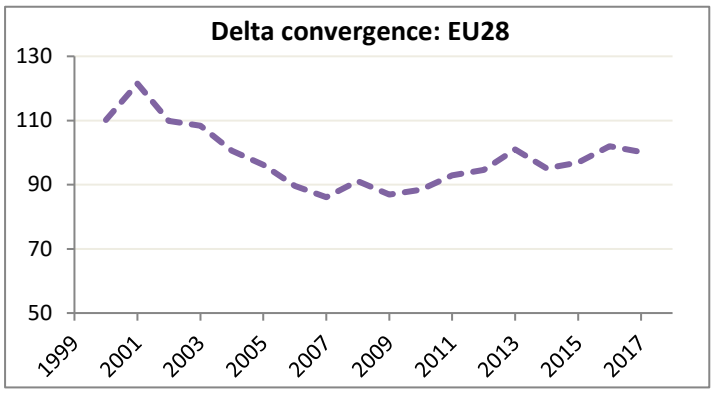
Figure 25: Sigma convergence in the EU28 by gender and type of work, 2000-2017



Delta convergence

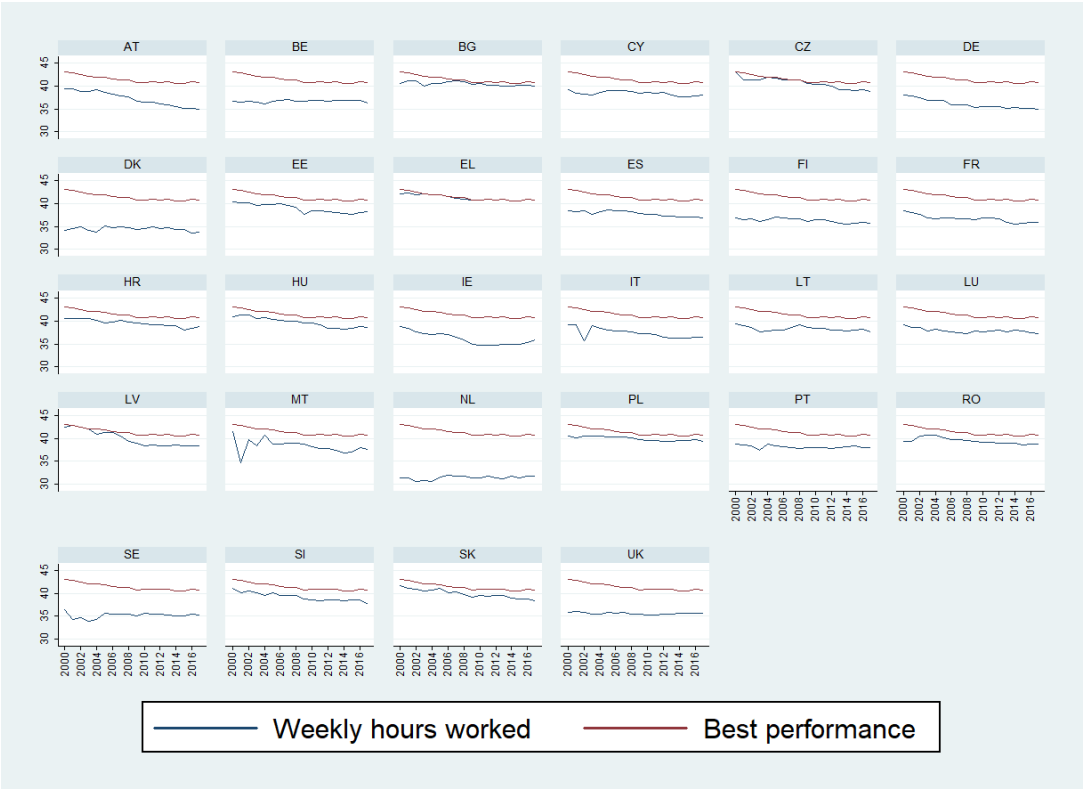
The analysis of delta convergence in the average weekly hours of works show an overall reduction between 2000 and 2017 of the distance with respect to the country with the highest weekly hours (Greece). However, two sub-periods showing different trends can be identified. A first period (2001-2007) in which a strong reduction took place, and a second period (2007-2017) in which the disparities increased constantly.

Figure 26: Delta convergence in the EU28, 2000-2017



Over the period 2000-2017 the country with the highest weekly hours is, with some exceptions, Greece. Instead, the country with the lowest average weekly hours worked is the Netherlands, due to the high incidence of part-time work among women (above 70% for women aged 20-64). Although with a declining trend in the average number of hours worked, most of the MSs maintained a constant gap over the period. Moreover, figure 27 shows that, beside Greece, Eastern countries are characterised by high working hours; whereas Scandinavian and Anglo-Saxon countries, as well as France and Germany present lower levels of working hours.

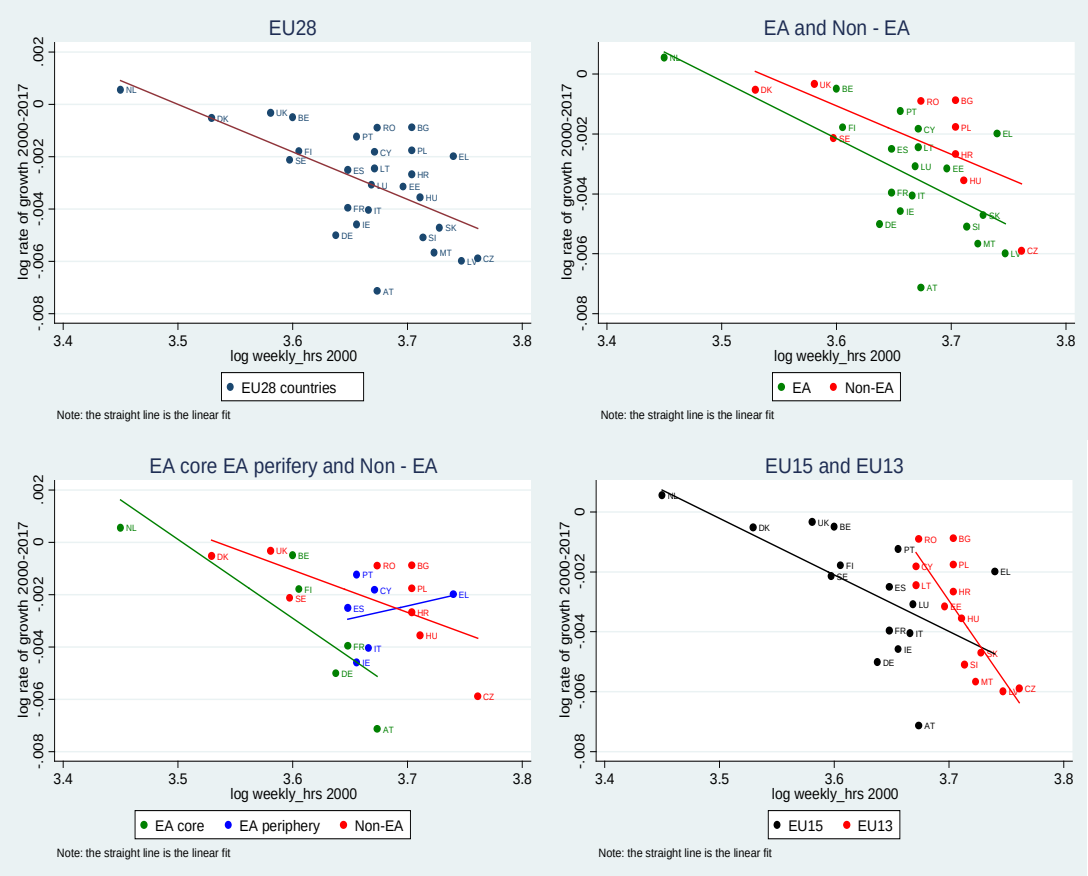
Figure 27: Average weekly hours of work of EU28 MSs *versus* Best performance line, 2000-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2000-2017** shows a pattern of convergence in the EU28 at 2% a year: countries with the highest working hours at the beginning of the period present the highest reductions. The pace of convergence is similar across the different country groupings.

Figure 28: Unconditional Beta convergence by groups of countries, 2000-2017



The analysis of unconditional beta convergence by sub-periods shows that a significant convergence process is only evident in the 2000-2010 period. In particular among EU13 countries, which converge at a rate of 8% a year.

Figure 29: Unconditional Beta convergence in the EU28 by periods, 2000-2017

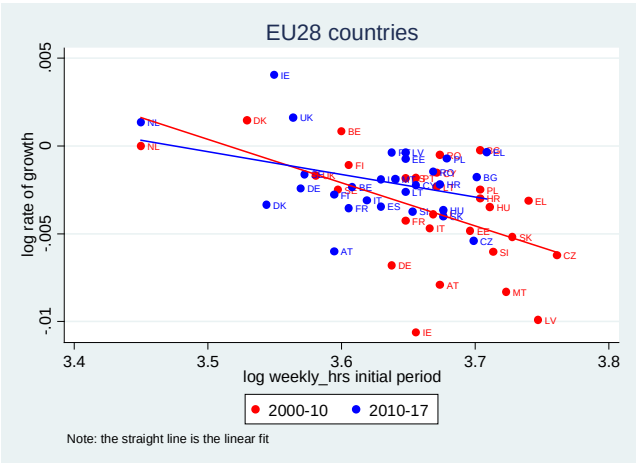
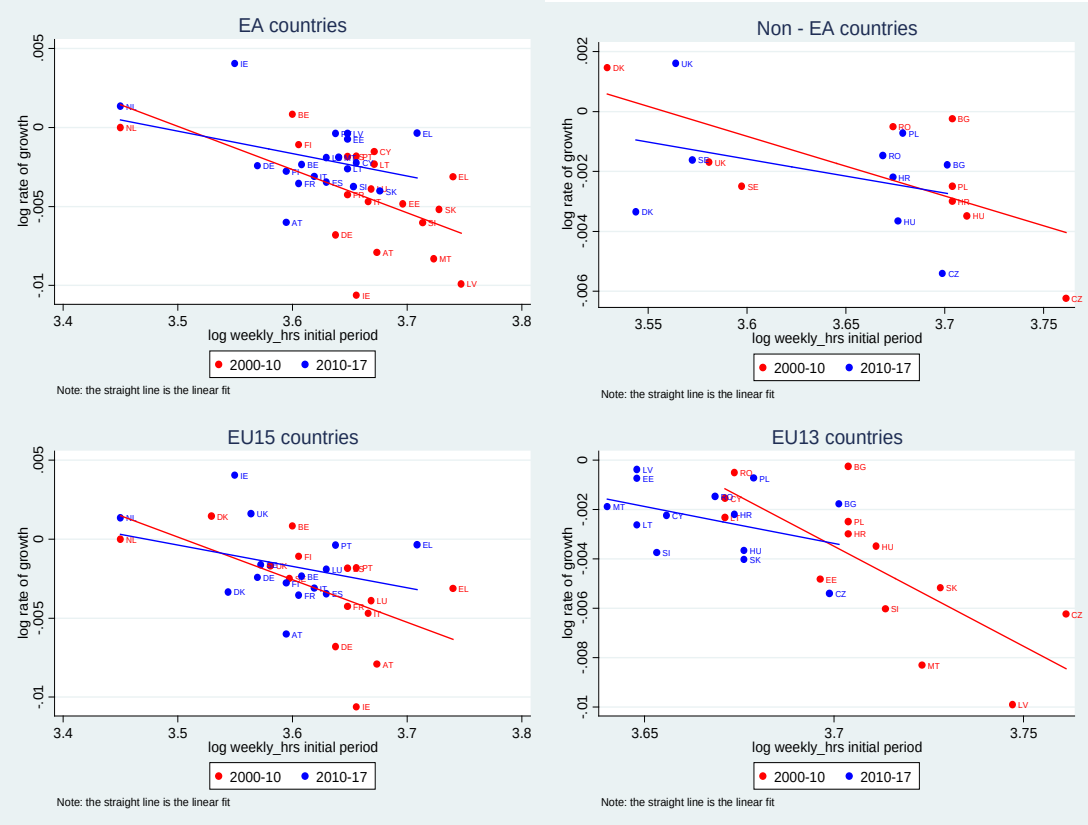


Figure 30: Unconditional Beta convergence by groups of countries and periods, 2000-2017



4. Young people not in employment or in education and training (NEETs rate)

Definition: Young people aged 15-24 not in employment or in education and training as a percentage of the of population of the same age.

Data source: Eurostat – LFS [edat_lfse_20]

Time: 2002-2017

The **analysis of upward convergence** of the NEETS rates in the EU28 shows a weak upward convergence process among the EU countries in the period 2000-2017, as a result of a clear upward convergence process in the period 2002-2008 interrupted by the economic and financial crisis, when downward divergence trend is observed (2008-2013), characterised by an increase in the average NEETs rate and an increase in the variation among MSs. During the following recovery period (2013-2017) an upward convergence process started again. For the Euro and Non-Euro area developments were rather similar, apart from the fact that in the Euro area MSs begun earlier than countries belonging to the Non-euro area

Sigma convergence (coefficient of variation) shows that males and females present similar trends in the convergence process of NEETS rates during the observed period.

Delta convergence shows also an overall reduction between 2002 and 2017 of the distance in the NEETs rate with respect to the best performing country.

The analysis of the **unconditional Beta convergence** over the period 2002-2017 shows a convergence process in the EU28: countries with higher NEETs rates presenting larger reductions during the period. The convergence process is observed both among countries of the Eurozone and among countries outside the Eurozone. While if distinguishing between EU15 and EU13 countries, a catching-up process in NEETs rates is evident only among EU13 countries.

At regional level, sigma convergence shows that while the economic crisis interrupted the convergence path both at the regional and national level, in the first case the effects were stronger and lasted longer. In particular, among regions of the Euro area countries a clear divergence process is evident over the whole period; while Non-EA regions registered convergence until 2009 and then divergence. Moreover, in the Non-Euro area variation among regions are similar to those registered among countries. Looking at **unconditional Beta convergence** among regions, the analysis shows converging pattern of NEETS rates among EU regions during the period 2004-2016 (at 2% a year), although the pace of convergence is higher in the period 2004-2010. The investigation by groups of countries reveals different pace of convergence among regions. In particular: no catching-up process emerge in the Eurozone or in the EU13, whereas a convergence process is observed among regions outside the Eurozone and in the EU15. Finally, the **Theil index** shows an increase of variation in NEETs rates among EU28 regions between 2004 and 2016. The increase is mainly determined by increased difference between countries in the

2009-2015 period. However, although to a lesser extent, also differences among regions within MSs are increasing, in particular since 2014 onwards.

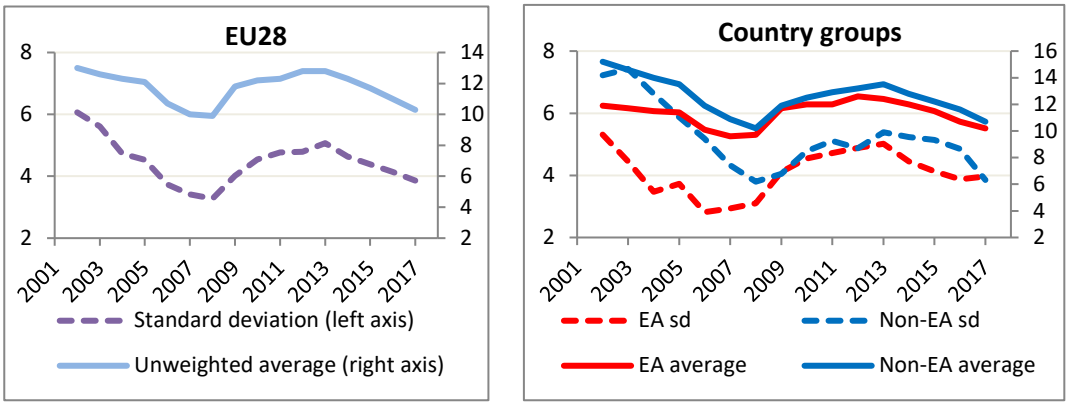
Upward convergence

During the 2002-2017 period, the NEETs rate in the EU28 registered a **weak upward convergence process**: on average the NEETs rate decreased from 13% to 10.3% in the EU28 and the variation among Member States decreased as well. The convergence process is weak since in several countries the rate increased over the period considered. The highest increase being recorded by Cyprus (+7.7 pp) and Italy (+3.3 pp).

Different patterns emerge when looking at **sub-periods**. In fact, the upward convergence process registered by the NEETs rate in the EU28 was interrupted by the economic and financial crisis: from 2008 to 2013 a downward divergence trend is observed, characterised by an increase in the average NEETs rate and an increase in the variation among MSs.

For the **Euro and Non-Euro area** developments were rather similar, apart from the fact that in the Euro area MSs begun to diverge in 2006, two years earlier than countries belonging to the Non-euro area.

Figure 31: NEETs rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2002-2017

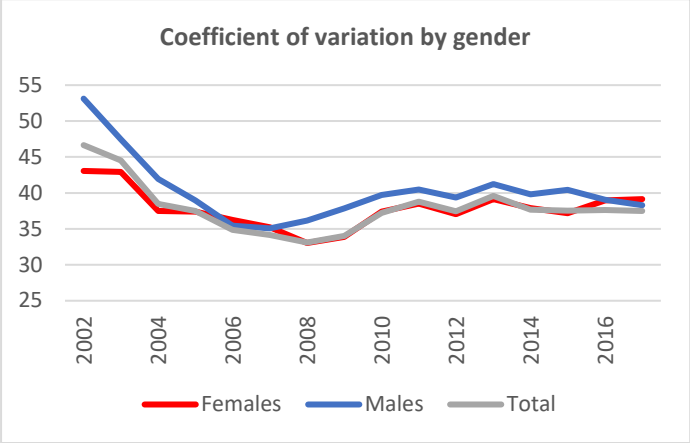


At the country level interesting trajectories can be observed. In particular, during the initial period and until the onset of the crisis in 2008 several Member States considerably caught up with the EU average by reducing their NEETs rate at a faster pace (e.g. Bulgaria, Slovakia, Romania and Croatia). Italy instead diverged from the EU average already between 2003 and 2005. If during the economic crisis the situation deteriorated in several countries, other countries such as Austria, Germany, Sweden and Luxembourg performed better than the EU overall by reducing their NEETS rate.

Sigma convergence by gender

In this section we use the coefficient of variation to measure convergence by demographic groups. Both **males and females** present similar trends in the convergence process of NEETS rates during the observed period. Differences measured by the coefficient of variation strongly reduce in the years before the economic and financial crisis, then steadily increase from 2009 onwards, although not reaching the initial levels.

Figure 32: Sigma convergence in the EU28 by gender, 2002-2017



Delta convergence

The analysis of delta convergence shows also **an overall reduction between 2002 and 2017 of the distance in the NEETs rate with respect to the best performing country**. Despite some oscillations, on average European countries converge towards the NEETs rates of the best performer, especially in the years before the crisis burst.

Figure 33: Delta convergence in the EU28, 2002-2017

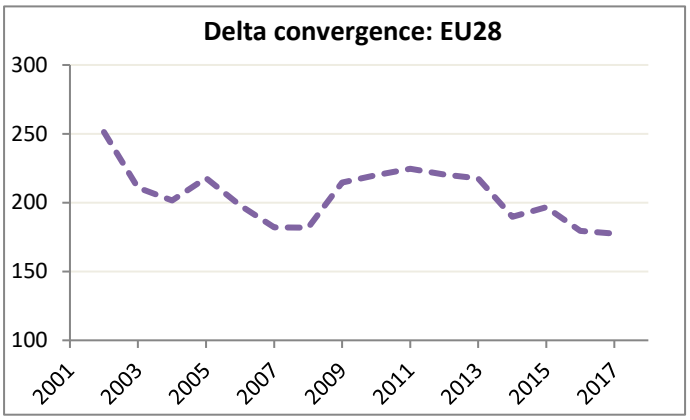
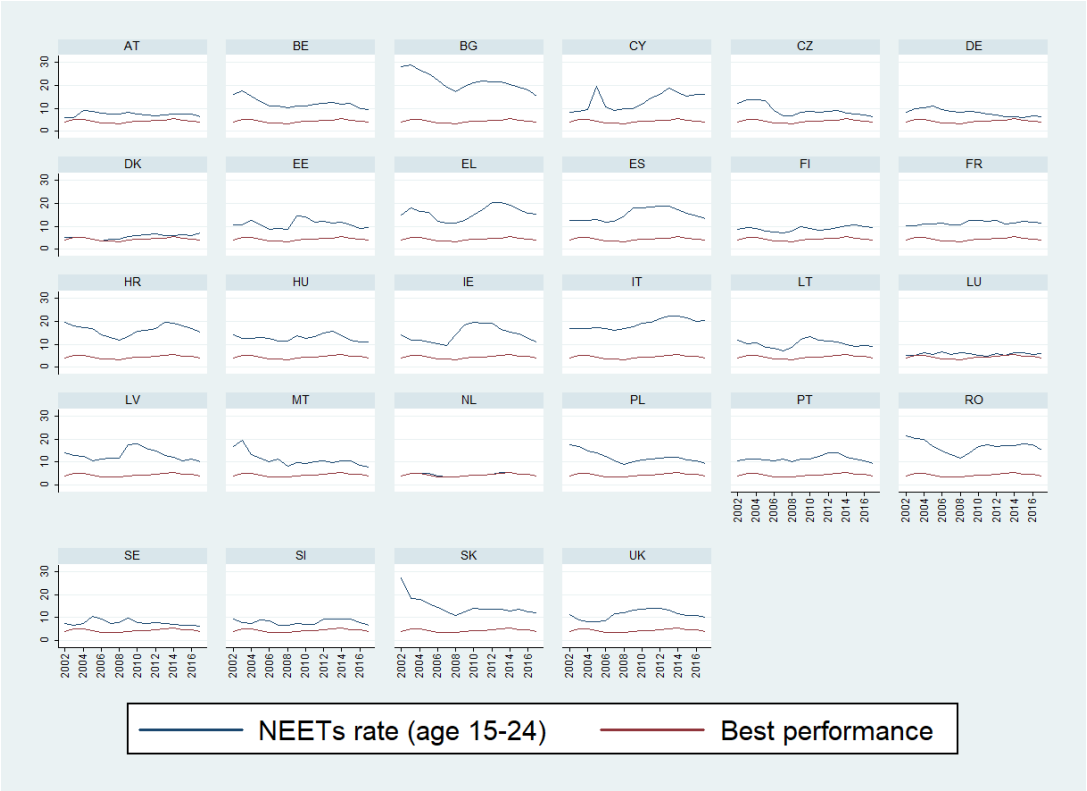


Figure 34 shows that the best performing country over the period 2002-2017 are the Netherlands, together with Denmark and Luxemburg which present similar rates (around 4-5%). During the observed period many countries showing very high initial levels reduced the gap with the best performing countries; these are: Belgium, Bulgaria, the Czech Republic, Malta, Poland, Romania and Slovakia. On the contrary, Cyprus and Italy have experienced an increase in the gap.

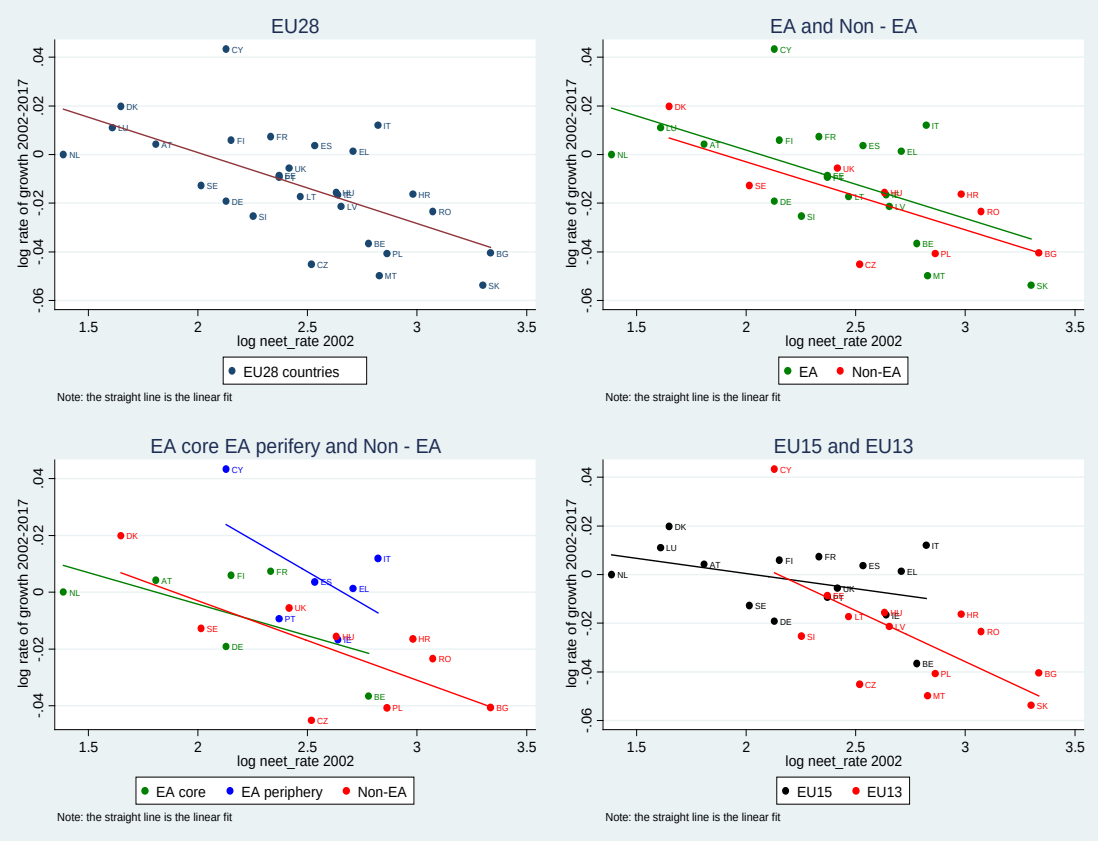
Figure 34: NEETs rate of EU28 MSs *versus* Best performance line, 2002-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2002-2017** shows a convergence process in the EU28: countries with higher NEETs rates presenting larger reductions during the period. The convergence process is observed both among countries of the Eurozone and among countries outside the Eurozone, with a pace of convergence of 3% a year. While if distinguishing between EU15 and EU13 countries, a catching-up process in NEETs rates is evident only among EU13 countries.

Figure 35: Unconditional Beta convergence by groups of countries, 2002-2017



Among the EU28 countries convergence took place **both in the 2002-2010 period and in the 2010-2017 period**, although the pace of convergence was slightly higher in the first period (4% versus 3% a year). Differences emerge when considering different groups of countries. In particular, after 2010 the convergence process is only evident in the Euro area and among EU15 countries. Instead, in the previous period- 2002-2010- the convergence process is observed in all groups of countries considered (except the EU15) and is particularly strong among EU13 countries (7% a year).

Figure 36: Unconditional Beta convergence in the EU28 by periods, 2002-2017

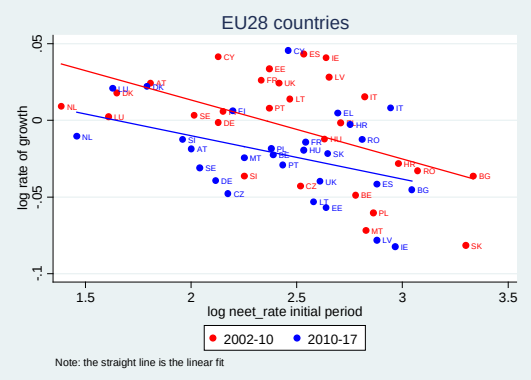
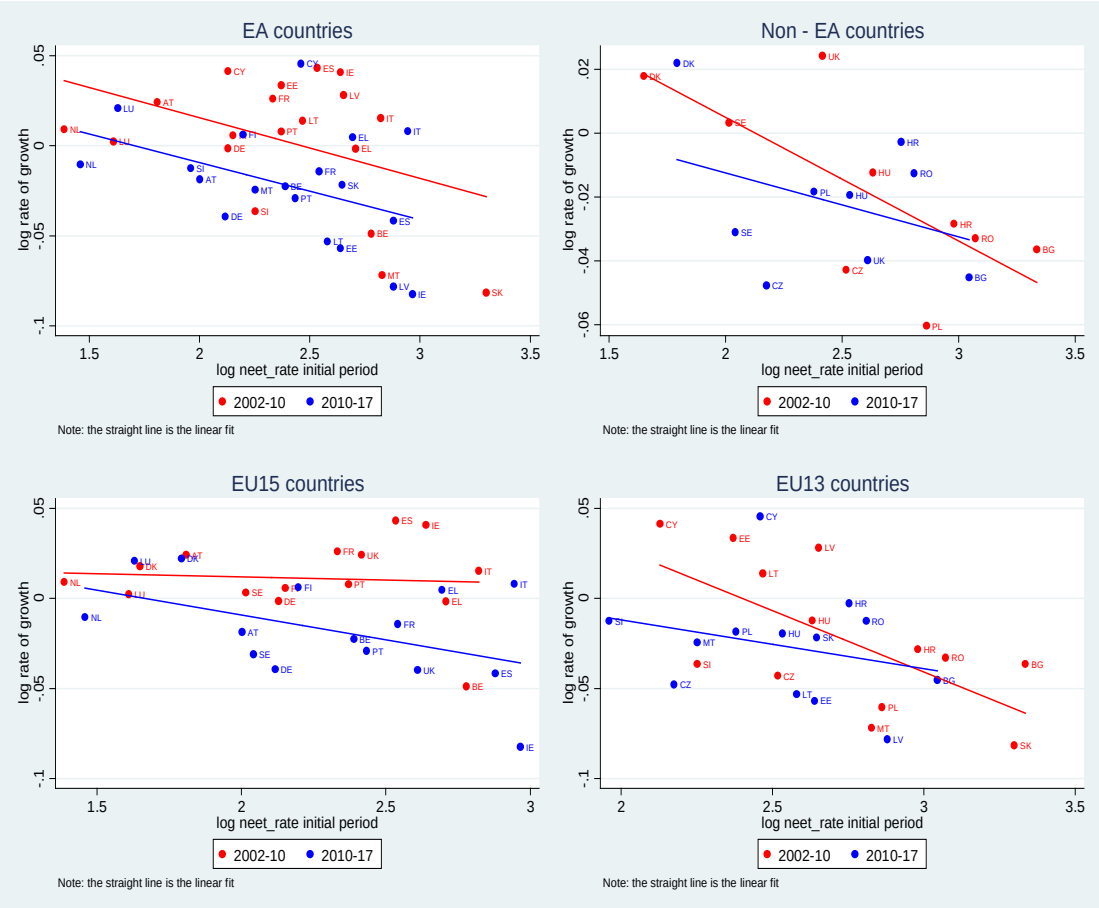


Figure 37: Unconditional Beta convergence by groups of countries and periods, 2002-2017



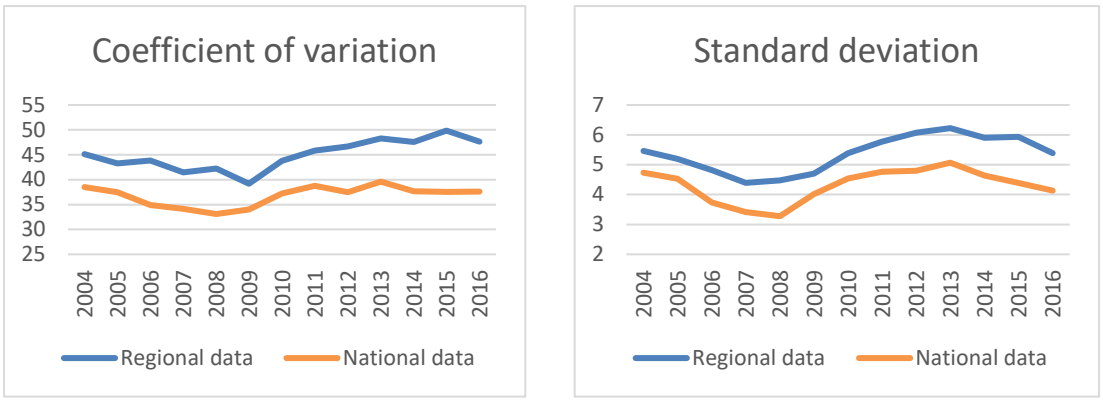
Regional Convergence

Sigma convergence

In general, **variation in NEETs rates is higher among EU regions than among EU countries** (this holds true when using either the standard deviation or the coefficient of variation). Moreover, the patterns of convergence are slightly different whether considering regional or national data. In particular, the main differences are the following:

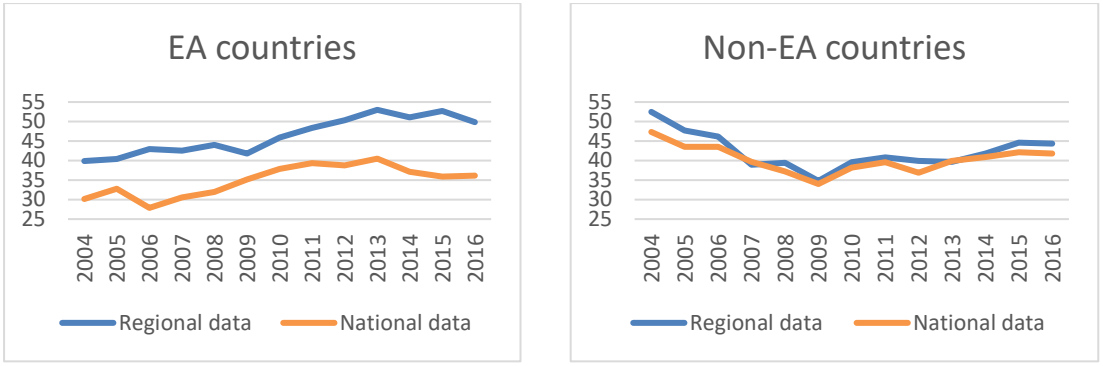
- convergence was progressing since 2004 both at regional and national level, although it was more pronounced in the first case;
- due to the economic and financial crisis, a divergence pattern started since 2009 and was more pronounced between regions than between countries.

Figure 38: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Concerning the **Euro and Non-Euro area**, the main differences in convergence patterns of NEETs rates between EU countries and EU regions are observed in the Euro area (figure 39). In particular, among regions of the Euro area countries a clear divergence process is evident over the whole period; while Non-EA regions registered convergence until 2009 and then divergence. Moreover, in the Non-Euro area disparities among regions are similar to those registered among countries.

Figure 39: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016

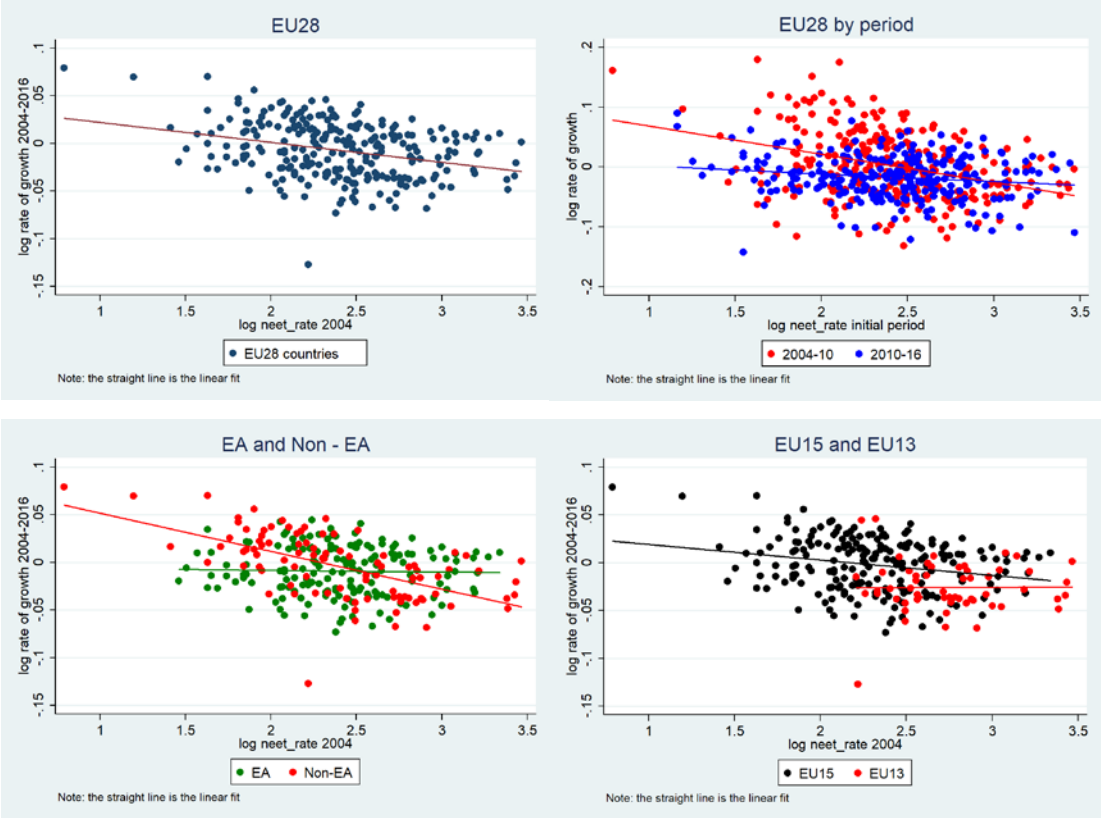


Unconditional Beta convergence

The analysis of Beta convergence shows a **converging pattern of NEETS rates among EU regions during the period 2004-2016** (at 2% a year), although the pace of convergence is higher in the period 2004-2010.

The investigation by **groups of countries** reveals different pace of convergence among regions. In particular: no catching-up process emerge in the Eurozone or in the EU13, whereas a convergence process is observed among regions outside the Eurozone and in the EU15.

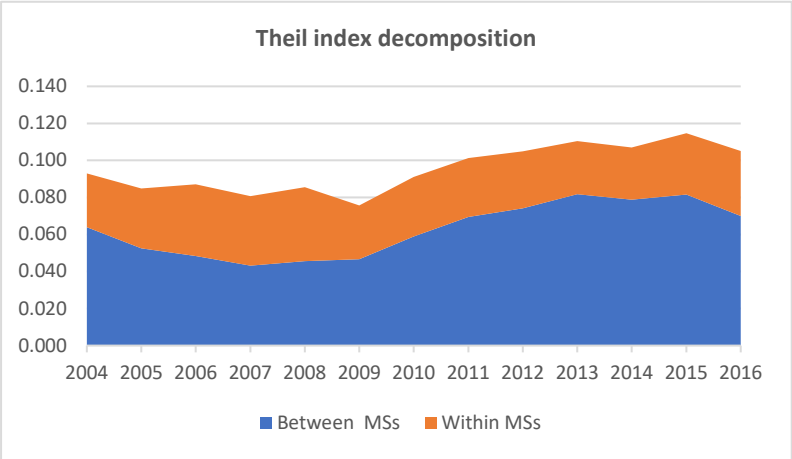
Figure 40: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



Theil index

The Theil index (another measure of sigma convergence) confirms an increase of disparities in NEETs rates among EU28 regions between 2004 and 2016. The increase is mainly determined by increased differences between countries in the 2009-2015 period. However, although to a lesser extent, also differences among regions within MSs are increasing, in particular since 2014 onwards.

Figure 41: Theil index decomposition, 2004-2016



5. Unemployment rate

Definition: Number of people aged 15 to 74 unemployed as a percentage of the labour force of the same age.

Data source: Eurostat – LFS [lfsa_urgan]

Time: 2000-2017

The **analysis of upward convergence** of the unemployment rates in the EU28 shows a weak upward convergence process among the EU countries in the period 2000-2017, as a result of a clear upward convergence process in the period 2000-2008 interrupted by the economic and financial crisis, when a downward divergence occurred with an increase in the average unemployment rate and in the variation among MSs from 2008 to 2013.

The economic and financial crisis has reversed the order of the magnitude of the differences: before the crisis distance among countries were larger in the Non-Eurozone, whereas after 2007 the distance became larger in the Eurozone.

Sigma convergence (coefficient of variation) shows differences in convergence patterns at EU level for man and women in the aftermath of the crisis: for men there is a high increase of variation during the main years of the crisis (2008-2011), then from 2012 a slight convergence. On the contrary, for women the economic and financial crisis set the beginning of a constant divergence process. For adults aged 25-54 and people with high educational levels the divergence process among EU countries initiated in 2008 is more marked compared to the youngster unemployed and those with a low educational level (which instead show a constant decline in variabilities).

Delta convergence shows also an overall reduction between 2000 and 2017 of the distance in the unemployment rates with respect to the best performing country, especially in the years before the crisis burst.

The analysis of the **unconditional Beta convergence** over the period 2000-2017 shows a convergence process in the EU28: countries with higher unemployment rates presenting larger reductions during the period. The convergence process is observed both among countries of the Eurozone and among Non-Euro countries and among new accession countries (both of them present a higher pace of convergence). Convergence in unemployment rates is also observed among core countries of the Eurozone.

At regional level, sigma convergence shows that before the crisis the convergence pattern was more pronounced and lasted longer among countries than among regions; conversely, the divergence pattern triggered by the economic and financial crisis was more pronounced and lasted longer at regional level. Differently from the Euro-area, in the Non-Euro area patterns of convergence\divergence and levels of dispersions are similar either considering countries or regions.

The analysis of regional **unconditional Beta convergence** shows a converging pattern of unemployment rates among EU regions during the period 2004-2016, although a catching-up process is evident only in the 2004-2010 period. The rate of convergence is higher in the Non-Euro area and in the EU13. Finally, the **Theil index** shows an increase of

differences among regions essentially determined by an increase of variation in unemployment rates between MSs rather than among regions within MSs. In fact, variation within countries tend to decrease over the period considered, especially since 2009.

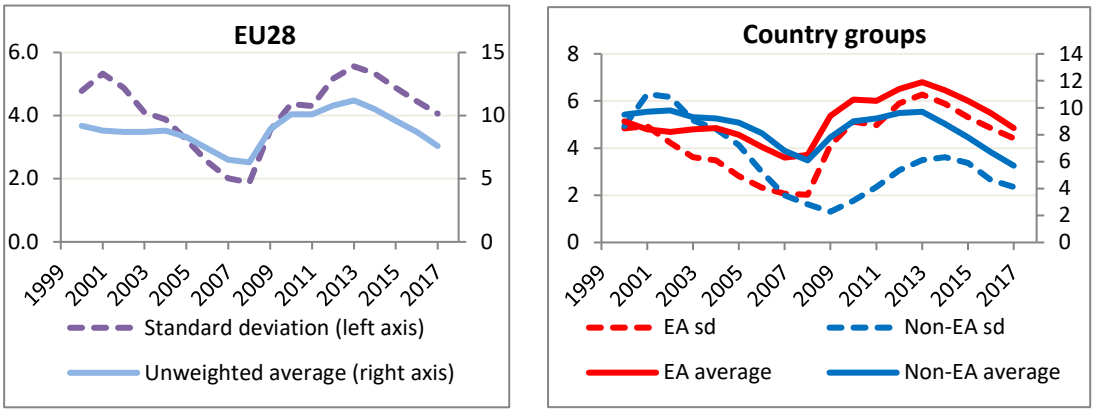
Upward convergence

During the 2000-2017 period, the unemployment rate in the EU28 registered a **weak upward convergence process**: on average the unemployment rate decreased from 8.8% to 7.6% in the EU28 and the variation among Member States decreased. The convergence process is weak since in many countries the unemployment rate increased over the period considered. Particularly high the increase registered by Greece (10 pp), Cyprus and Bulgaria (over 5 pp).

Different patterns emerge when looking at **sub-periods**. In fact, the upward convergence process registered by the unemployment rate in the EU28 was interrupted by the economic and financial crisis: from 2008 to 2013 a downward divergence trend is observed, characterised by an increase in the average unemployment rate and an increase in the variation among MSs.

For the **Euro and Non-Euro area** similar patterns of the average unemployment rates were observed during the period. However, some evidences are worth to be noted. First, since the beginning of the crisis the average unemployment rate of the Eurozone surpassed that of the Non-Eurozone and the gap increased over time, being around 3 pp in 2017. Second, the economic and financial crisis has also reversed the order of the magnitude of the disparities: before the crisis variation among countries were larger in the Non-Eurozone, whereas after 2007 the variation became larger in the Eurozone.

Figure 42: Unemployment rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017



At the country level interesting trajectories can be observed. For example, Greece and Spain were strongly hit by the economic and financial crisis and the unemployment rate considerably increased, at least up to the 2013, when the recovery brought about a catching up process. In Ireland and the Baltic Republics there were a high increase in the unemployment rate just in the first years and then the rate returned to the average EU level.

Instead, in other countries characterised by high unemployment levels in 2000, such as Bulgaria, Poland and Slovakia, the upward convergence process of the unemployment rate was less influenced by the crisis.

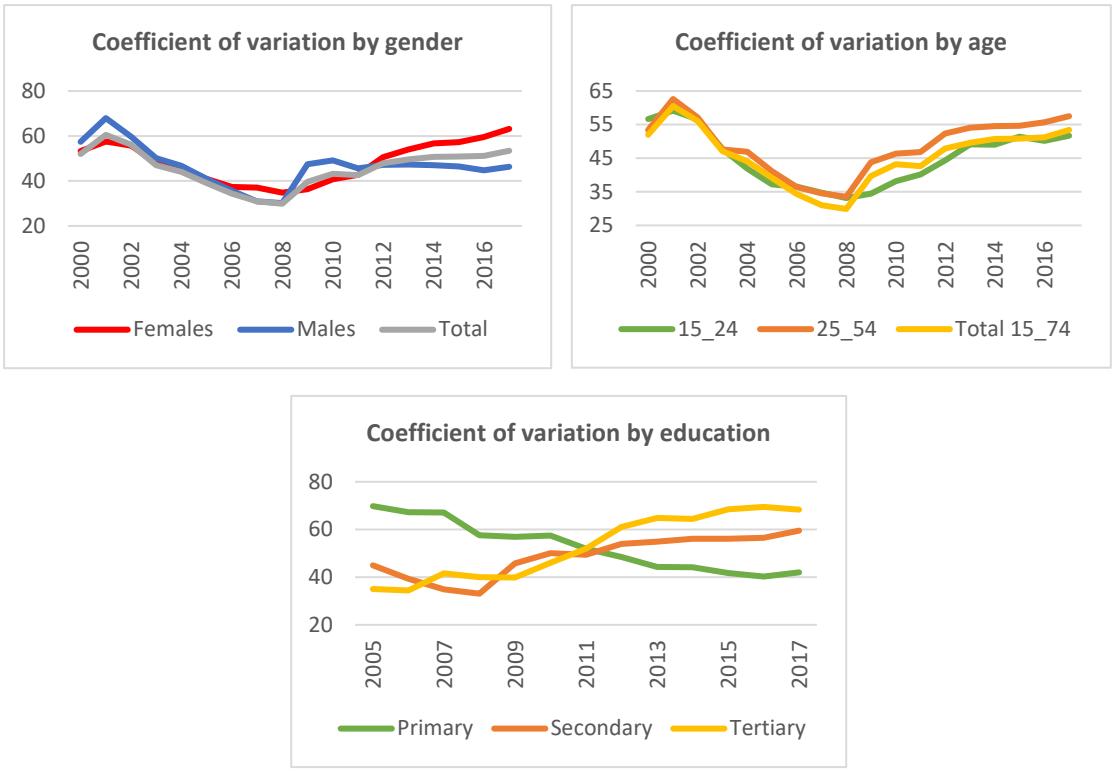
Sigma convergence by demographic groups

In this section we use the coefficient of variation to measure convergence by demographic groups. Both **males and females** present similar trends and a convergence process of unemployment rates until 2008, then they follow different trends. In particular, for men there is a high increase of variation among EU countries during the main years of the crisis (2008-2011), then from 2012 a slight convergence process takes place. On the contrary, for women the economic and financial crisis set the beginning of a constant divergence process in unemployment rates, which results in higher disparities in 2017 than in 2000.

When looking at the different component of **unemployment by age**, the divergence process among EU countries initiated in 2008 is more marked for adults aged 25-54 than for the youngsters.

As far regards **educational levels**, disparities in unemployment rates among EU countries constantly decline over the considered period only for workers with low educational attainment. Whereas, for workers having attained secondary or tertiary educational the divergence process triggered by the economic and financial crisis has increased disparities among EU countries.

Figure 43: Sigma convergence in the EU28 by demographic groups, 2000-2017



Delta convergence

The analysis of delta convergence shows also an overall reduction between 2000 and 2017 of the distance in the unemployment rate with respect to the best performing country. Despite some oscillations, on average European countries converge towards the unemployment rates of the best performer, especially in the years before the crisis burst.

Figure 44: Delta convergence in the EU28, 2000-2017

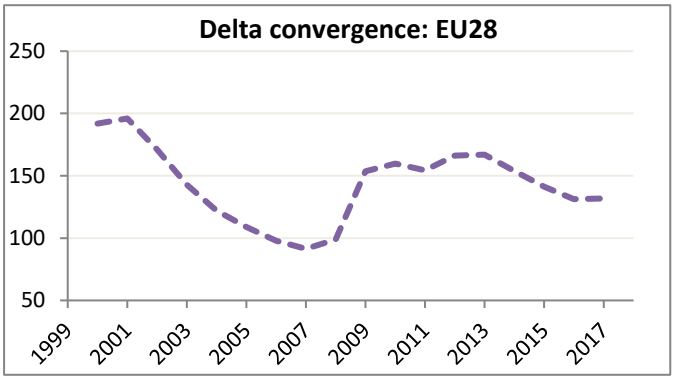


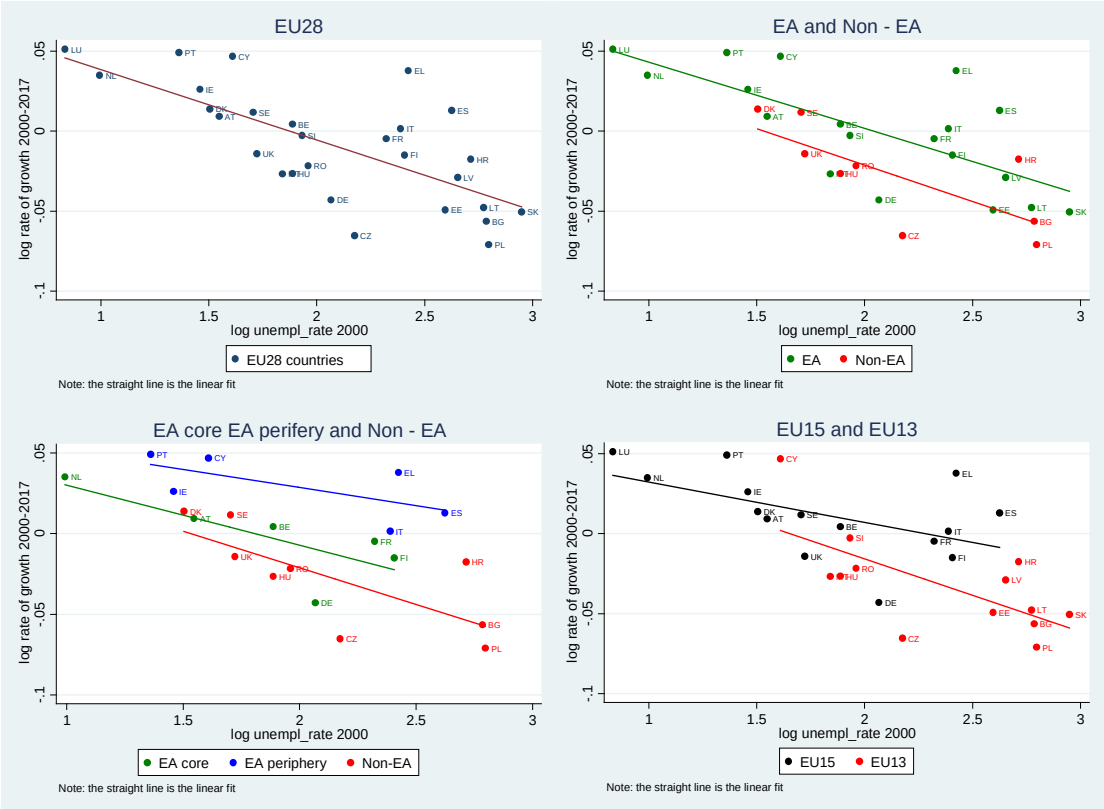
Figure 45 shows that the best performing countries over the period 2000-2017 are, with some exceptions, Central European countries: Luxemburg and the Netherlands in the period before the economic and financial crisis, then Austria and Germany. During the period under observation, Central European and Scandinavian countries, all of them present unemployment rates near those of the best performing countries, but also the UK, Malta, Slovenia and Romania. On the contrary, Mediterranean countries, present a high gap, especially since the beginning of the crisis.

Figure 45: Unemployment rate of EU28 MSs *versus* Best performance line, 2000-2017

Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2000-2017** shows a convergence process in the EU28: countries with higher unemployment rates presenting larger reductions during the period. The convergence process is observed both among countries of the Eurozone and among countries outside the Eurozone and among new accession countries (both of them present a higher pace of convergence- around 5% per year). Convergence in unemployment rates is also observed among core countries of the Eurozone.

Figure 46: Unconditional Beta convergence by groups of countries, 2000-2017



Among the EU28 countries the pace of convergence in the unemployment rate rates **is higher in the period following the launch of the EU 2020 Agenda** (7% per year) with respect to the previous period (2000-2010). In particular, after 2010 the convergence process is particularly strong in the Euro area. Whereas for the Non-Euro area the convergence rate was higher in the 2000-2010 period.

Differences in convergence patterns and rates are also evident when distinguishing between EU15 and EU13 countries. Among new accession countries the pace of convergence in unemployment rates is higher following the launch of the EU 2020 Agenda than in the previous years. While, for the EU15 countries a convergence process is observed only before 2010.

Figure 47: Unconditional Beta convergence in the EU28 by periods, 2000-2017

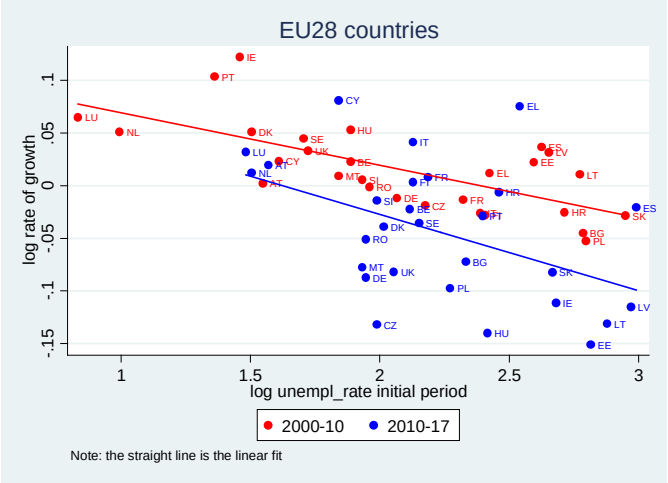
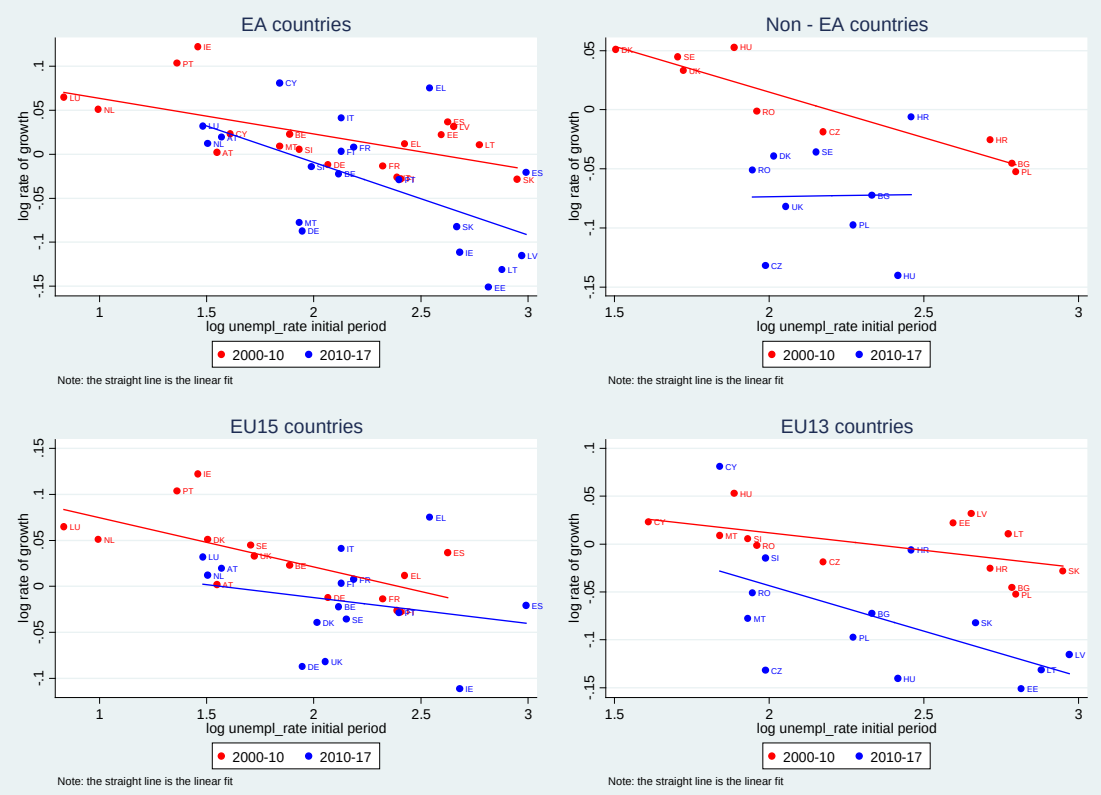


Figure 48: Unconditional Beta convergence by groups of countries and periods, 2000-2017



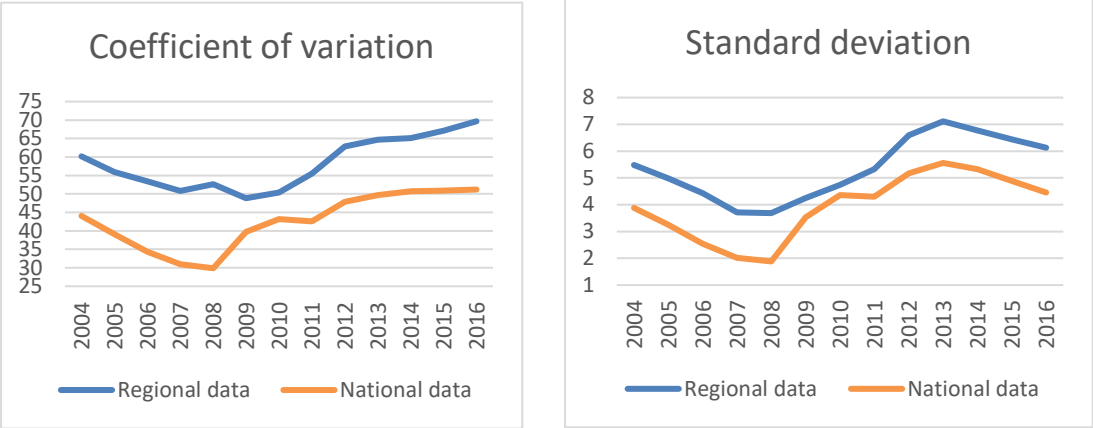
Regional Convergence

Sigma convergence

In general, **variation in unemployment rates is higher among EU regions than among EU countries** (this holds true when using either the standard deviation or the coefficient of variation). Moreover, the patterns of convergence are slightly different whether considering regional or national data. In particular:

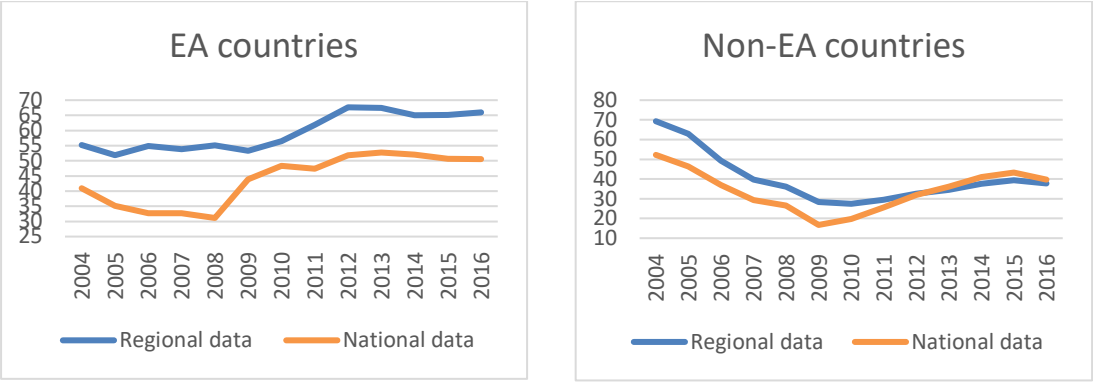
- although before the crisis convergence is observed both at regional and national level, the convergence pattern was more pronounced and lasted longer among countries;
- whereas, the divergence pattern triggered by the economic and financial crisis was more pronounced and lasted longer at regional level compared to the national one.

Figure 49: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Concerning the **Euro and Non-Euro area**, the main differences in convergence patterns of unemployment rates between countries and regions are observed in the Euro area (figure 50). Instead, in the Non-Euro area patterns of convergence\divergence and levels of dispersions are similar either considering countries or regions.

Figure 50: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016



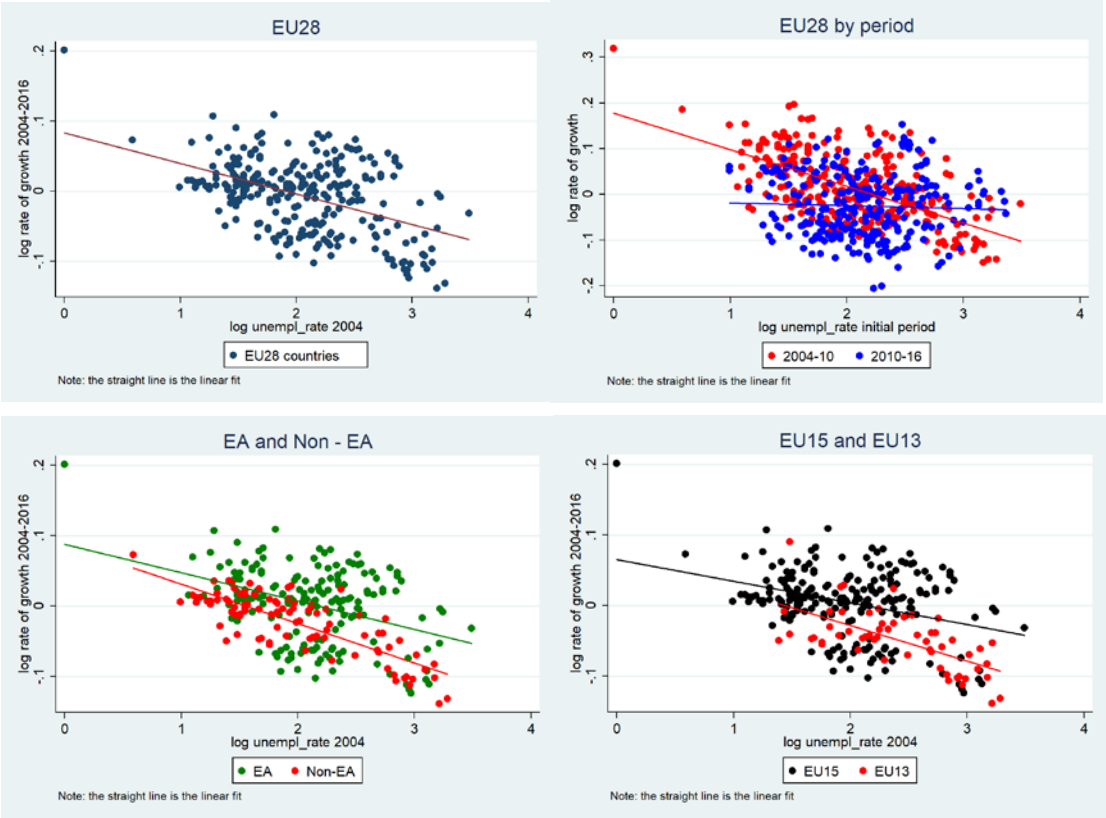
Unconditional Beta convergence

The analysis of Beta convergence shows a **converging pattern of unemployment rates among EU regions during the period 2004-2016** (at 4% a year). However, the convergence process is more evident in the period 2004-2010, while in the 2010-2016 period no catching-up process among regions emerges.

The investigation by groups of countries reveals a convergence process among regions both in the **Euro and in the Non-Euro area** during the period 2004-2016, with the latter showing a higher convergence pace. This difference is also evident when comparing regions belonging

to old (EU15) with respect to new Member States (EU13) which show a more rapid convergence.

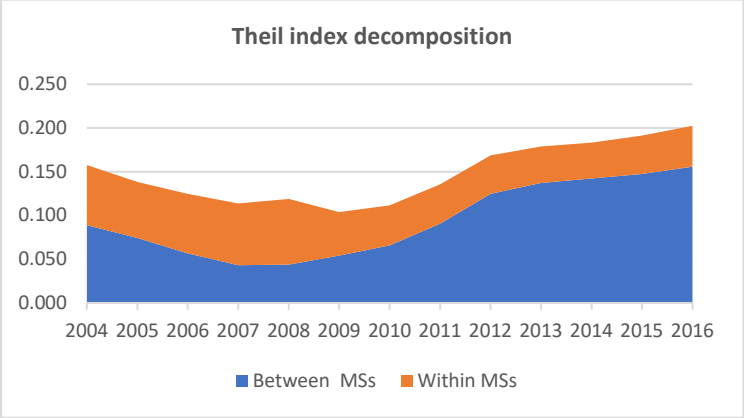
Figure 51: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



Theil index

The Theil index (another measure of sigma convergence) shows an increase of variation among EU28 regions between 2004 and 2016. The increase is essentially determined by an increase of disparities in unemployment rates between MSs rather than an increase of disparities among regions within MSs. In fact, disparities within countries tend to decrease over the period considered, especially since 2009.

Figure 52: Theil index decomposition, 2004-2016



6. Long-term unemployment rate

Definition: Number of people aged 15-74 who have been unemployed for 12 months or more, as a percentage of total unemployment.

Data source: Eurostat – LFS [lfsa_upgan]

Time: 2000-2017

The **analysis of upward convergence** of the long-term unemployment rates in the EU28 shows a weak upward convergence process among the EU countries in the period 2000-2017, as a result of a clear upward convergence process in the period 2000-2008 interrupted by the economic and financial crisis, when a downward divergence occurred from to 2009 to 2014 with increasing long-term unemployment rates and increasing variation across EU countries. Non-Euro area countries showed upward convergence with a significant reduction of overall dispersion and of the average level of long-term unemployment rate whereas the Eurozone registered downward divergence due to a considerable increase in the long-term unemployment during the crisis and a slower recovery.

Sigma convergence (coefficient of variation) shows similarities in convergence patterns for woman and men notwithstanding variation among EU Member States in long-term unemployment rates are higher for women than for men.

Delta convergence shows also an overall reduction between 2000 and 2017 of the distance in the long-term unemployment rates with respect to the best performing country.

The analysis of the **unconditional Beta convergence** over the period 2000-2017 shows a convergence process that is evident in the Eurozone but not among countries outside the Eurozone. Moreover, in the Euro area only periphery countries are converging. Finally, when distinguishing between EU15 and E13, only the latter converge.

Regional Sigma convergence shows that, in general, variation in long-term unemployment rates are similar among regions than among countries. Moreover, the patterns of convergence/divergence are similar whether considering regional or national data. In particular, among regions of Non-Euro area countries the convergence process initiated earlier (2004), lasted up to the 2012 and started to diverge, while regions of the EU area are still on a pattern of convergence.

The analysis of **regional unconditional Beta convergence** shows that while a convergence process is evident in the period 2004-2010, due to crisis period, in the 2010-2016 period almost no convergence pattern emerges. The investigation by groups of countries reveals a similar pattern of convergence among regions of EA and of Non-EA countries during the period 2004-2016, with the latter showing a higher convergence pace. This difference is also evident when comparing regions belonging to old with respect to new Member States which show a more rapid convergence. Finally, the **Theil index** shows a decrease of variation among EU regions. The decrease observed since 2008/2009 is mainly

determined by a reduction of disparities in long-term unemployment rates between MSs, although also disparities within countries are reducing.

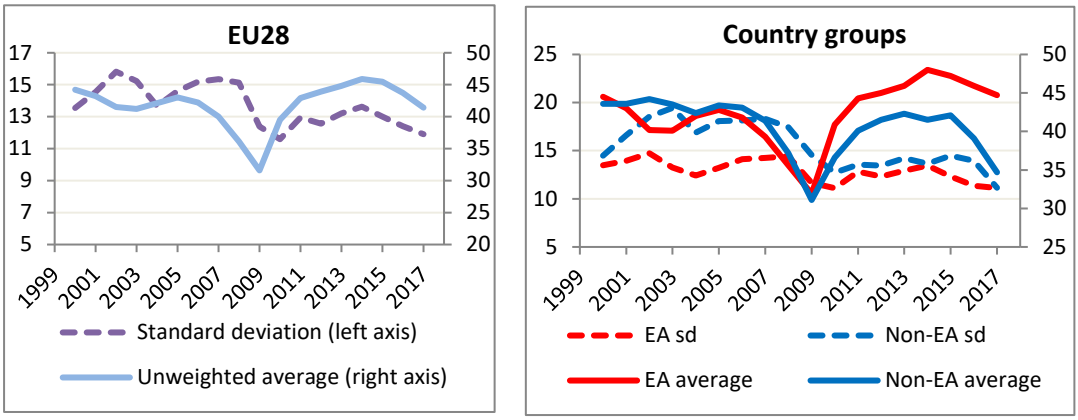
Upward convergence

During the 2000-2017 period, the long-term unemployment rate in the EU28 registered a **weak upward convergence process**: on average the share of unemployed for more than 12 months decreased from 44.2% to 41.4% in the EU28 and the variation among Member States decreased. The convergence process is weak since in some countries the unemployment rate was higher in 2017 than in 2000. Particularly high the increase registered by the Netherland (14 pp), Ireland (8.6 pp), Slovakia and Portugal (above 6 pp), France and Austria (around 5 pp).

Different patterns emerge when looking at **sub-periods**. In fact, the upward convergence process registered by the long-term unemployment rate in the EU28 was interrupted by the economic and financial crisis: from 2009 to 2014 a downward divergence trend took place, characterised by a strong increase in the average long-term unemployment rate (+14 pp) and an increase in the variation among MSs.

Over the observed period the **Euro and Non-Euro area** registered different trends, in particular following the economic crisis. Between 2000 and 2017 the Non-Euro area showed upward convergence with a significant reduction of overall dispersion and of the average level of long-term unemployment rate (from 46.6% in 2000 to 34.7% in 2017). Whereas the Eurozone registered downward divergence due to a considerable increase in the long-term unemployment during the crisis (from 31.9% in 2009 to 48% in 2014) and a slower recovery.

Figure 53: Long-term unemployment rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017

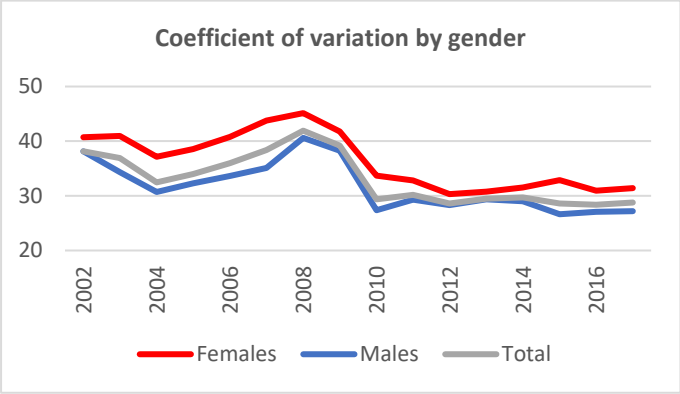


At the country level interesting trajectories can be observed. For instance, Ireland has performed very well until the crisis, with levels of long-term unemployment below EU28 average, then the rate increased faster than in the EU overall, reaching a staggering 61.7%. Recently, Ireland has caught up again improving its performance faster than the EU average. Greece instead shows little sign of recovery with an LTU rate at 72.8% in 2017. On the contrary, Poland and Romania considerably closed the gap with the EU average during the period considered.

Sigma convergence by gender

In this section we use the coefficient of variation to measure convergence among EU MSs in the LTU rates by gender. In general disparities in long term unemployment rates among EU Member States are higher for women than for men. However, both **males and females** present similar trends in the convergence process (albeit with minor differences) during the period. In fact, the coefficient of variation increases from 2004 until 2008, then there is a step decrease from 2008 and 2010, and finally it remains more or less constant from 2010 onwards.

Figure 54: Sigma convergence in the EU28 by gender, 2000-2017



Delta convergence

The analysis of delta convergence shows also an overall reduction between 2000 and 2017 of the disparities in the long-term unemployment rate with respect to the best performing country. Despite some oscillations, on average European countries have converged towards the long-term unemployment rate of the best performer in the 2005-2009 period and from 2014 onwards.

Figure 55: Delta convergence in the EU28, 2000-2017

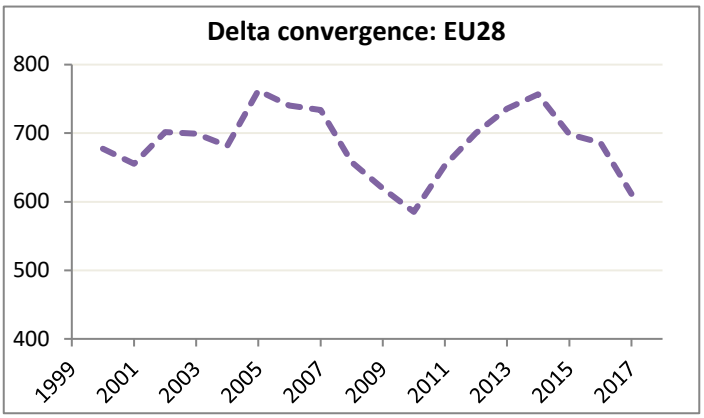


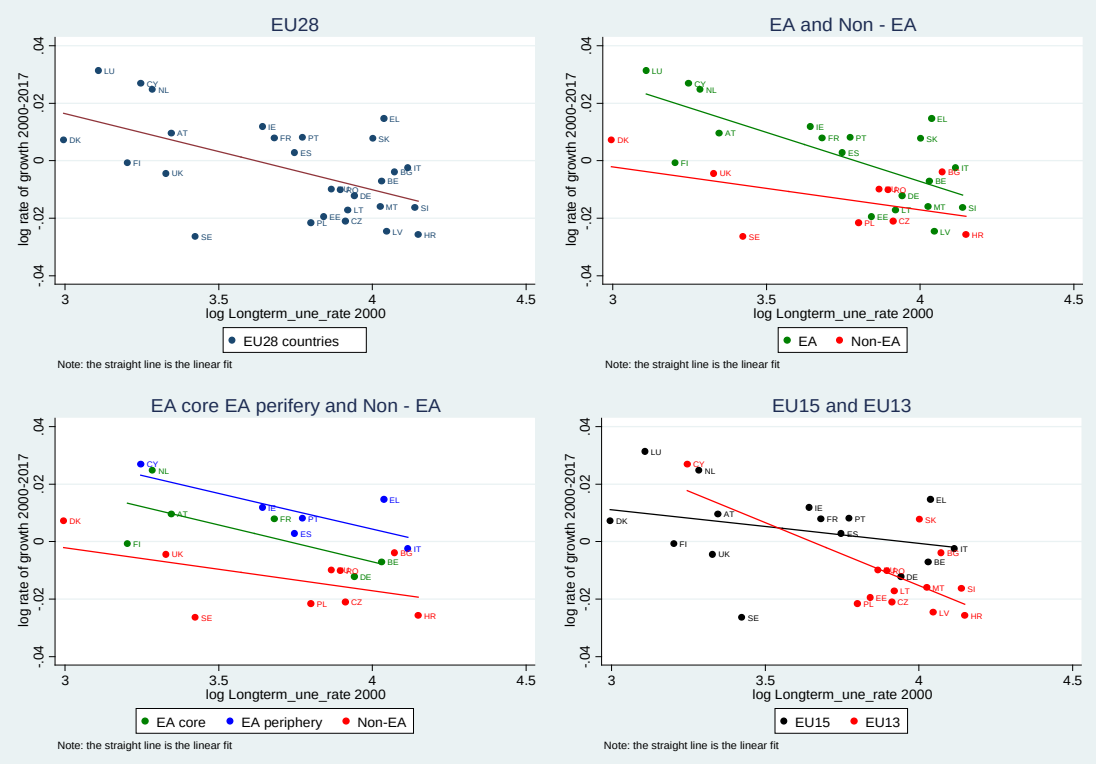
Figure 56 shows that the best performing country over the period 2000-2017 is, with some exceptions, Sweden. In general, Scandinavian countries, Luxemburg, Austria and the UK present relatively low long-term unemployment rates. A gap reduction in recent years is evident among Eastern European countries, such as Poland, the Czech Republic, Croatia, Romania and the Baltic Republics. Also, Germany is converging towards the rates of the best performing country.

Figure 56: Long-term unemployment rate of EU28 MSs *versus* Best performance line, 2000-2017

Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2000-2017** shows a convergence process in the EU28 at a rate of 3% a year: countries with higher long-term unemployment rates presenting larger reductions during the period. When considering different groups of countries different results emerge. In particular, a convergence process is evident in the Eurozone but not among countries outside the Eurozone. Moreover, in the Euro area only periphery countries are converging. Finally, when distinguishing between EU15 and E13, only the latter converge.

Figure 57: Unconditional Beta convergence by groups of countries, 2000-2017



Among the EU 28 countries the pace of convergence in the long-term unemployment rate **is higher in the period following the launch of the EU 2020 Agenda** (5% a year) as compared to the previous period (2% a year). In particular, after 2010 the convergence process is particularly strong in the Euro area (7% a year) and among EU13 countries (10% a year). Whereas for the other groups of countries no convergence emerges.

Figure 58: Unconditional Beta convergence in the EU28 by periods, 2000-2017

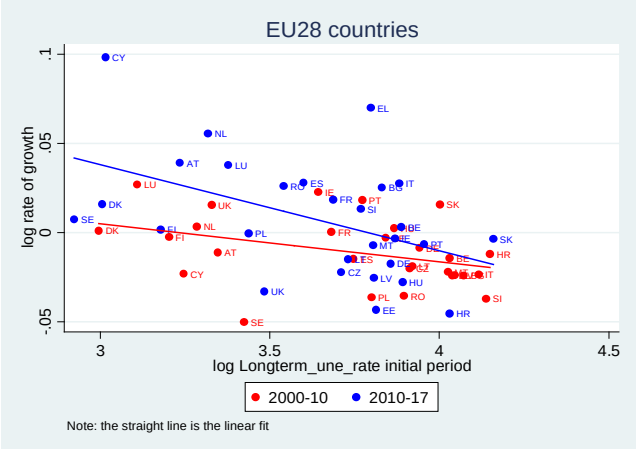
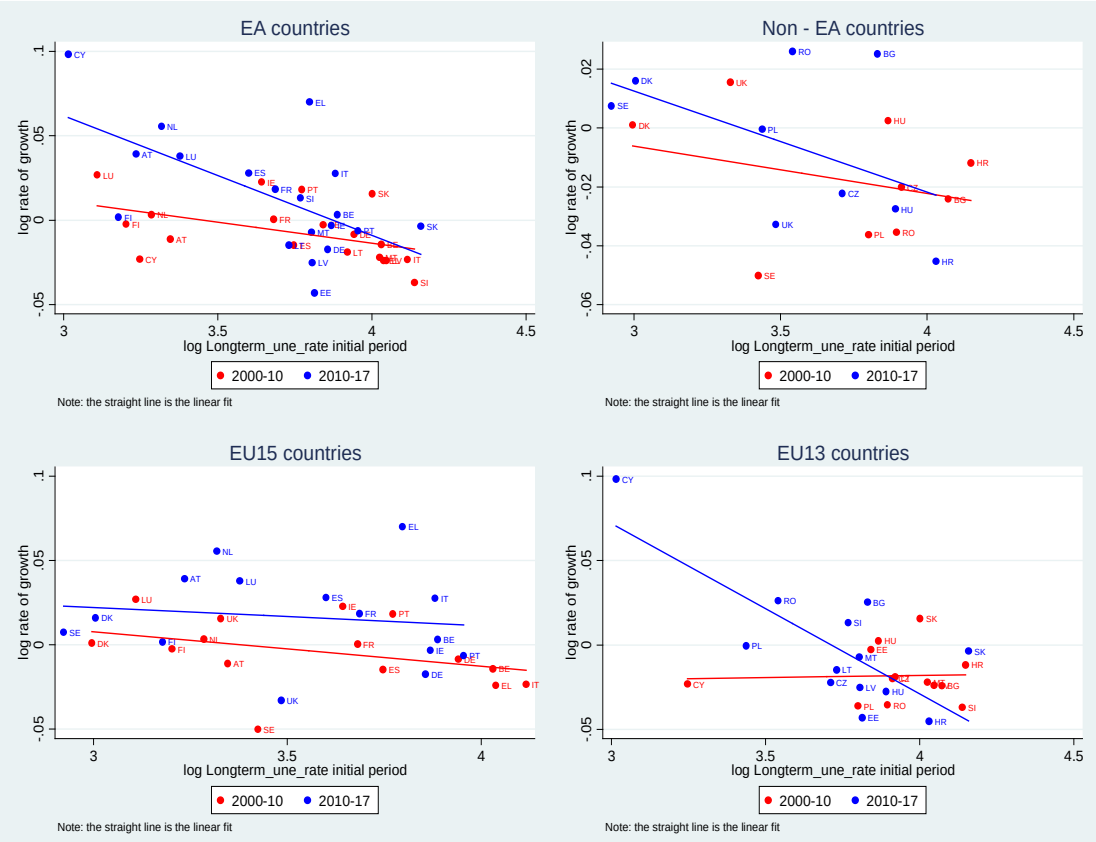


Figure 59: Unconditional Beta convergence by groups of countries and periods, 2000-2017

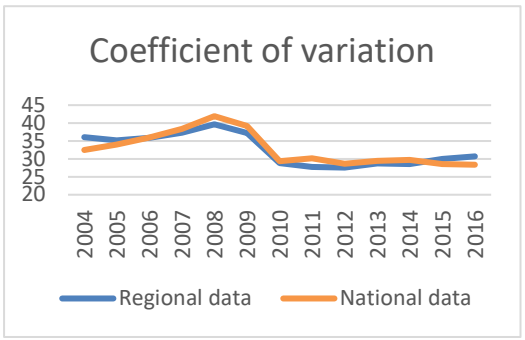


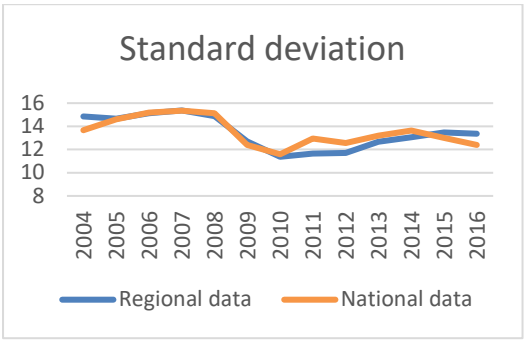
Regional Convergence

Sigma convergence

In general, **variation in long-term unemployment rates at regional level and at national level is similar** (this holds true when using either the standard deviation or the coefficient of variation).

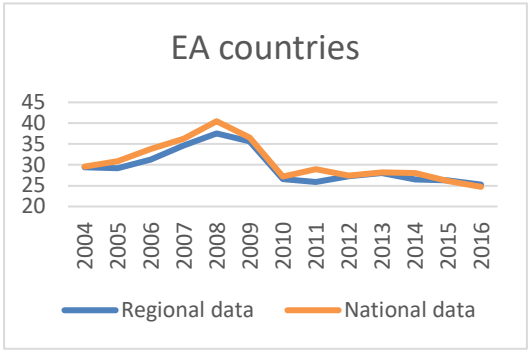
Figure 60: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2000-2016

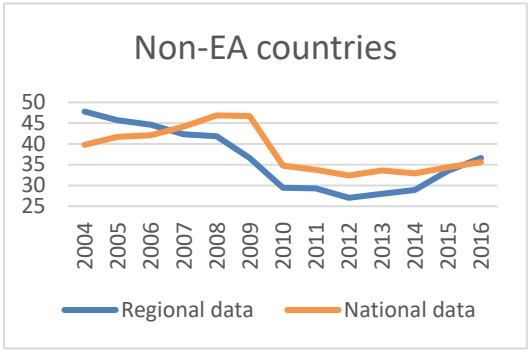




Concerning the **Euro and Non-Euro area**, the main differences in convergence patterns at national and regional level are observed in the Non-Euro area (figure 61). In particular, in this area during the recession dispersion in unemployment rates is lower at regional level than at national level.

Figure 61: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016



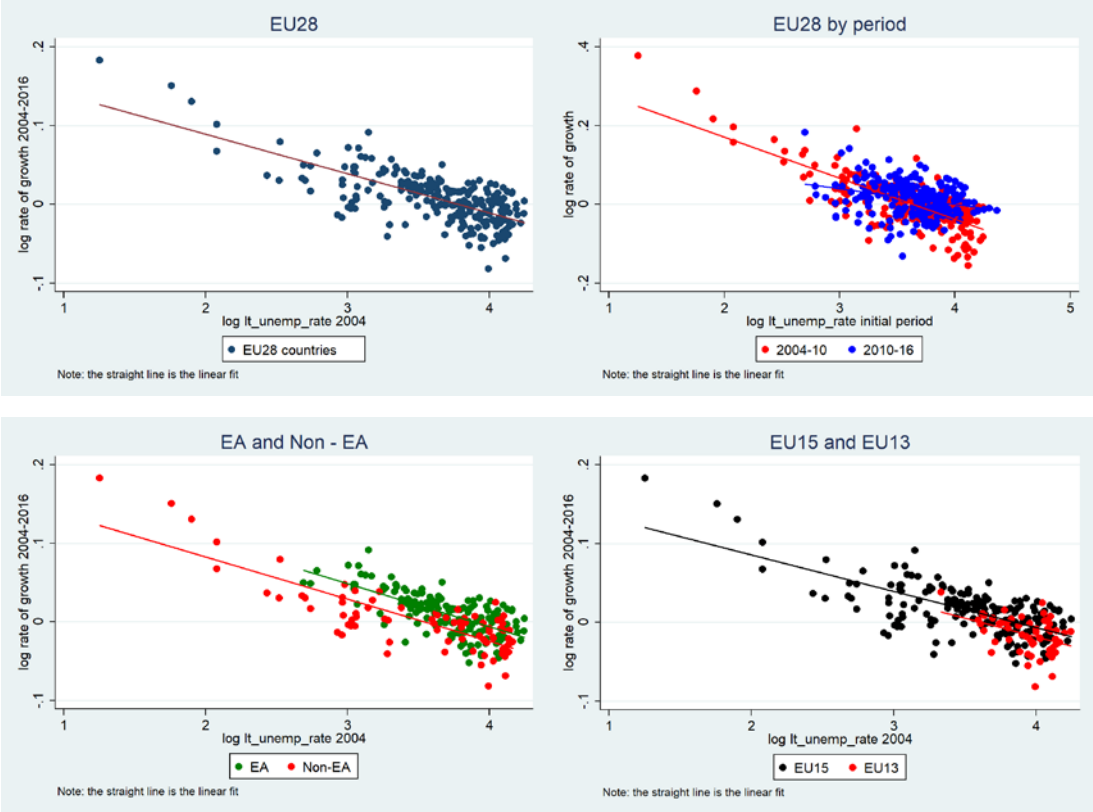


Unconditional Beta convergence

The analysis of unconditional beta convergence **of long-term unemployment rates** shows a catching-up process in the EU28 during the period 2004-2016**,** and the pace of convergence is more evident in the period 2004-2010.

The investigation by groups of countries reveals a similar catching-up process among regions of **EA and of Non-EA countries** as well as among regions belonging to old (EU15) and to new Member States (EU13).

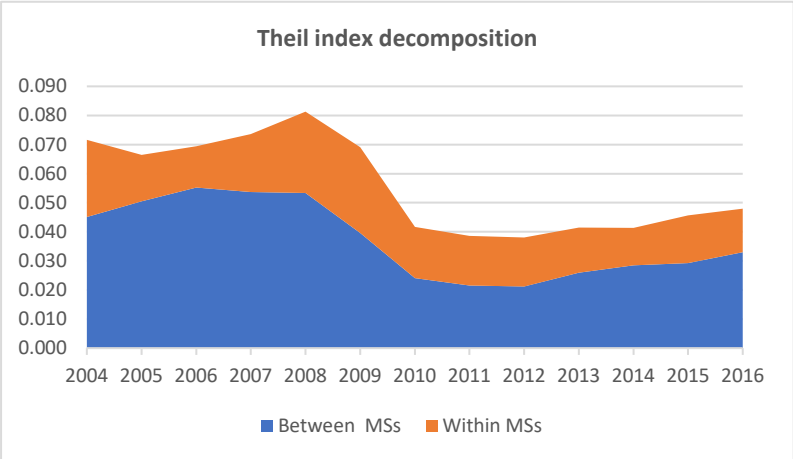
Figure 62: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



Theil index

The Theil index (another measure of sigma convergence) shows a decrease of variation among EU28 regions between 2004 and 2016. The decrease observed since 2008/2009 is mainly determined by a reduction of disparities in long-term unemployment rates between MSs, although also disparities within countries are reducing.

Figure 63: Theil index decomposition, 2004-2016



7. Involuntary temporary work

Definition: Percentage of employees aged 20-64 with an involuntary temporary work because they could not find a permanent job.

Data source: Eurostat – LFS [lfsa_etgar]

Time: 2002-2017

The **analysis of upward convergence** of involuntary temporary work in the EU28 shows a weak downward divergence process among the EU countries in the period 2002-2017, due to a constant increase, since 2011, of the rate workers in a temporary job because they could not find a permanent job accompanied by an increase in differences among MSs. The downward divergence process being stronger in the Non-Euro zone.

Sigma convergence, measured through the **coefficient of variation** shows more fluctuations during the period. Divergence among EU countries is observed up to 2008 and then since 2013 onwards, especially for male workers. Whereas a convergence trend is observed during the years of the economic and financial crisis, due to a generalised increase of the rates of temporary work across MSs.

Delta convergence shows also an overall increase between 2002 and 2017 of the distance in the rate of involuntary temporary work with respect to the best performing country.

The analysis of the **unconditional Beta convergence** over the period 2002-2017 does not show any convergence process in the EU28 area. In fact, the largest reductions in the rate of involuntary temporary work are observed by countries presenting low initial levels. During this period a convergence process is only evident in the EU15 area and among Euro area periphery countries (i.e. Ireland, plus Mediterranean MSs) which converge towards higher rates of involuntary temporary work.

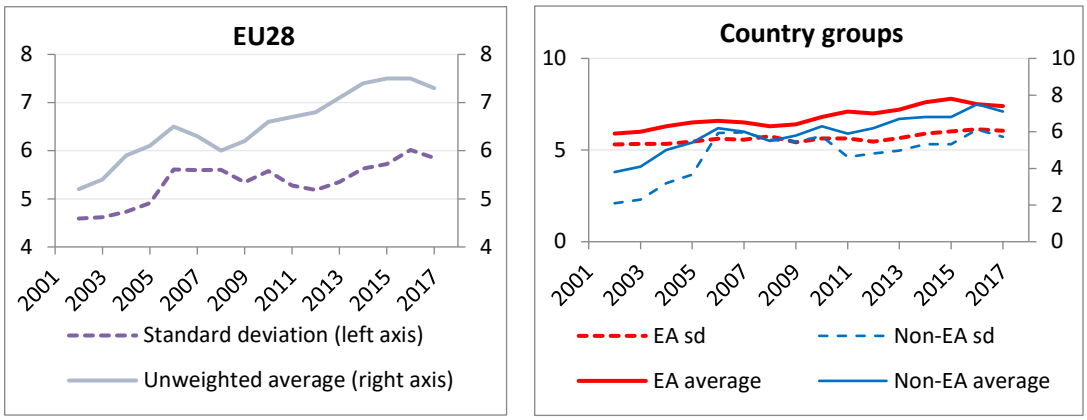
Downward convergence

During the 2002-2017 period, the rate of involuntary temporary work in the EU28 registered a **weak downward divergence process**: on average the rate of involuntary temporary work increased from 5.2% to 7.3% in the EU28 and the variation among Member States increased as well. The divergence process is weak since in some countries, and especially in the Baltic Republics, the rate of involuntary temporary work decreased over the period considered.

When looking at **sub-periods** no different patterns emerge**.** The divergence process tends to be consistent over the period considered, albeit some oscillations in the variation among countries and a reduction of the rate between 2006 and 2007.

For both the **Euro and Non-Euro area** downward divergence is observed during the period. However, developments reveal that the greatest increase both in the average rate of involuntary temporary work and in the variation among Member States was recorded in the Non-euro area during the initial sub-period 2002-2006.

Figure 64: Rate of involuntary temporary work (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2002-2017

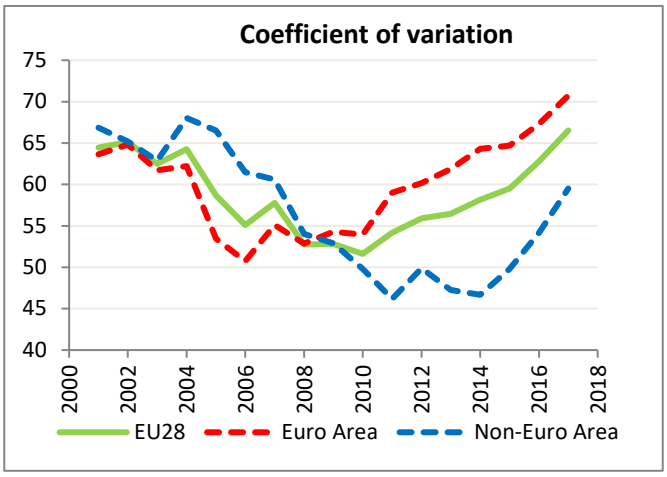


At the country level interesting trajectories can be observed. For example, Italy, Spain and Greece followed a rather similar pattern of divergence from the EU average at the beginning of the crisis and up to the recovery period. Cyprus instead started to widen more clearly its gap from the EU average between 2010 and 2011, registering a high jump. Whereas, Bulgaria having the highest rate in 2005, it caught up with the average very fast in the following period.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the rate of involuntary part-time work by area. Overall, the analysis of the coefficient of variation confirms convergence, albeit with some oscillations, among European Member States up to the beginning of the economic and financial crisis and then a strong divergence trend lasting up to 2017. However, when considering separately countries of the Eurozone and Non-Eurozone different patterns emerge. In fact, in the Non-Euro area a clear divergence trend is evident since 2014, whereas in the Euro area the divergence trend starts well before, in 2008.

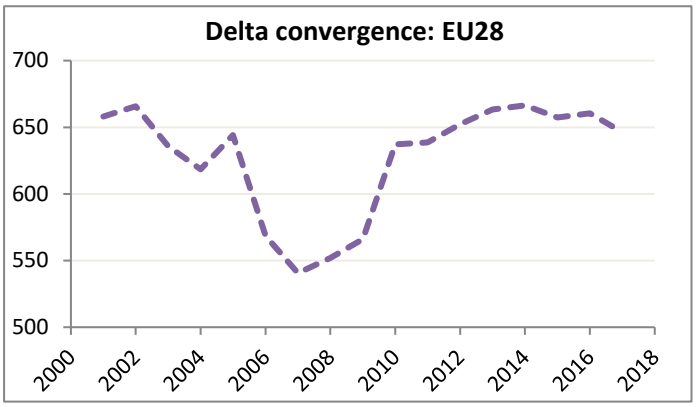
Figure 72: Sigma convergence in the EU28 by area, 2001-2017



Delta convergence

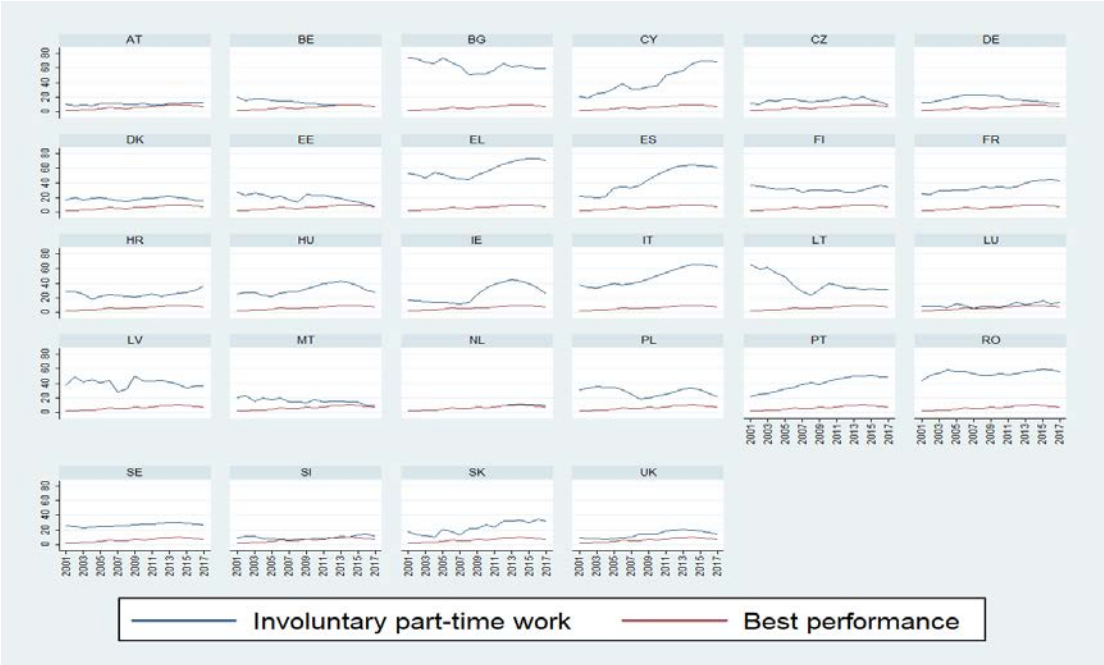
The analysis of delta convergence shows an overall reduction between 2001 and 2017 of the distance in the involuntary part-time rate with respect to the best performing country. However, during the period analysed different trends emerge. Specifically, a strong reduction at the beginning of the 2000s, then a large increase during the economic and financial crisis (2007-2014), finally a weak reduction from 2014 onwards.

Figure 73: Delta convergence in the EU28, 2001-2017



The best performing countries, in terms of the share of involuntary part-time work are the Netherlands over the period 2001-2011 and Belgium from 2013 onwards. As can be seen in figure 74, several countries experienced a large increase, especially since the beginning of the crisis, in the gap during the period: Cyprus, Greece, Spain, Italy, Portugal. Instead other countries, such as Belgium, Germany, Denmark, the Baltic Republics, Malta and Poland significantly reduced the gap.

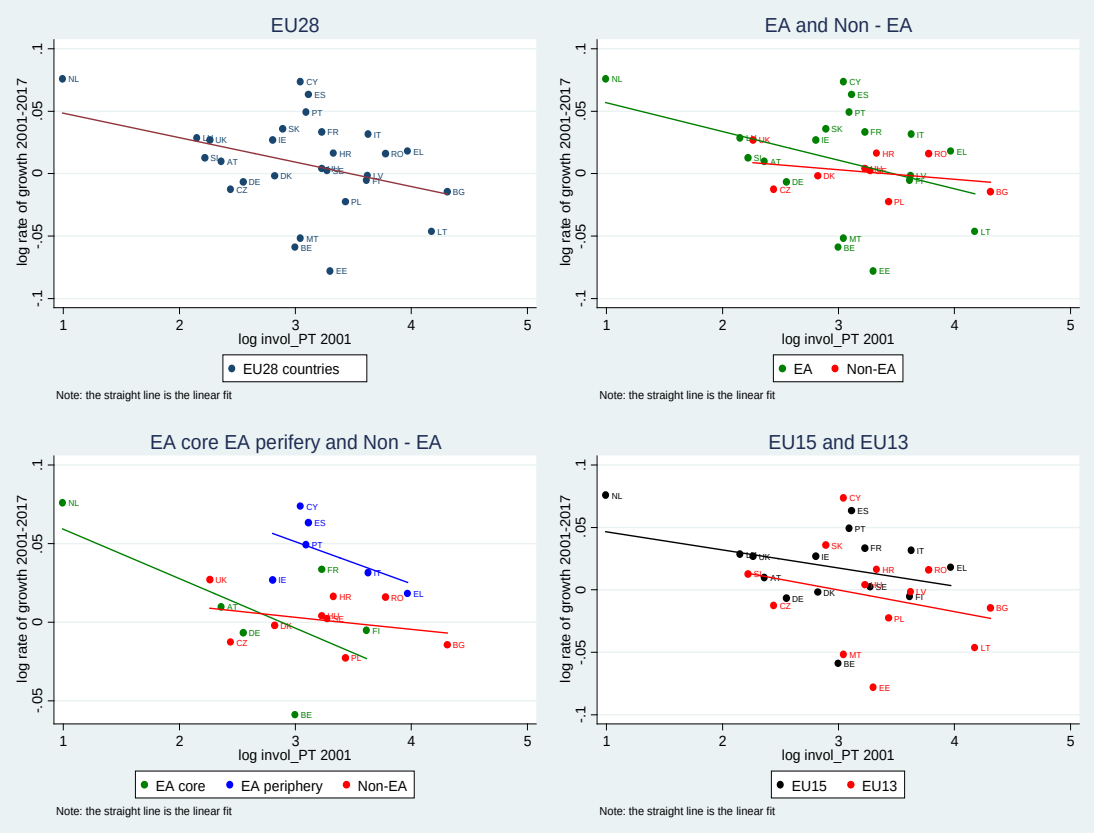
Figure 74: Involuntary part-time rate of EU28 MSs *versus* Best performance line, 2001-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2001-2017** shows a convergence process in the EU28 (2% a year): countries with higher initial levels of involuntary part-time rates presenting larger reductions during the period than countries with lower initial levels. If distinguishing by different groups of countries no convergence process emerges between 2001 and 2017.

Figure 75: Unconditional Beta convergence by groups of countries, 2001-2017



When analysing unconditional beta convergence by sub-periods, it emerges that a convergence process among MSs took place only in the period 2001-2010, **before the launch of the EU 2020 Agenda.** During this period, the convergence process is significant not only in the EU28, but also in all the other sub-areas analysed, but in the EU15 area (see figure 75).

Figure 76: Unconditional Beta convergence in the EU28 by periods, 2001-2017

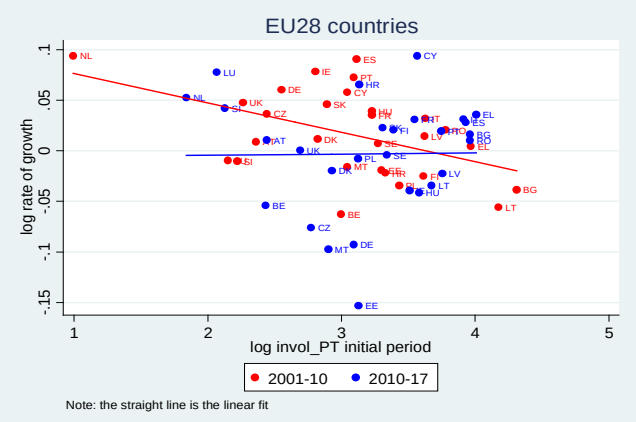
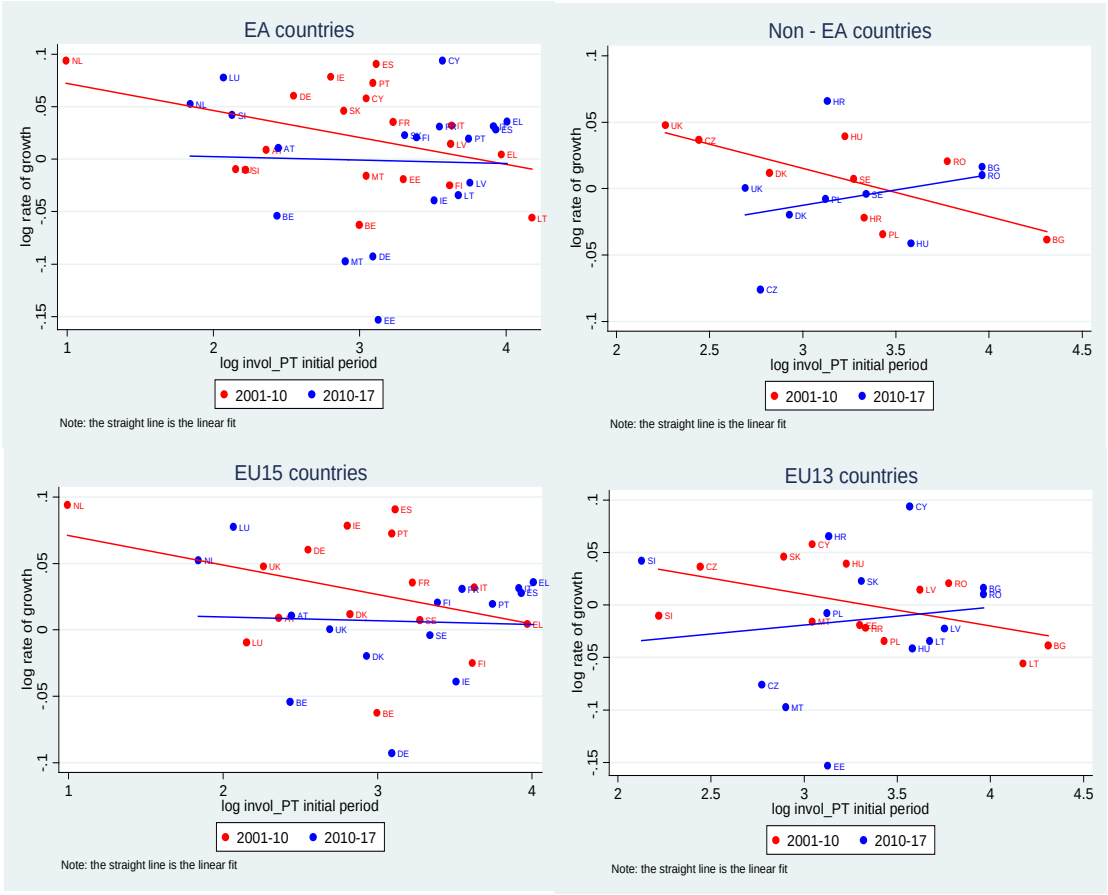


Figure 77: Unconditional Beta convergence by groups of countries and periods, 2001-2017



8. Involuntary part-time work

Definition: Involuntary part-time employment as percentage of the total part-time employment. Persons working on an involuntary part-time basis are those who declare that they work part-time because they are unable to find full-time work.

Data source: Eurostat – LFS [lfsa_eppgai]

Time: 2001-2017

The **analysis of upward convergence** of involuntary part-time work in the EU28 shows a weak downward divergence process among the EU countries in the period 2001-2017, as a result of a clear downward divergence process initiated in 2008, with the economic and financial crisis, and lasting up to 2014. Indeed, during the crisis both the share of part-time employment and the variation among European countries increased, especially in the Eurozone.

Sigma convergence (coefficient of variation) shows differences in convergence patterns for different groups countries: in the Non-Euro area a clear divergence trend is evident since 2014, whereas in the Euro area the divergence trend starts well before, in 2008.

Delta convergence shows also an overall reduction between 2001 and 2017 of the of the distance in the involuntary part-time rate with respect to the best performing countries (Netherlands; Belgium from 2013 onwards). However, during the period analysed different trends emerge: a strong reduction at the beginning of the 2000s, then a large increase during the economic and financial crisis (2007-2014), finally a weak reduction from 2014 onwards.

The analysis of the **unconditional Beta convergence** over the period 2001-2017 shows a convergence process in the EU28 at 2% a year: countries with higher initial levels showing higher decreases than countries with lower initial levels. However, when the analysis is conducted by sub-periods, it emerges that a convergence process among MSs took place only before the launch of the EU 2020 Agenda. During this period the convergence process is significant not only in the EU28, but also in all the other sub-areas analysed, but in the EU15 area.

Upward convergence

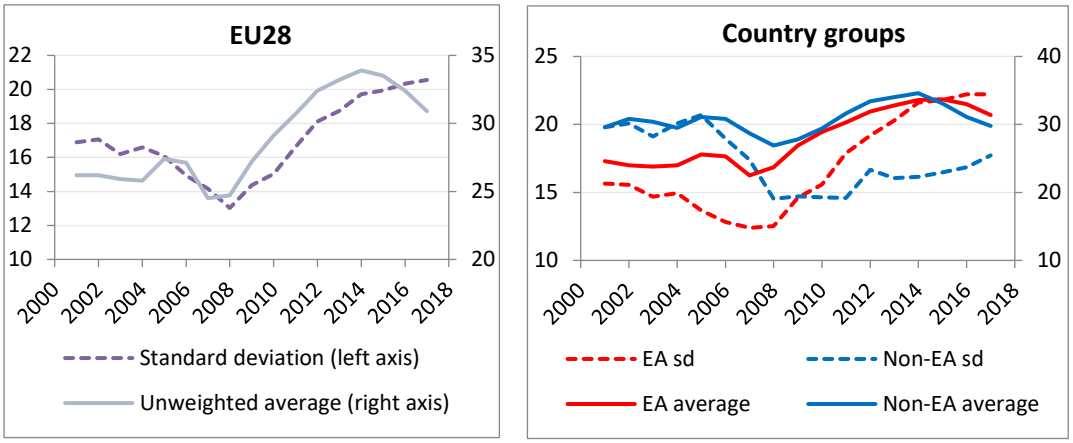
During the 2001-2017 period, the involuntary part-time rate in the EU28 registered a **weak downward divergence process**: on average the involuntary part-time rate increased from 26.2% to 30.9% in the EU28 and the variation among Member States also increased. The divergence process is weak since in many countries the involuntary part-time rate decreased over the period considered. Particularly high the decrease registered by Estonia, Latvia, Bulgaria, Belgium, Malta and Poland.

Different patterns emerge when looking at **sub-periods**. In fact, before the economic and financial crisis, from 2005 to 2008, desirable upward convergence took place. Then, the

trend was inverted with the crisis and a reduction of involuntary part-time has only been recorded since 2014, although the variation among countries continued to increase.

For the **Euro and Non-Euro area** different developments are observed. In fact, if in the Eurozone a clear downward divergence process is evident, at least between 2008 -2014, in the Non-Eurozone the pattern of convergence/divergence is not so clear (see figure 71).

Figure 71: Involuntary part-time rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2001-2017

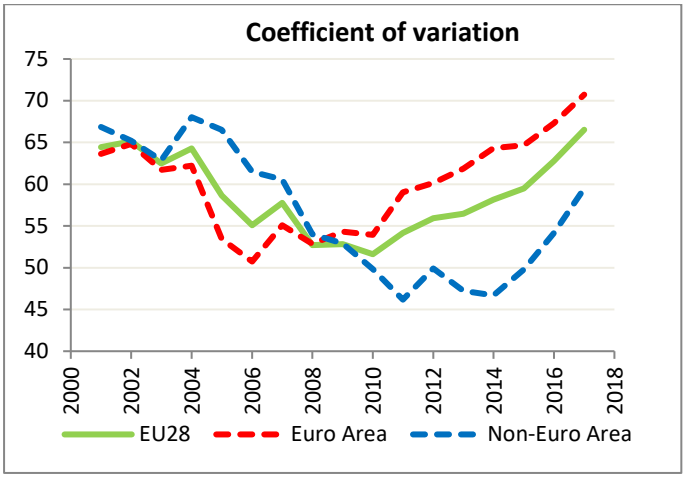


At the country level interesting trajectories can be observed. For example, Italy, Spain and Greece followed a rather similar pattern of divergence from the EU average at the beginning of the crisis and up to the recovery period. Cyprus instead started to widen more clearly its gap from the EU average between 2010 and 2011, registering a high jump. Whereas, Bulgaria having the highest rate in 2005, it caught up with the average very fast in the following period.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the rate of involuntary part-time work by area. Overall, the analysis of the coefficient of variation confirms convergence, albeit with some oscillations, among European Member States up to the beginning of the economic and financial crisis and then a strong divergence trend lasting up to 2017. However, when considering separately countries of the Eurozone and Non-Eurozone different patterns emerge. In fact, in the Non-Euro area a clear divergence trend is evident since 2014, whereas in the Euro area the divergence trend starts well before, in 2008.

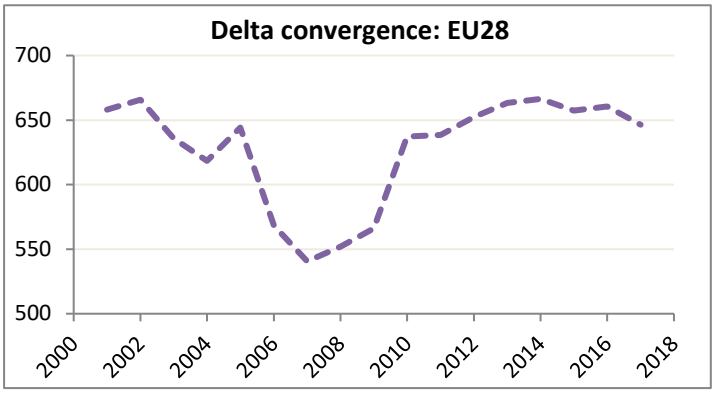
Figure 72: Sigma convergence in the EU28 by area, 2001-2017



Delta convergence

The analysis of delta convergence shows an overall reduction between 2001 and 2017 of the distance in the involuntary part-time rate with respect to the best performing country. However, during the period analysed different trends emerge. Specifically, a strong reduction at the beginning of the 2000s, then a large increase during the economic and financial crisis (2007-2014), finally a weak reduction from 2014 onwards.

Figure 73: Delta convergence in the EU28, 2001-2017



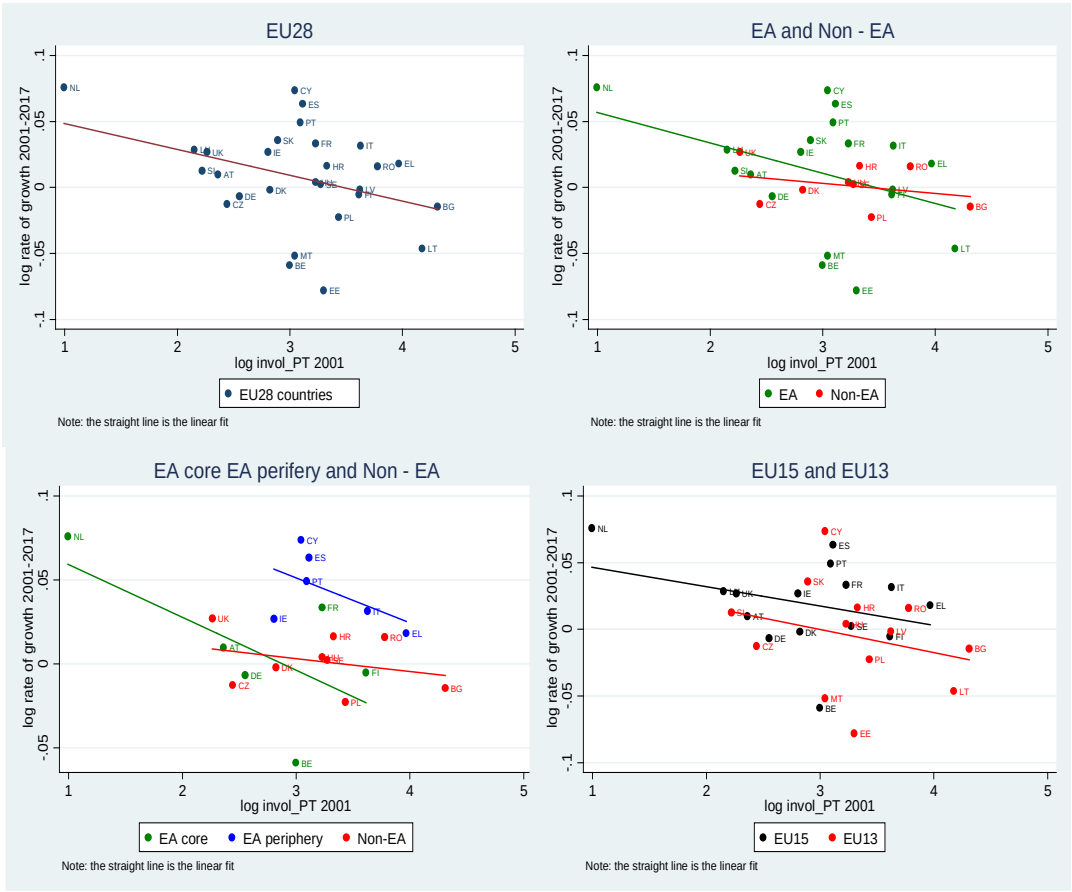
The best performing countries, in terms of the share of involuntary part-time work are the Netherlands over the period 2001-2011 and Belgium from 2013 onwards. As can be seen in figure 74, several countries experienced a large increase, especially since the beginning of the crisis, in the gap during the period: Cyprus, Greece, Spain, Italy, Portugal. Instead other countries, such as Belgium, Germany, Denmark, the Baltic Republics, Malta and Poland significantly reduced the gap.

Figure 74: Involuntary part-time rate of EU28 MSs *versus* Best performance line, 2001-2017

Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2001-2017** shows a convergence process in the EU28 (2% a year): countries with higher initial levels of involuntary part-time rates presenting larger reductions during the period than countries with lower initial levels. If distinguishing by different groups of countries no convergence process emerges between 2001 and 2017.

Figure 75: Unconditional Beta convergence by groups of countries, 2001-2017



When analysing unconditional beta convergence by sub-periods, it emerges that a convergence process among MSs took place only in the period 2001-2010, **before the launch of the EU 2020 Agenda.** During this period, the convergence process is significant not only in the EU28, but also in all the other sub-areas analysed, but in the EU15 area (see figure 75).

Figure 76: Unconditional Beta convergence in the EU28 by periods, 2001-2017

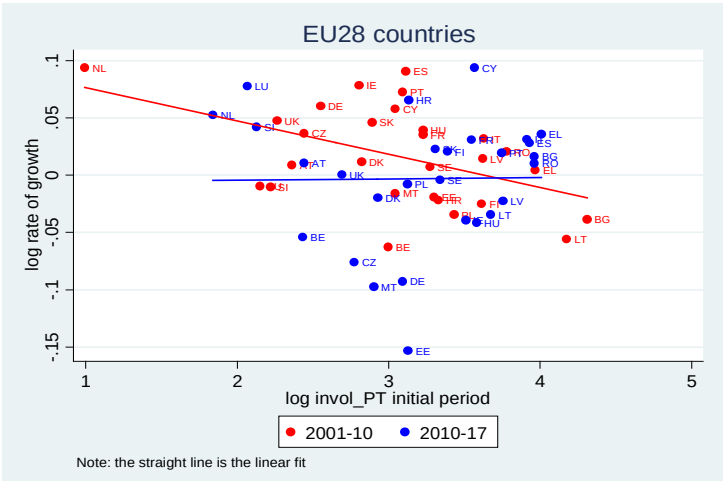
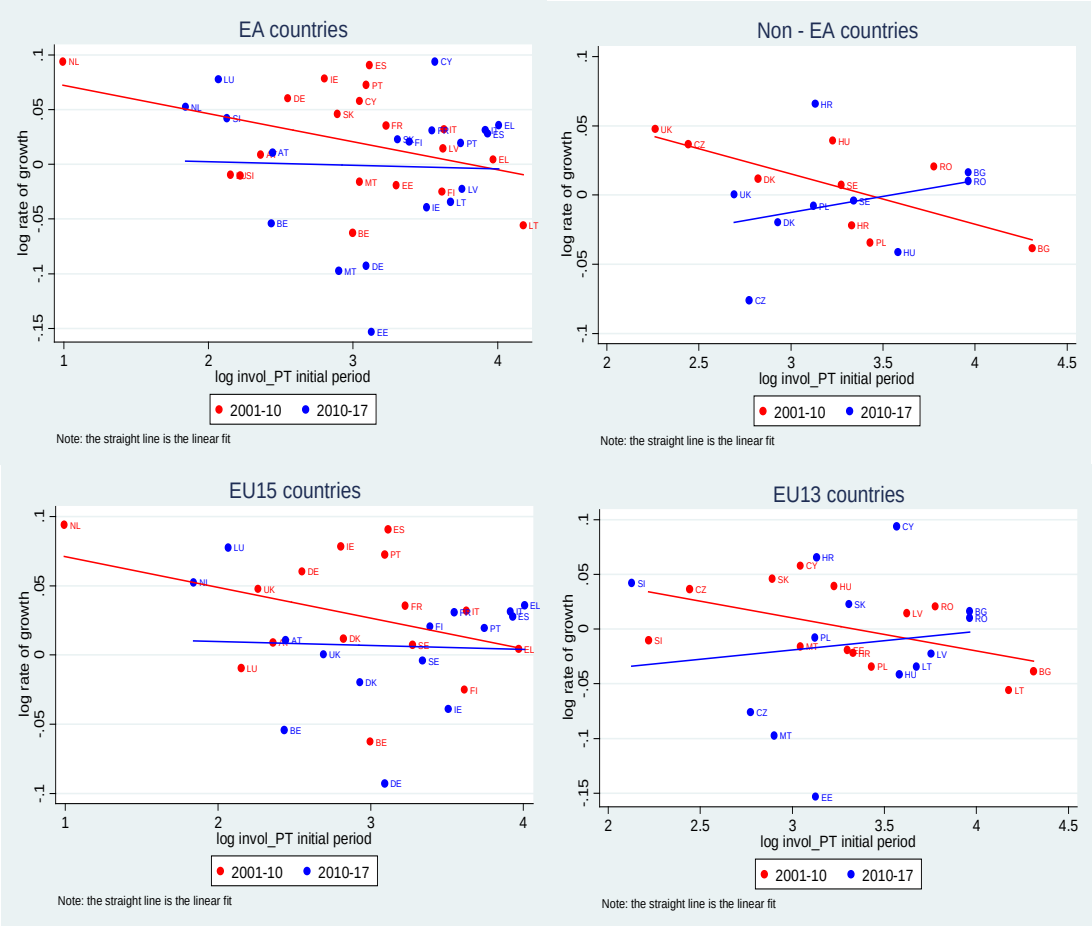


Figure 77: Unconditional Beta convergence by groups of countries and periods, 2001-2017



9. Labour transitions from temporary to permanent contracts

Definition: Percentage of persons aged 16-64 having a temporary contract who moved to a permanent contract between two consecutive years. Figures are averaged over three years.

Data source: Eurostat [ilc_lvhl36]

Time: 2010-2016

The **analysis of upward convergence** of labour transitions from temporary to permanent contracts in the EU28 shows a weak downward divergence process among the EU countries in the period 2010-2016: the transition rate decreased, at least until 2014 and the variation among MSs increased during the recession period. However, since 2014 onwards an upward convergence process can be detected.

Sigma convergence, measured by the **coefficient of variation**, confirms a convergence trend among EU countries since 2014, especially among Euro countries, which experienced during the years of the recession a higher increase in variation compared to the Non-Euro countries.

Delta convergence shows, albeit some oscillations, an overall reduction between 2010 and 2016 of the distance: on average European countries converge towards the transition rates of the best performing countries (UK, Estonia and Latvia).

The analysis of the **unconditional Beta convergence** of the transition rates over the period 2010-2016 does not show any convergence process neither at the EU28 level, nor for subgroups of countries.

Downward convergence

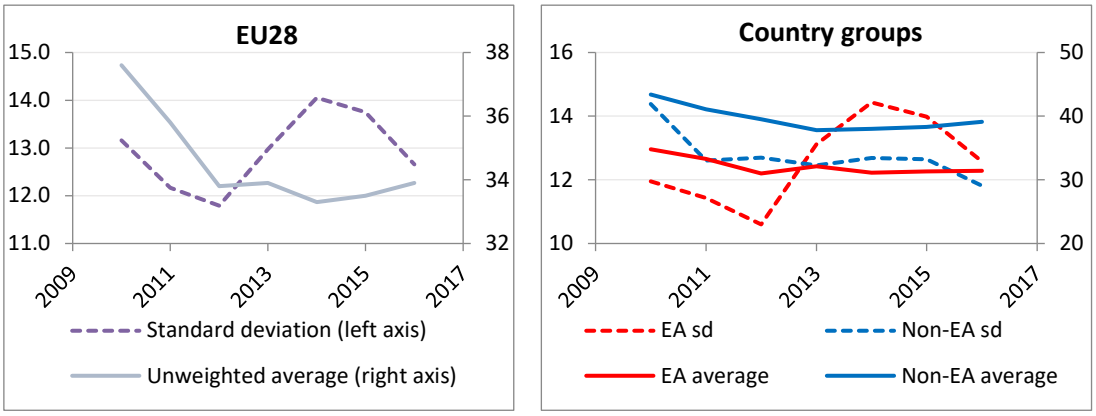
During the 2010-2016 period, the transition rate from temporary to permanent contracts in the EU28 registered a **weak downward divergence process**: on average the transition rate decreased from 35.8% to 33.9% in the EU28 and differences among Member States increased at the same time. The divergence process is weak since in some countries (Cyprus, Portugal, Estonia, Latvia, Romania, Slovakia, Greece, the Netherlands, Denmark) the transition rate increased over the period considered.

Different patterns emerge when looking at **sub-periods**. In fact, between 2010 and 2012 downward convergence is observed in the EU28, then from 2012 to 2014 downward divergence occurs, and finally since 2014 onwards an upward convergence process can be detected.

For the **Euro and Non-Euro area** similar patterns of the average transition rate were observed during the period, with non-Eurozone countries presenting, on average, higher transition rates from temporary to permanent work than Eurozone countries. However, different patterns are observed in the variation among countries. Therefore, in the non-Eurozone a clear pattern of downward convergence emerges; whereas in the Eurozone the

downward process in the transition rates is more blurred with alternating periods of convergence and divergence.

Figure 78: Transition rate from temporary to permanent work (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2010-2016

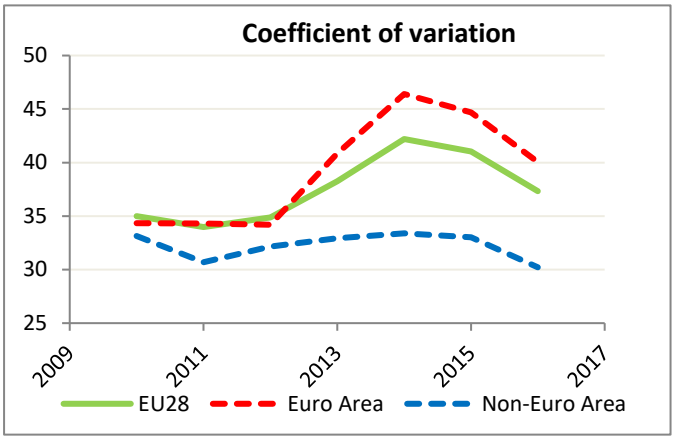


Behind these overall changes **interesting trajectories** can be observed at the country level. For example, Malta, having a transition rate above the EU28 average, recorded a significant drop in the considered period which brought the country well below the European average. The Baltic countries of Estonia and Latvia observed an improvement in the transition from temporary to permanent employment, although the transition rate in Estonia started to decline in 2014 after a remarkable increase from 40.2% to 63% between 2011 and 2013.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the rate of involuntary part-time work by area. Overall, the analysis of the coefficient of variation confirms a convergence trend since 2014, especially among Euro countries, which experienced during the years of the recession a higher increase in variation compared to the Non-Euro countries.

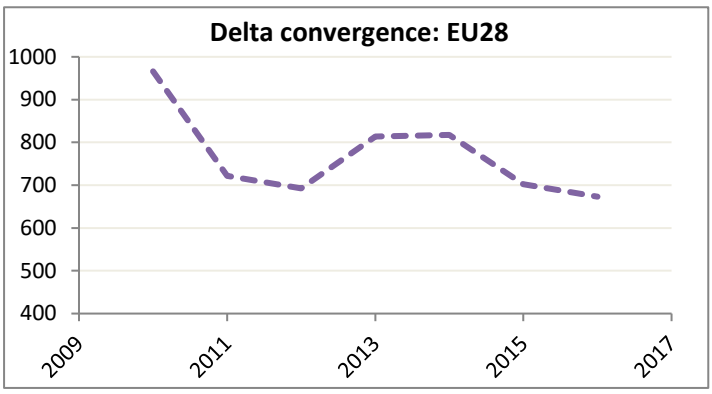
Figure 79: Sigma convergence in the EU28 by area, 2010-2017



Delta convergence

The analysis of delta convergence shows **an overall reduction between 2010 and 2016 of the distance with respect to the best performing country**. Despite some oscillations, on average European countries converge towards the transition rates of the best performer (i.e. a reduction in the sum of the distances from the best performer is observed).

Figure 80: Delta convergence in the EU28, 2010-2016



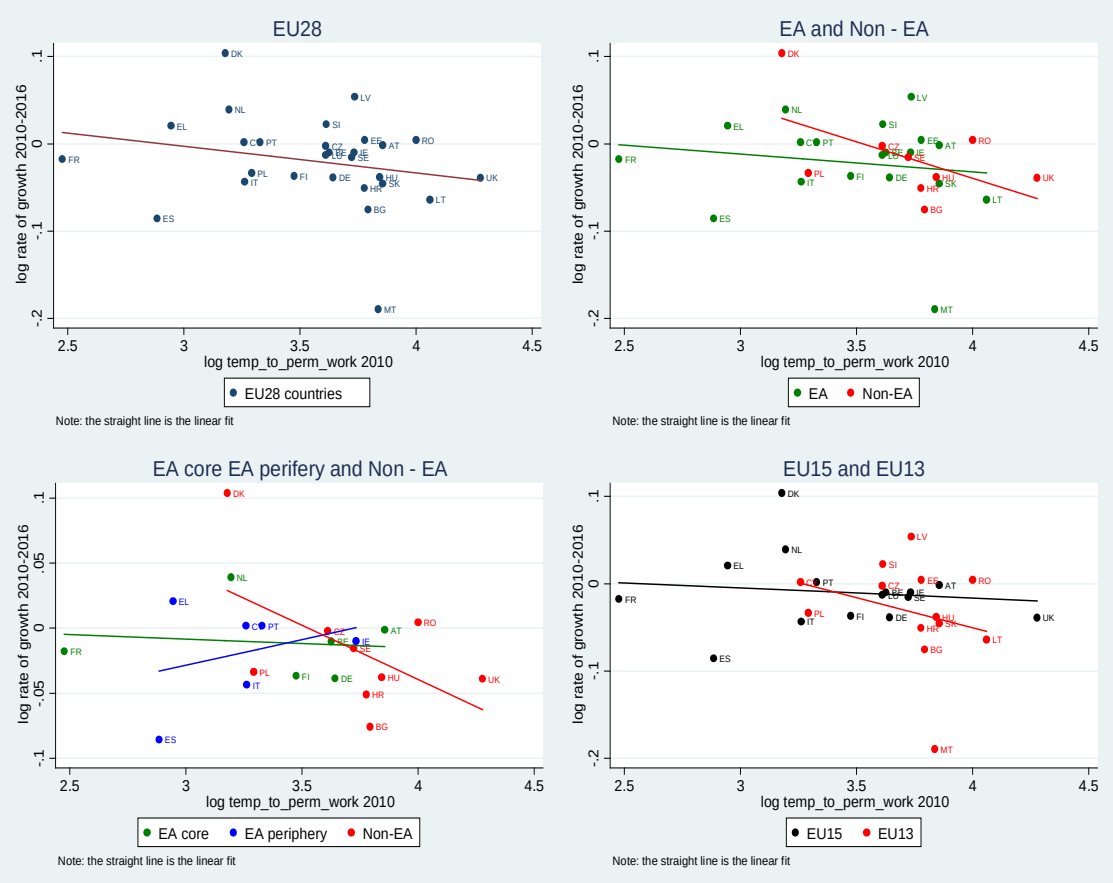
As can be seen from figure 81, the best performing countries over the period 2010-2016 are the UK, and the Baltic Republic of Estonia and Latvia which experience a remarkable increase in the last years. Compared to 2010 almost all countries reduced the gap with the best performing country. Only Malta significantly increased the gap.

Figure 81: Transition rate from temporary to permanent work of EU28 MSs *versus* Best performance line, 2010-2016

Unconditional Beta convergence

The analysis of the **unconditional Beta convergence of the transition rates over the period 2010-2016 does not** show any convergence process neither at the EU28 level, nor for subgroups of countries.

Figure 82: Unconditional Beta convergence by groups of countries, 2010-2016



10. Real GDP per capita in PPS

Definition: Real Gross Domestic Product per capita refers to the total value of all the goods and services produced by a country in a particular year (controlled for inflation rates), divided by the number of people living there and expressed in purchasing power standards.

Data source: Eurostat [prc_ppp_ind]

Time: 1995-2017

The **analysis of upward convergence** of the real GDP per capita in PPS in the EU28 shows a strict upward divergence process among the EU countries in the period 1995-2017, as a result of three phases: a steep rise between 1995 and 2007 (upward divergence), a setback in 2007 and 2008 against the backdrop of the economic and financial crisis (downward convergence) and a recovery since then (upward convergence). The diverging trend was much more pronounced in the Eurozone than in the Non-Eurozone, especially in the crisis and post-crisis period. In fact, from 2007 onwards among Non-Euro area countries a strict upward convergence pattern can be identified.

Delta convergence shows also an overall increase between 1995 and 2017 of the distance in the real GDP per capita with respect to the best performing country (Luxemburg).

However, the analysis of **sigma convergence**, measured by the **coefficient of variation**, shows a process of convergence in the real GDP per capita among MSs, especially between 2000 and 2008 (i.e. the degree of variation in the average value decrease). Particularly relevant is the reduction of variation in the Non-Euro area.

Also, the analysis of the **unconditional Beta convergence** shows a convergence process in the EU28 over the period 1995-2017 (at 2% a year). However, the catching-up process seems to be in act only among new MSs and Non-Euro countries; whereas in the Eurozone a convergence process is only evident in the period 1995-2010.

Variation in real GDP per capita in PPS among EU regions is higher with respect to EU countries. Between 2000 and 2016 there is no evidence convergence among EU regions and variation increase. Moreover, differences emerge between groups of countries. First, differences in real GDP pc among regions are higher in the Eurozone than outside the Eurozone. Second, in the Non-Eurozone if at national level a convergence pattern is evident throughout the 2000-2016 period, convergence among regions is observed only before the crisis (2000-2008). The analysis of **unconditional beta convergence** does not show a clear converging pattern of real GDP per capita in PPS among EU regions during the period 2000-2016. In fact, a catching-up process is evident only in the period 2000-2010. Finally, the **Theil index** shows a slight reduction of variation in real GDP per capita among regions in the period 2000-2016. In particular, the observed reduction is mainly due to a decrease of disparities between MSs rather than among regions within MSs, which in fact register an increase over the period.

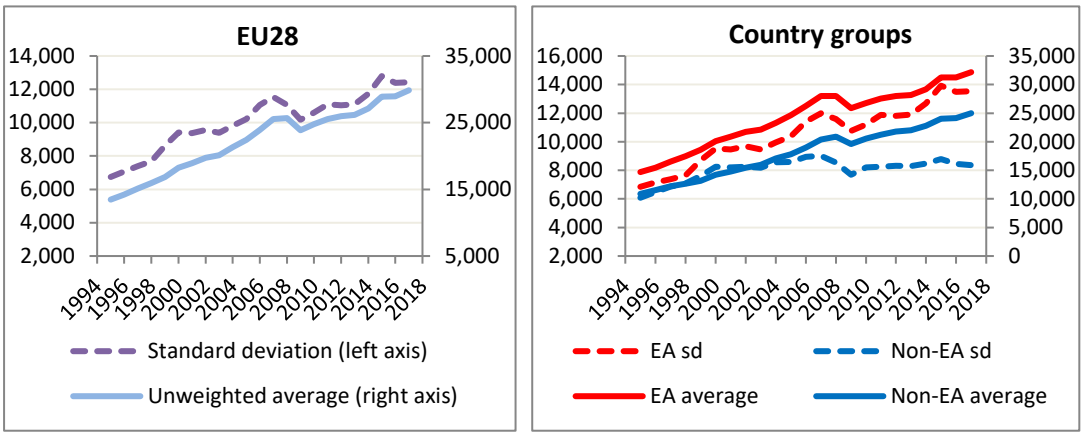
Upward convergence

During the 1995-2017 period, the real GDP per capita in PPS registered a **strict upward divergence process** in EU28: in all the MSs the GDP per capita increased and the variation among Member States increased as well, albeit with some oscillations. On average in the EU28 the GDP per capita grew from about 13,500 PPS in 1995 to almost 30,000 PPS in 2017.

When looking at **sub-periods** different patterns emerge. In particular, the development of GDP p.c. and its variation p.c. can be divided into three main phases with a steep rise between 1995 and 2007 (upward divergence), a setback in 2007 and 2008 against the backdrop of the economic and financial crisis (downward convergence) and a recovery since then (upward convergence).

During the period 1995-2017 the diverging trend was much more pronounced in the **Eurozone than in the Non-Eurozone.** In fact, from 2007 onwards among Non-Euro area countries a strict upward convergence pattern can be identified. It should also be noted that in terms of absolute levels the variation outside the Eurozone is lower compared to the Euro area in throughout the period.

Figure 83: GDP per capita in PPS (unweighted average, right axis) and standard deviation (left axis) in the EU28, 1995-2017



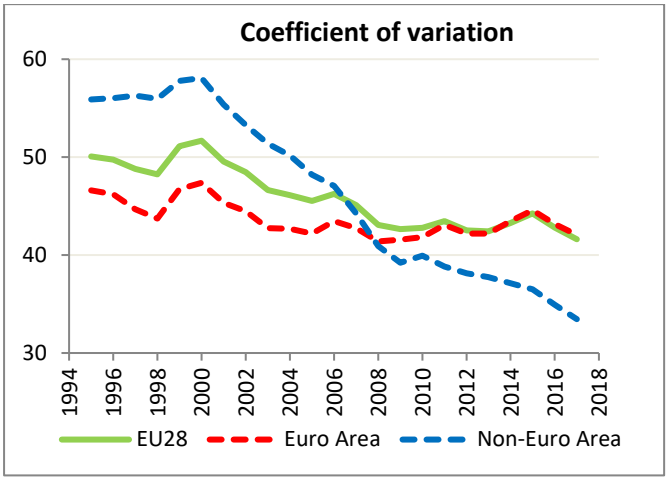
Behind these overall changes **interesting trajectories** can be observed for some countries. For example, Ireland performed well (above the average) until 2008, when it was hardly hit the crisis and the real GDP went down for a couple of years, then since 2010 the country recovered, and the GDP started to grow again. On the contrary, other countries, such as Greece, Bulgaria, Hungary or Croatia, experienced a constant decrease in the GDP per capita, diverging from the EU average. Greece instead performed in line with the EU average until 2008, afterwards the GDP p.c. started to diverge from the average.

Sigma convergence by area

Differently from the previous analysis, a convergence process in the real GDP per capita emerges between 2000 and 2008, when analysing the coefficient of variation, which is

calculated as the ratio of the standard deviation to the mean[3]. The reduction of differences among European countries is particularly relevant in the Non-Euro area, where the convergence process is still taking place.

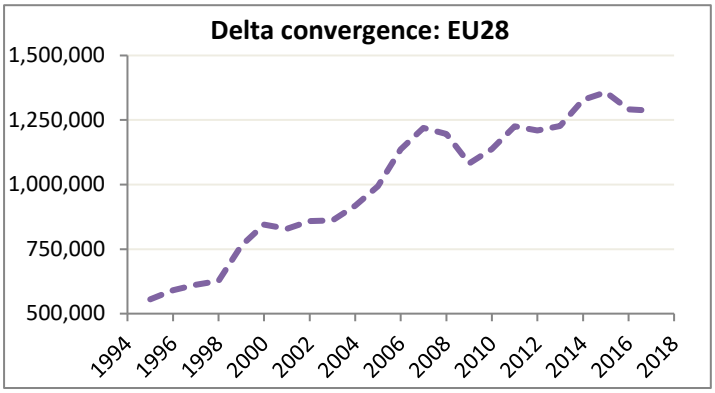
Figure 84: Sigma convergence in the EU28 by area, 1995-2017



Delta convergence

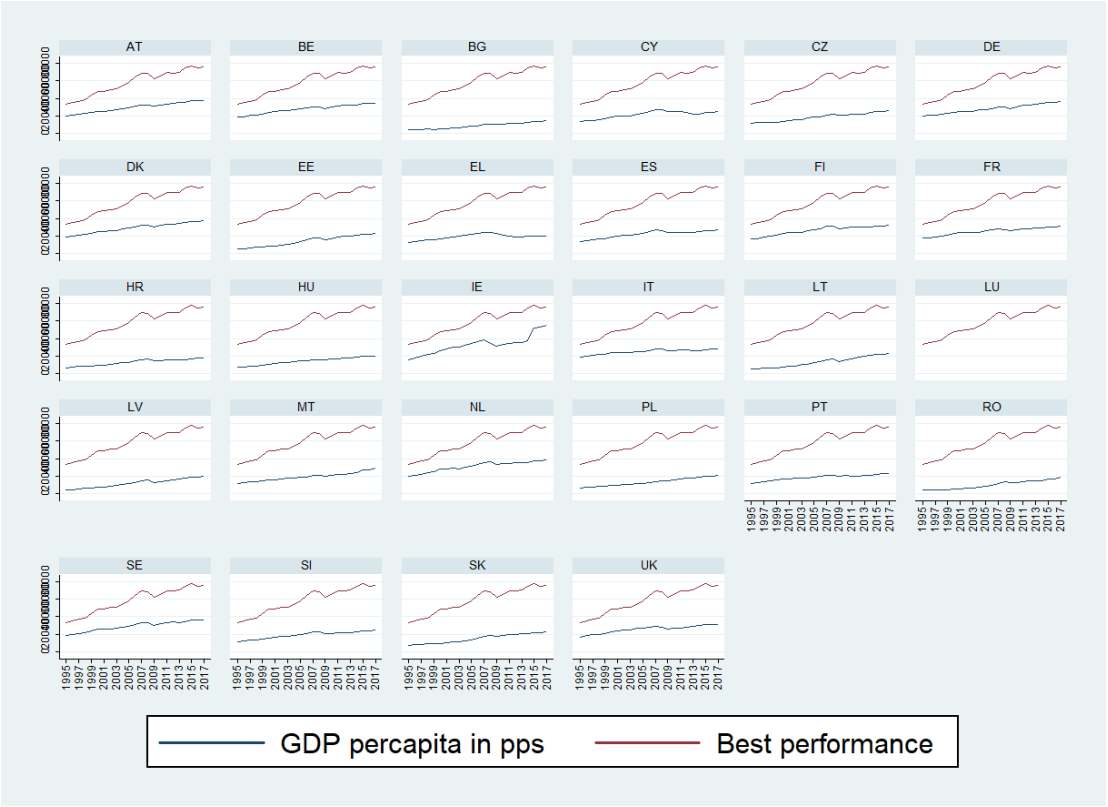
The analysis of delta convergence (which measures the sum of distances of the EU MSs from the best performing country of the EU28) shows **an overall increase between 1995 and 2017 of the distance with respect to the best performing country**. Despite some oscillations, on average European countries diverge with respect of the GPD p.c. of the best performing country, which is Luxemburg over the entire period. Compared to 1995 all the EU countries increase the gap with respect to the GDP p.c. of Luxemburg (see figure 86).

Figure 85: Delta convergence in the EU28, 1995-2017



[3] For a given standard deviation value, the coefficient of variation indicates a high or low degree of variation only in relation to the mean value.

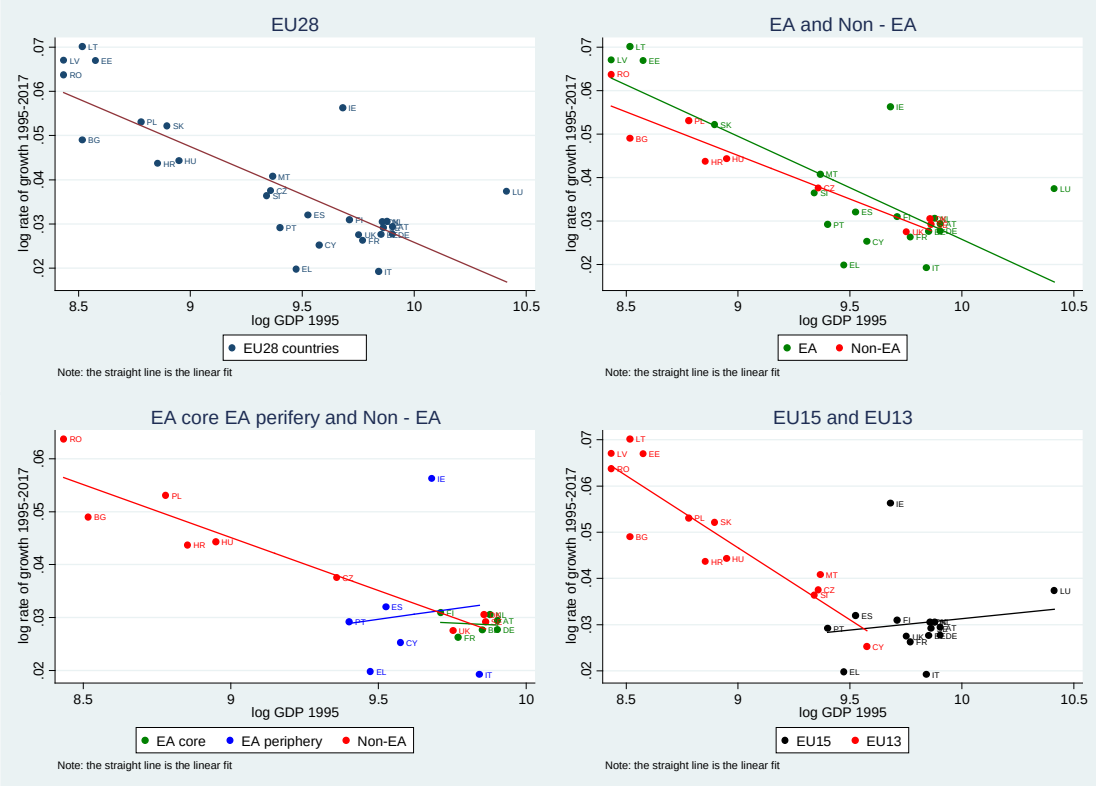
Figure 86: GDP per capita in PPS of EU28 MSs *versus* Best performance line, 1995-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence of the real GDP per capita in PPS over the period 1995-2017 in the EU28** shows a convergence process: new Member States catching up on the Union's richest ones. In particular, Eastern countries (Baltic Republic, Romania, Bulgaria, Poland, Slovakia, Hungary and Croatia) had grown faster than other countries with higher initial levels of GDP p.c. The pace of convergence is estimated at 2% a year. The analysis by groups of countries show that among EU15 countries convergence is no longer taking place. On the contrary, among EU13 countries it is evident a process of convergence and at a higher pace (3% a year).

Figure 87: Unconditional Beta convergence by groups of countries, 1995-2017



Among the EU 28 countries the pace of convergence in GDP p.c. observed in the period 1995-2010 is similar to the one observed in the period 2010-2017 (**following the launch of the EU 2020 Agenda)**. However, when considering subgroups of countries some differences emerge. In the Eurozone a convergence process is only evident in the period 1995-2010; whereas among Non-Euro area countries there is evidence of a convergence process in both periods. In the EU15 no convergence process is taking place in either of the two periods. Instead, among EU13 countries convergence is observed in both periods, and the pace of convergence being higher in the period 2010-2017 (5% a year) than in the previous period (3% a year).

Figure 88: Unconditional Beta convergence in the EU28 by periods, 1995-2017

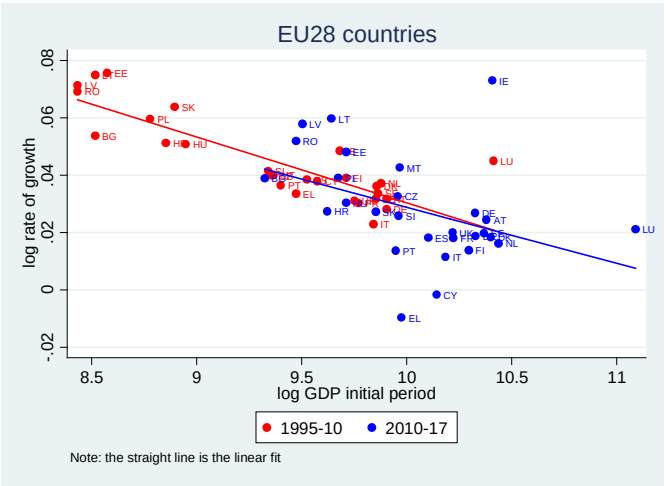
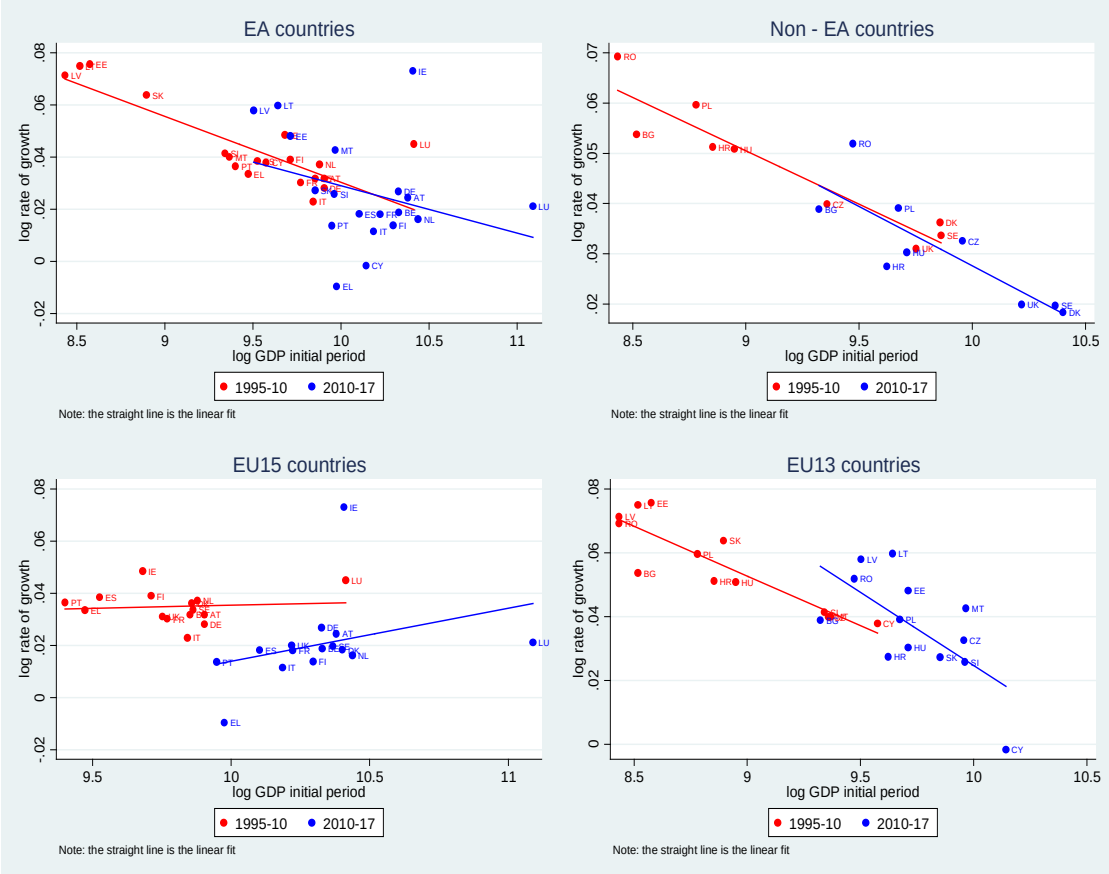


Figure 89: Unconditional Beta convergence by groups of countries and periods, 1995-2017

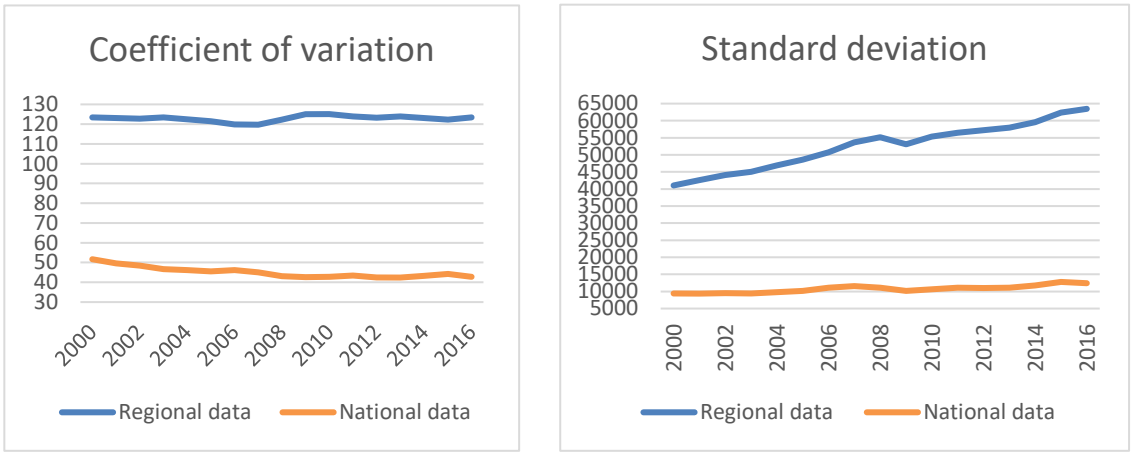


Regional Convergence

Sigma convergence

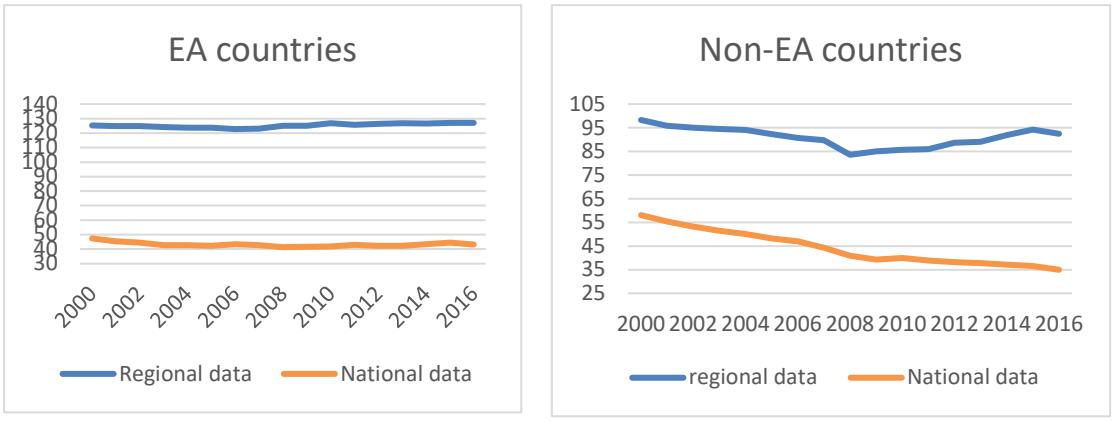
In general, **variation in real GDP per capita in PPS among EU regions is higher with respect to EU countries**. Between 2000 and 2016 there is no evidence convergence among EU regions and distance increase.

Figure 90: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2000-2016



Disparities in real GDP pc among regions are higher in the **Eurozone** than outside the Eurozone. Moreover, in the **Non-Eurozone** different paths of convergence emerge for regions and countries. In fact, if at national level a convergence pattern is evident throughout the 2000-2016 period, convergence among regions is observed only before the crisis (2000-2008), while since the beginning of the crisis disparities increase to a large extent.

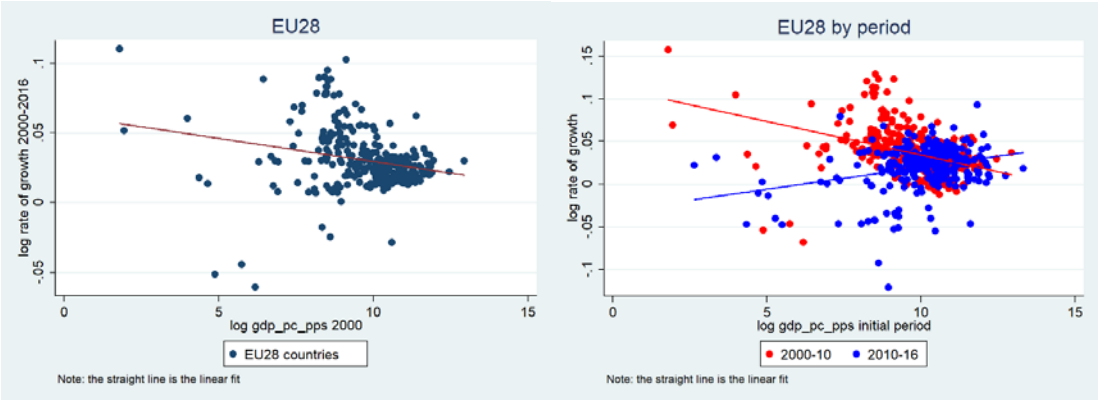
Figure 91: Regional data *versus* national data: coefficient of variation by groups of countries, 2000-2016

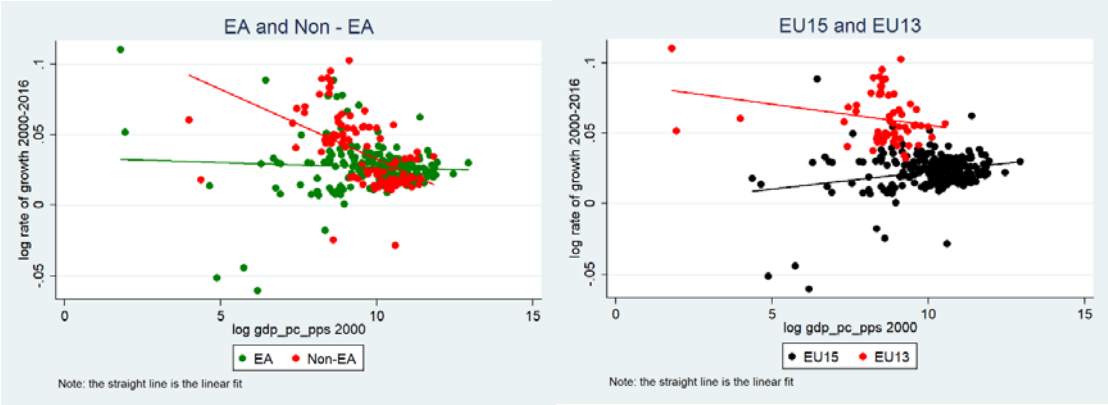


Unconditional Beta convergence

The analysis of unconditional beta convergence **does not show a clear converging pattern of real GDP per capita in PPS among EU regions during the period 2000-2016**. In fact, a catching-up process is evident only in the period 2000-2010. There is also convergence among regions outside Euro Area.

Figure 92: Unconditional Beta convergence among EU28 regions by periods and groups of countries, 2000-2016

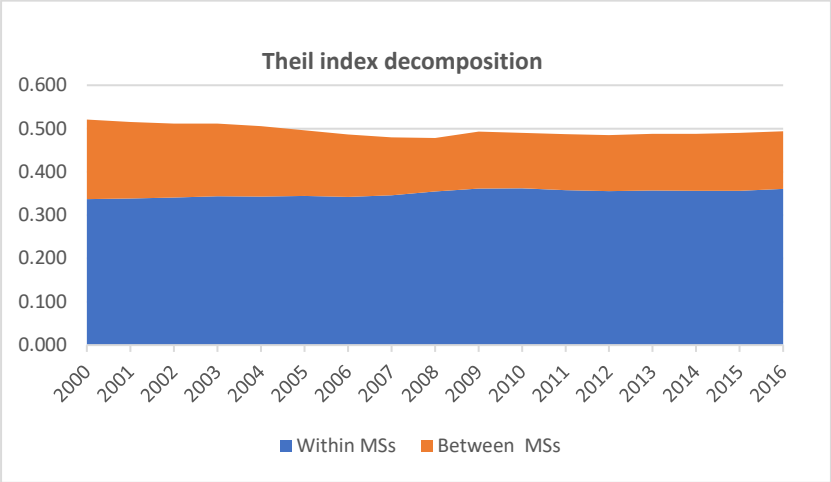




Theil index

The Theil index (another measure of sigma convergence) shows a slight reduction of disparities in real GDP per capita among regions in the period 2000-2016. In particular, the observed reduction is mainly due to a decrease of disparities between MSs rather than among regions within MSs, which in fact register an increase over the period.

Figure 93: Theil index decomposition, 2000-2016



11. Monthly national minimum wages in PPS

Definition: Minimum wage statistics refer to national minimum wages for employees in all sectors or at least in a majority of sectors. Gross wages are reported. Minimum wages are constructed as a simple average of data of semester 1 (1st January) and semester 2 (1st July). The indicator is expressed in purchasing power standards (PPS).

Data source: Eurostat [earn_mw_cur]

Time: 2000-2017

Coverage: the convergence analysis conducted in this fiche does not include European countries which haven't national minimum wage[4], as well as countries which have introduced national minimum wage after 2000 (i.e. Croatia and Germany, that introduced national minimum wage in 2008 and 2015, respectively).

The **analysis of upward convergence** of the monthly minimum wages in PPS shows a weak upward convergence process among the EU28 countries in the period 2000-2017. On average the minimum wage steadily increased and the variation across countries decreased, albeit and increase in disparities is observed until 2007. Differences emerge between the Euro area and the Non-Euro area: on average the Euro area shows a higher national minimum wage, but also higher disparities between countries; while the Non-Euro area observe an upward divergence process until 2007.

Sigma convergence (coefficient of variation) shows that convergence patterns are similar in the Eurozone and in the Non-Eurozone, although convergence is more evident in the latter, which also present higher disparities among countries until 2013.

Delta convergence shows, instead, an overall increase between 2000 and 2017 of the distance in the monthly minimum wages in PPS with respect to the best performing country (Luxembourg).

The analysis of the **unconditional beta convergence** over the period 2000-2017 show a convergence process among the EU28 in the national minimum wages (at 4% a year); the speed of convergence being higher among new MSs. A catching-up process in the EU28 is evident both in the 2000-2010 and in the 2010-2017 period, although the rate of convergence is higher since the launch of the EU 2020 Agenda. Particularly high the convergence speed among new MSs and among countries outside the Eurozone.

[4] The national minimum wage is in 22 out of 28 EU Member States: Belgium, Bulgaria, the Czech Republic, Germany (from 1 January 2015) Estonia, Ireland, Greece, Spain, France, Croatia, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, and the United Kingdom. In all these countries, except Belgium, the national minimum wage is enforced by the government, often after consultation with the social partners. In Belgium, the national minimum wage is set by national intersectoral agreement and acquires legal force by royal decree.

There is no national minimum wage in 6 EU Member States (Cyprus, Denmark, Italy, Austria, Finland and Sweden). Specifically:

For CY minimum wages are set by the government for some specific occupations.

For DK, IT, AT, FI and SE minimum wages are set by sectoral collective agreements.

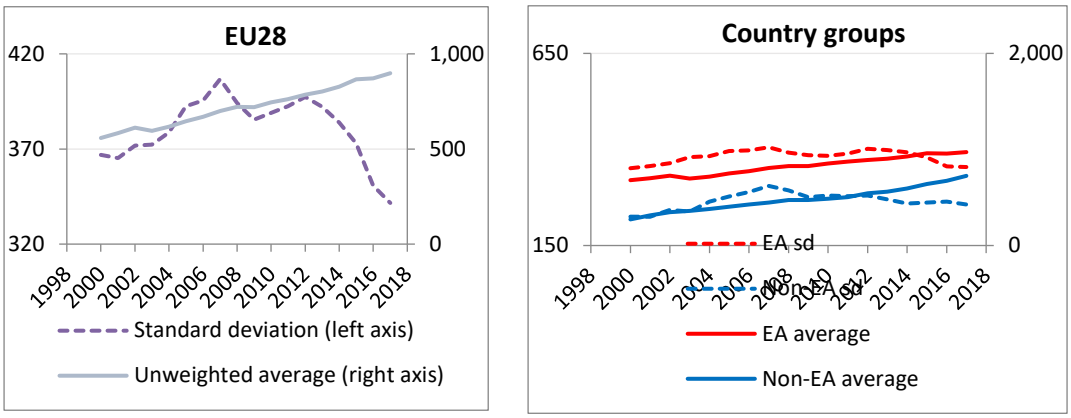
Upward convergence

During the 2000-2017 period, the monthly minimum wages in PPS in the EU28 registered a **weak upward convergence process**: on average monthly minimum wages increased from 524 PPS to 915 PPS and the variation among Member States decreased, despite an increase in the 2001-2007 period. The convergence process is weak since in one country (Lithuania) minimum wage in PPS decreased over the period considered.

Different patterns emerge when looking at **sub-periods.** In fact, during the period the variation among countries presents some oscillations: it increases between 2001 and 2007 and then between 2009 and 2012 (showing upward divergence); whereas it decreases in the period2008-2009 and since 2013 (upward convergence).

During the 2000-2017 period different patterns in the monthly minimum wages in PPS were observed for the **Euro and Non-Euro area**. Specifically, an upward convergence process is recorded in the Euro area: the monthly minimum wages in PPS increase while the variation among countries decreases. Instead, in the Non- Eurozone a clear upward divergence process is recorded between 2000 and 2006, then since 2007 disparities among countries decrease. Moreover, it has to be noted that different levels in the averages and variation are registered between the Euro and Non-Eurozone. In particular, the Eurozone present a higher monthly minimum wage in PPS as well as a higher variation among countries than the Non-Eurozone.

Figure 94: Monthly minimum wages in PPS (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017



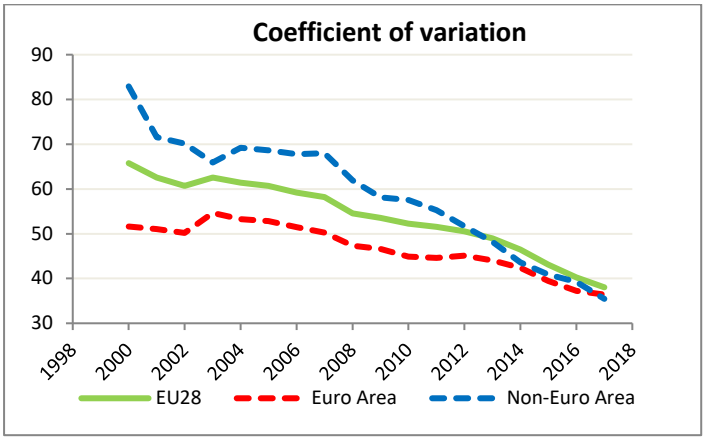
At the country level interesting trajectories can be observed. For example, Cyprus and Greece starting with higher levels converged towards the EU average national minimum wage. Whereas other countries presenting below average national minimum wages at the beginning of the 2000s slowly converged towards the average: Estonia, Latvia, Slovakia, Romania and Poland. In particular Poland almost closed the gap with the EU average in 2017.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the monthly minimum wages in PPS by area. Overall, the analysis of the coefficient of

variation confirms convergence among European MSs. The convergence patterns are similar in the Eurozone and in the Non-Eurozone, although convergence is more evident in the latter, which also present higher variation among countries until 2013, when they become almost equal.

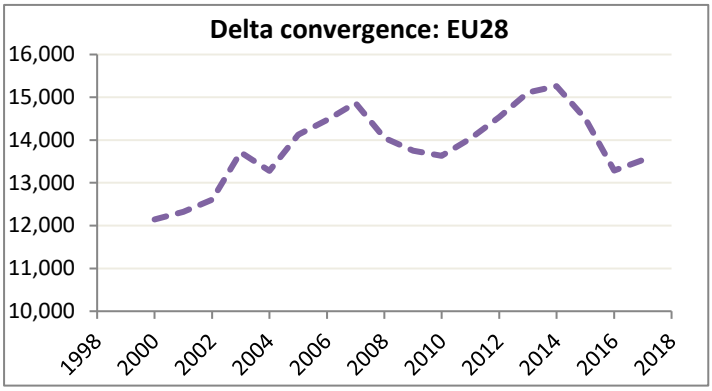
Figure 95: Sigma convergence in the EU28 by area, 2000-2017



Delta convergence

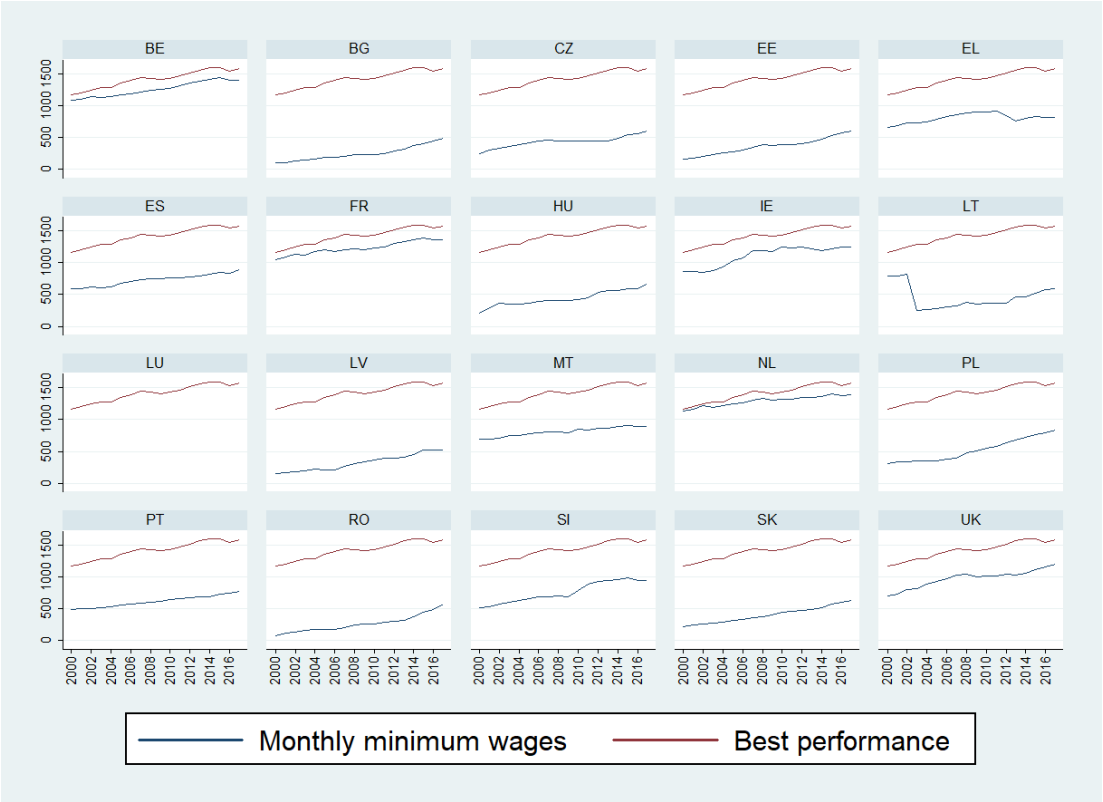
The analysis of delta convergence shows **an overall increase between 2000 and 2017 of the distance with respect to the best performing country**. Despite some oscillations, on average European countries diverge from the monthly minimum wage in PPS of the best performer (i.e. an increase in the sum of the distances from the best performer is observed).

Figure 96: Delta convergence in the EU28, 2000-2017



As can be seen from figure 97, the best performing country over the entire period is Luxembourg, which outperform all other EU countries: the monthly minimum wages in PPS ranging from 1,150 to almost 1,600. Only few countries reduced the gap with Luxembourg; these are Poland, Romania, Hungary, Estonia, and the UK.

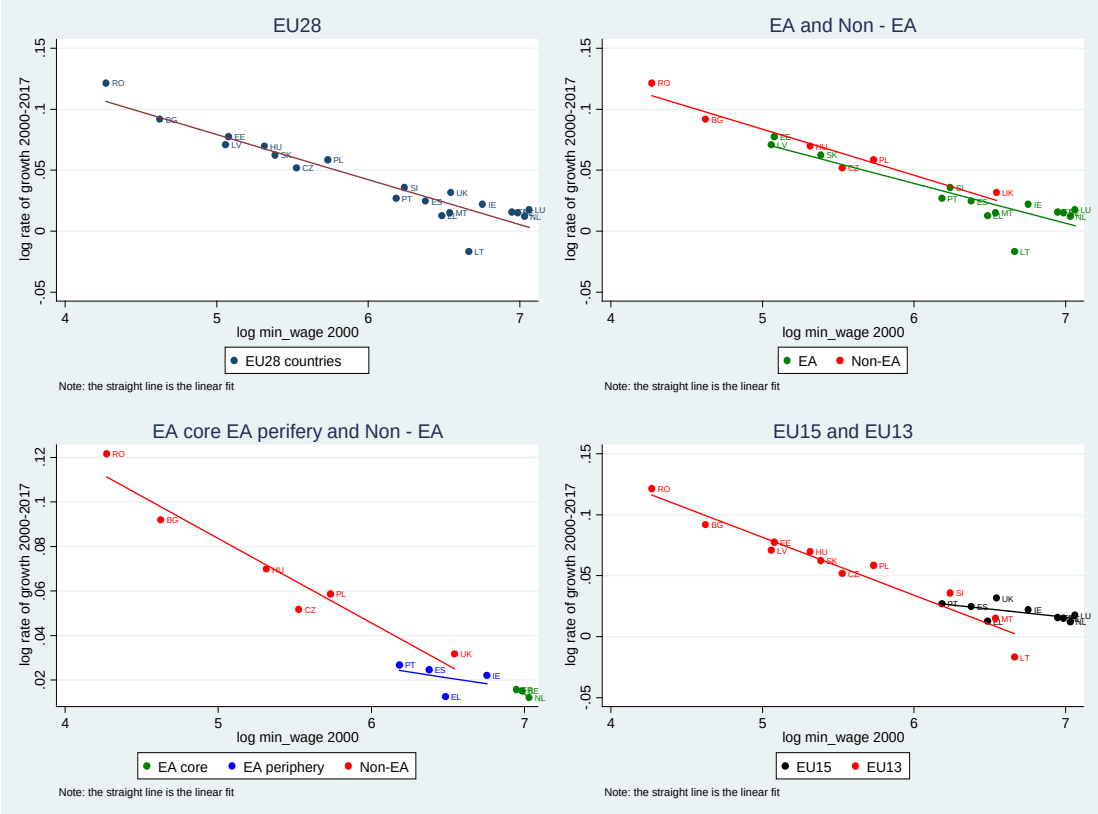
Figure 97: Monthly minimum wages in PPS of EU28 MSs *versus* Best performance line, 2000-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2000-2017** show convergence process among the EU28 in the indicator (at 4% a year). A convergence process is evident also for subgroups of countries, and the speed of convergence is higher among new MSs.

Figure 98: Unconditional Beta convergence by groups of countries, 2000-2017



A catching-up process in the EU28 is evident both in the 2000-2010 and in the 2010-2017 period, although the rate of convergence is higher since the **launch of the EU 2020 Agenda**. Particularly high the convergence speed among new MSs and among countries outside the Eurozone.

Figure 99: Unconditional Beta convergence in the EU28 by periods, 2000-2017

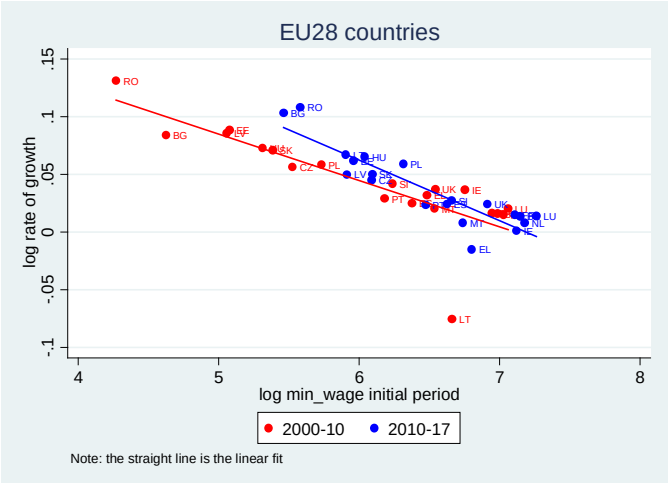
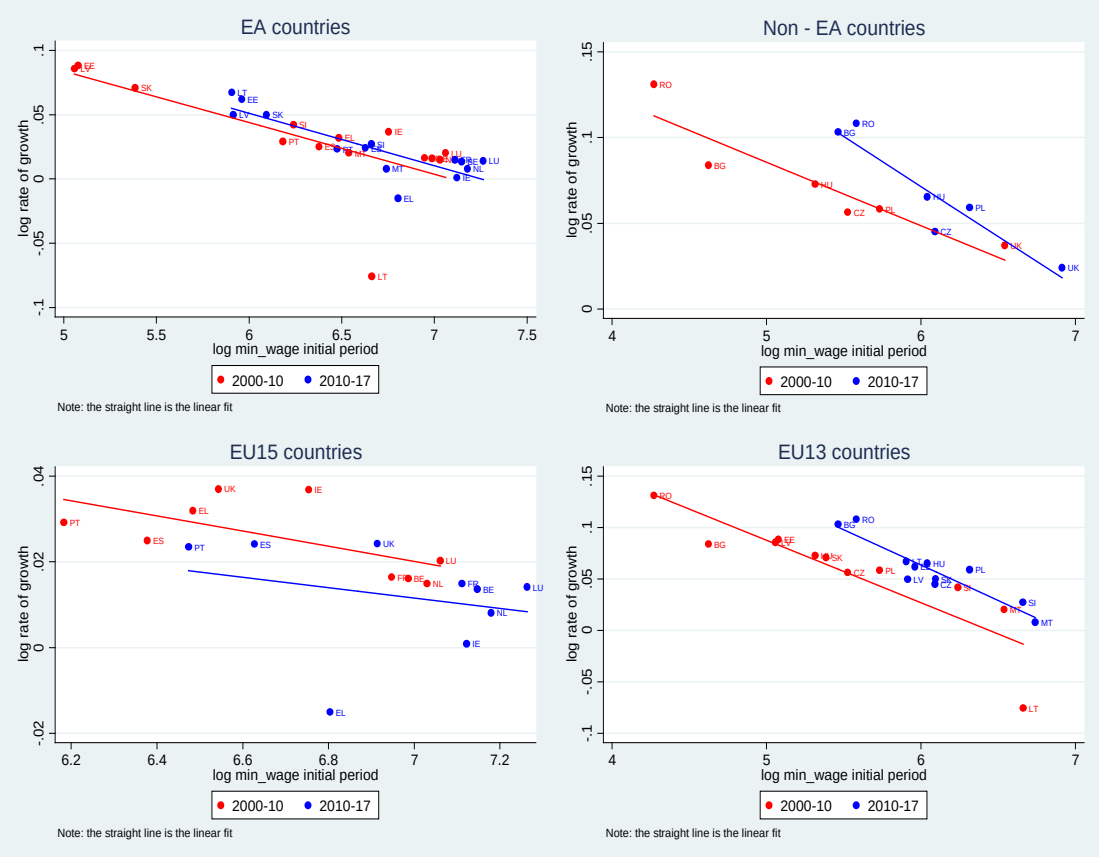


Figure 100: Unconditional Beta convergence by groups of countries and periods, 2000-2017



12. Disposable income of private households

Definition: The disposable income of private households per inhabitant is the balance of primary income and the redistribution of income in cash (i.e. social contributions paid, social benefits in cash received, current taxes on income and wealth paid, as well as other current transfers). It is based on final consumption and expressed in PPS (purchasing power standards).

Data source: Eurostat - Regional economic accounts - ESA 2010 [nama_10r_2hhinc]

Time: 2005-2015

The **analysis of upward convergence** of disposable income of private households per inhabitant in the EU28 shows a weak upward convergence process among the EU countries in the period 2005-2015, as a result of a n initial period of characterised by an upward divergence trend between 2005 and 2007/2008 and then a more consistent upward convergence process from 2008 onwards, albeit an increase in country disparities in 2012. Euro area countries show a clear upward convergence process whereas in the Non-Euro area disparities increased in several periods bringing to an upward divergence trend over the period 2005-2015.

Sigma convergence, measured by the **coefficient of variation**, confirms a convergence trend among EU countries; reduction of disparities being higher in the Non-Euro area, especially since 2008.

Delta convergence shows an overall reduction between 2005 and 2015 of the distance in the disposable incomes with respect to the best performing country.

The analysis of the **unconditional Beta convergence** of the disposable household income over the period 2005-2015 shows a convergence pattern in the EU28. Convergence is observed both among Euro countries and among Non-Euro countries at the same pace. Moreover, a converge process is also registered in the EU13, but not among countries of the EU15.

A converge process in disposable household incomes in the EU is observed both at national and **at regional level**. Moreover, variation is smaller among regions than among countries, at least since 2012, when the variation among regions tend to increase. Differences emerge also when analysing separately the Euro and Non-Euro area. In particular, in the Eurozone regional data show a lower variation with respect to the national ones and a divergence process initiated earlier was registered in the aftermath of the economic and financial crisis (2009-2012). Whereas in the Non-Euro area, regions show instead a pattern of convergence over the whole 2005-2015 period. Furthermore, the analysis of **unconditional beta convergence** shows a converging process of disposable household incomes among EU regions during the period 2005-2015 (at 3% a year). The catching-up process is faster in the period 2005-2010 with respect to the 2010-2015 period. Moreover, the investigation by groups of countries reveals a higher rate of convergence among regions of the Non-Euro area and of the new Member States than among regions of the Eurozone or of the EU15. Finally, the **Theil index** confirms a reduction of disparities in the disposable income of private households among regions in

the period 2005-2015. In particular, the observed reduction is mainly due to a reduction of differences between MSs rather than a reduction among regions within MSs, which remain constant throughout the period.

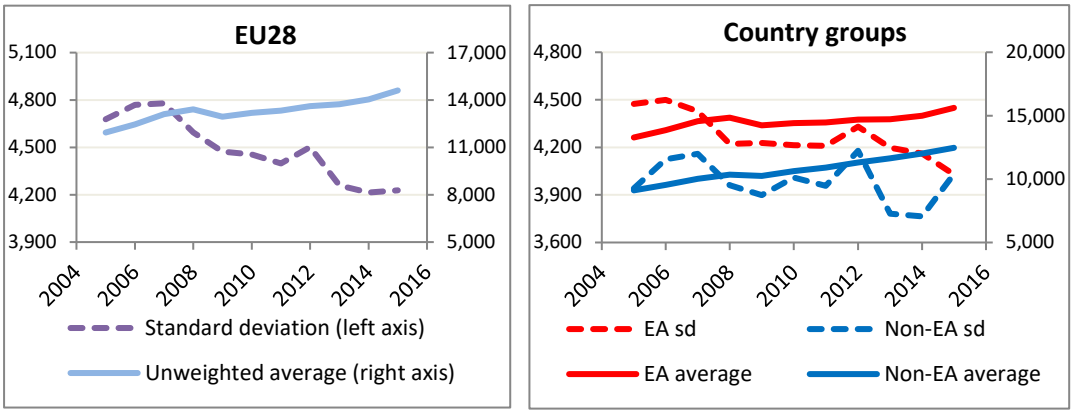
Upward convergence

During the 2005-2015 period the disposable income of private households per inhabitant in the EU28 registered a **weak upward convergence**: on average the income increased from 11.900 PPS to 14.600 PPS and the variation among Member States decreased. The convergence process is weak since Cyprus and Greece registered a decrease of the disposable income of households. Particularly relevant the contraction in Greece: -1.800 PPS.

Looking at **sub-periods two main patterns** emerge. An initial period characterised by an upward divergence trend between 2005 and 2007/2008 and then a more consistent upward convergence process from 2008 onwards, albeit an increase in country disparities in 2012.

For the **Euro and Non-Euro area** similar patterns of the average disposable income were observed during the period. However, the variation among countries follow different trends in the two areas. In fact, among Euro countries a clear upward convergence process took place. Whereas in among Non-Euro countries disparities increased in several periods bringing to an upward divergence trend over the period 2005-2015.

Figure 101: Disposable income of private households per inhabitant in PPS (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2005-2015

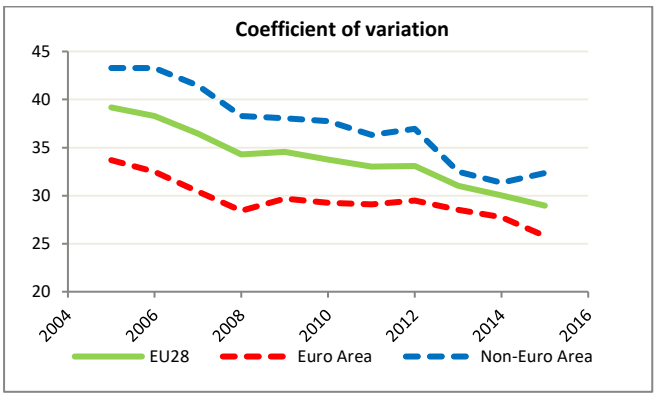


At the country level Behind some **interesting trajectories** can be detected. In particular, a group of MSs with low initial disposable income converged during the period towards the EU average: Estonia, Lithuania, Poland, Slovakia, Romania. Other countries converged, as well, to the EU average, but the situation of households' income significantly deteriorated: Cyprus, Greece, Italy. There are also other countries which diverged from the EU average because the disposable income increased at a faster rate than the average; these are Germany, Austria, Finland and Sweden.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the disposable income of private households by area. Overall, the analysis of the coefficient of variation confirms a convergence trend over the 2005-2015 period. Reduction of disparities being higher in the Non-Euro area, especially since 2008.

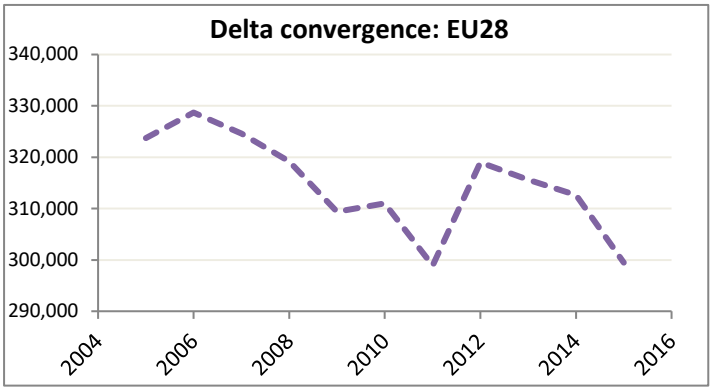
Figure 102: Sigma convergence in the EU28 by area, 2005-2015



Delta convergence

The analysis of delta convergence of the disposable incomes shows also **an overall reduction between 2005 and 2015 of the distance with respect to the best performing country**. Despite some oscillations, on average European countries converge towards the disposable incomes of the best performer (i.e. a reduction in the sum of the distances from the best performer is observed).

Figure 103: Delta convergence in the EU28, 2005-2015



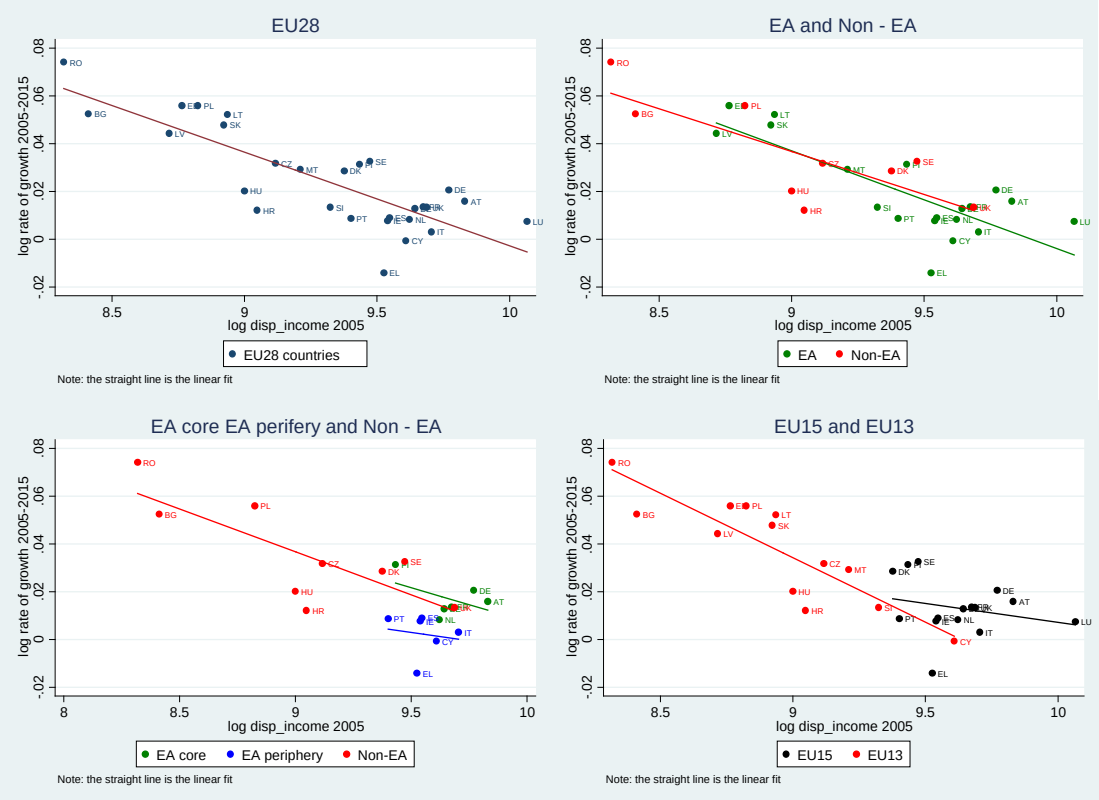
As can be seen from figure 104, the best performing country over the period 2005-2015 is Luxemburg, which has a very high disposable income per inhabitant as compared to most of the other MSs. Only a few countries have comparably high incomes: Austria and Germany, which is catching up at a fast pace. Compared to 2005 there are several EU countries that reduced the gap with Luxemburg; these are Germany, Lithuania, Estonia, Poland, Romania, Sweden.

Figure 104: Disposable income of EU28 MSs *versus* Best performance line, 2005-2015

Unconditional Beta convergence

The analysis of the **unconditional Beta convergence of the disposable household income over the period 2005-2015** shows a convergence pattern in the EU28 at a 4% a year. Convergence is observed both among Euro countries and among Non-Euro countries at the same pace. Moreover, a converge process is also registered in the EU13, but not among countries of the EU15.

Figure 105: Unconditional Beta convergence by groups of countries, 2005-2015



Also analysing sub-periods similar results emerge. Unconditional beta convergence is observed in the EU28 area and among other country groupings (apart from the EU15) both before and after the 2010.

However, the rate of convergence in disposable incomes results higher **after the launch of the EU 2020 Agenda** in the Eurozone (5% a year) and in the EU13 (7% a year).

Figure 106: Unconditional Beta convergence in the EU28 by periods, 2005-2015

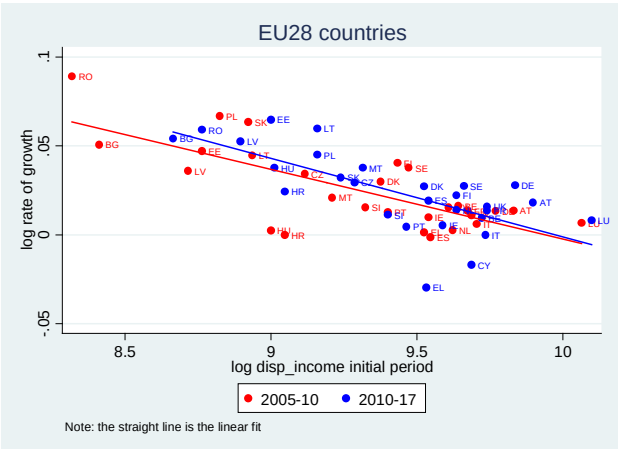
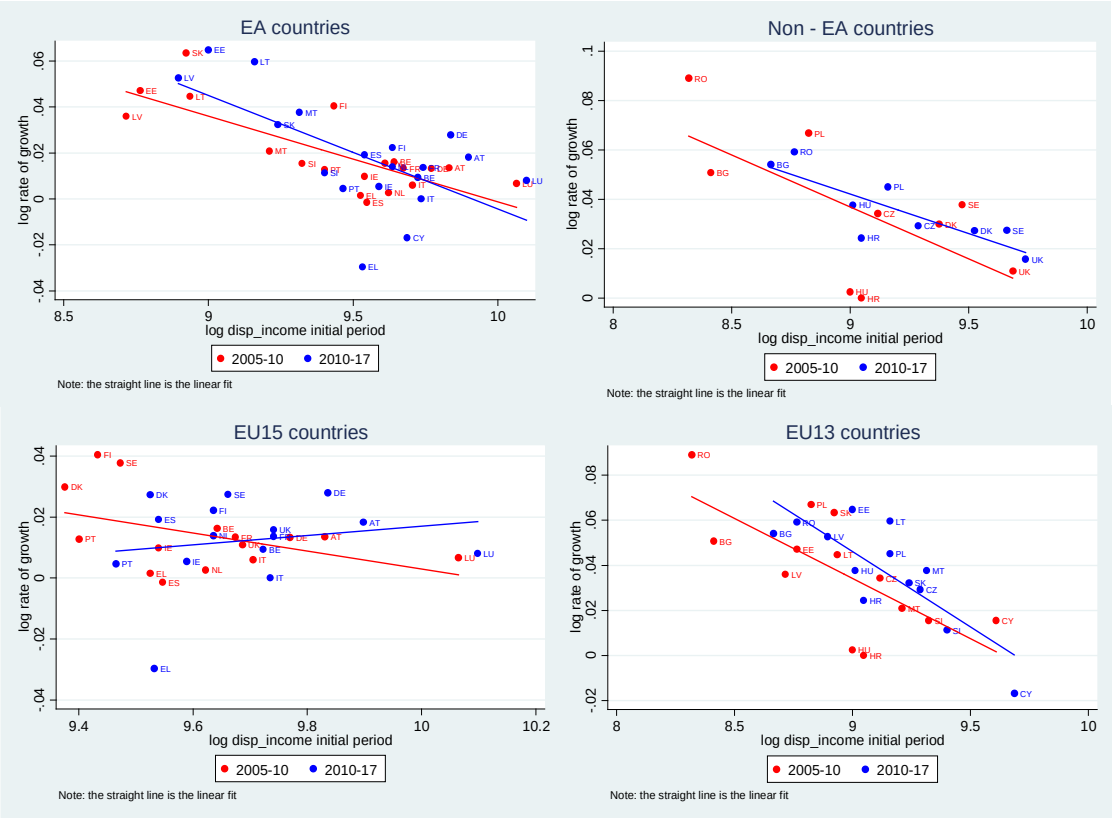


Figure 107: Unconditional Beta convergence by groups of countries and periods, 2005-2015

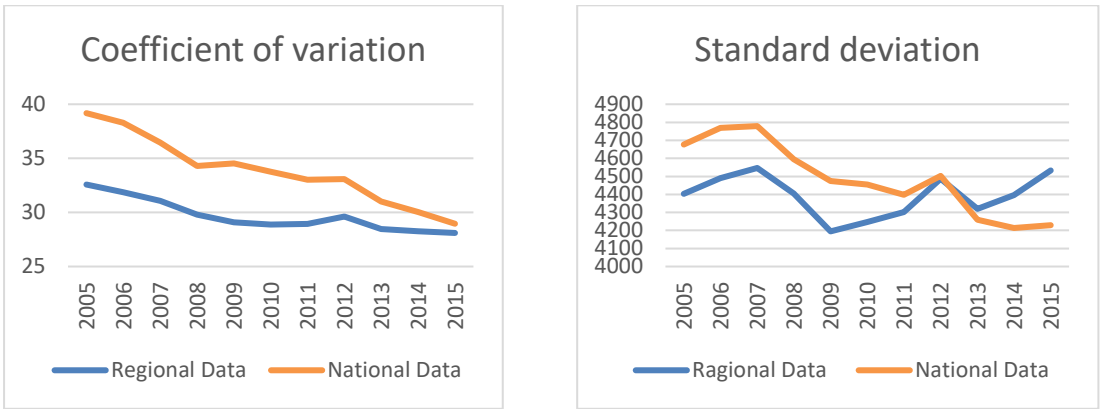


Regional Convergence

Sigma convergence

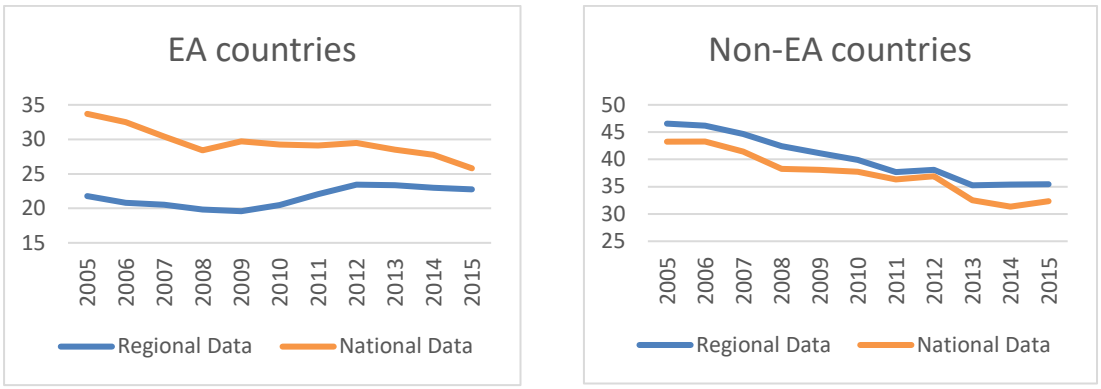
A **reduction of variation** in disposable household incomes in the EU is observed **both at national and regional level.** Moreover, disparities are smaller among regions than among countries, at least since 2012, when the variation among regions tend to increase.

Figure 108: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2005-2015



Differences emerge also when analysing separately the **Euro and Non-Euro area**. In particular, in the Eurozone regional data show a lower variation with respect to the national ones and a divergence process initiated earlier was registered in the aftermath of the economic and financial crisis (2009-2012). Whereas in the Non-Euro area, regions show instead a pattern of convergence over the whole 2005-2015 period.

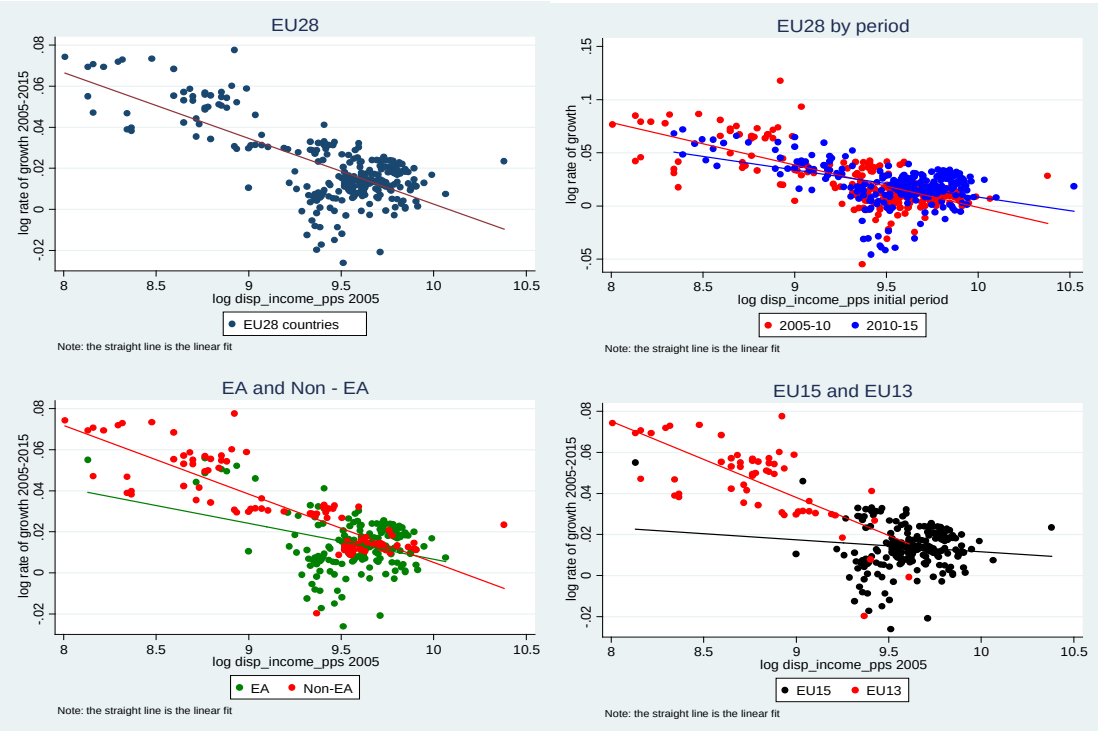
Figure 109: Regional data *versus* national data: coefficient of variation by groups of countries, 2005-2015



Unconditional Beta convergence

The analysis of unconditional beta convergence shows a **converging process of disposable incomes among EU regions during the period 2005-2015** (at 3% a year). The catching-up process is faster in the period 2005-2010 with respect to the 2010-2015 period. Moreover, the investigation by groups of countries reveals a higher rate of convergence among regions of the **Non-Euro area** and of the new Member States than among regions of the Eurozone or of the EU15**.**

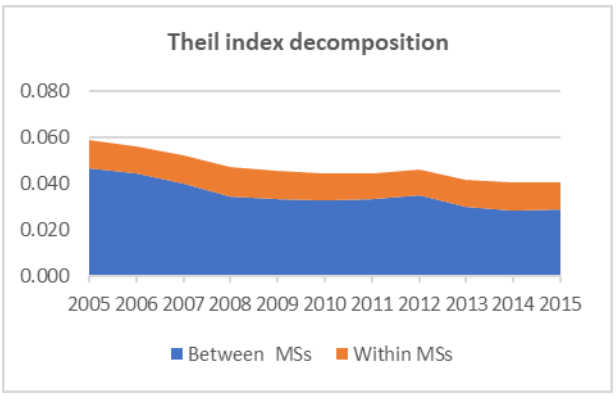
Figure 110: Unconditional Beta convergence among EU28 regions by periods and groups of countries, 2005-2015



Theil index

The Theil index (another measure of sigma convergence) shows a reduction of disparities in the disposable income of private households among regions in the period 2005-2015. This result is in line with the ones obtained above with other measures. In particular, the observed reduction is mainly due to a reduction of differences between MSs rather than a reduction among regions within MSs, which remain constant throughout the period.

Figure 111: Theil index decomposition, 2005-2015



13. Income inequality: income quintile share ratio

Definition: income quintile share ratio (s80/s20) is a measure of the inequality of income distribution. It is calculated as the ratio of total income received by the 20 % of the population with the highest income (the top quintile) to that received by the 20 % of the population with the lowest income (the bottom quintile). All incomes are compiled as equivalised disposable incomes.

Data source: Eurostat – EU SILC [ilc_di11]

Time: 2006-2016

The **analysis of upward convergence** of the income quintile share ratio in the EU28 shows a weak downward divergence process among the EU countries in the period 2006-2016. In fact, after initial period (2006-2011) of reduction of differences, variation among countries increased in the period 2011-2015, especially in the Non-Euro area. However, between 2015 and 2016 new signs of convergence are observed.

Sigma convergence (coefficient of variation) shows similar patterns for men and women, although convergence observed in the period 2006-2011 is stronger for women than for men.

Delta convergence shows also different trends during the period: an overall reduction of income inequality distance with respect to the best performing countries (Slovenia and the Czech Republic), followed by an increase since 2011.

The analysis of the **unconditional Beta convergence** over the period 2006-2016 shows a convergence process in the EU28 at 2% a year. However, when distinguishing by periods, unconditional beta convergence is only observed in the period before the launch of the EU 2020 Agenda (2006-2010). In this period convergence is registered not only in the EU28, but also in other groups of countries.

Downward convergence

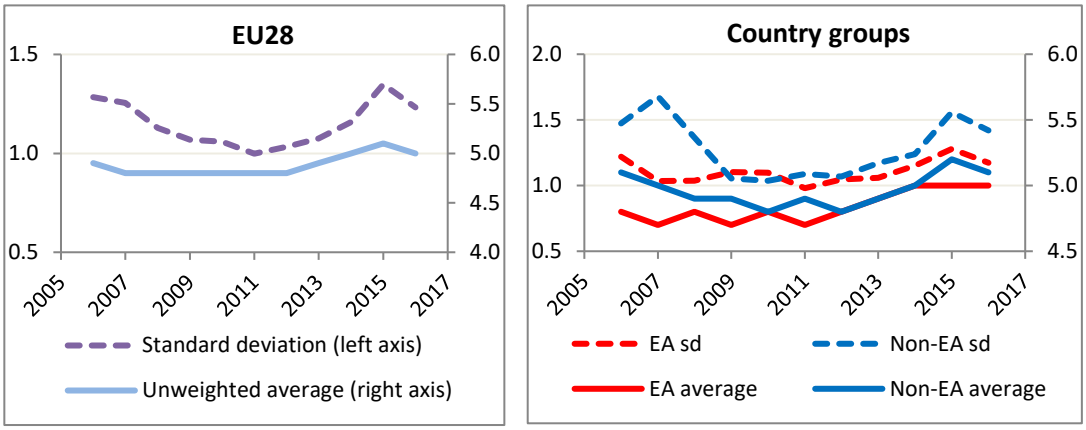
During the 2006-2016 period, the income quintile share ratio in the EU28 registered **weak downward divergence**: on average the income quintile share ratio increased from 4.9 to 5 in the EU28 and the variation among Member States increased. The convergence process is weak since in some countries income inequality ratio decreased over the period considered. Particularly relevant the decrease registered by Latvia (-1.6) and Hungary (-1.2).

Different patterns emerge when looking at **sub-periods**. In fact, from 2006 to 2011 average income inequality remained stable while disparities across MSs decreased. Differently, in the period 2012-2015 a clear pattern of downward divergence took place. Finally, since 2015 a principle of upward convergence can be detected.

Those developments were mostly driven by the Non-Euro area, where standard deviation decreased particularly between 2007 and 2010 and went up again until 2015, whereas it

only very moderately decreased (with some oscillations) between 2006 and 2011 across the Eurozone and went than up in line with the Non-Euro-area.

Figure 112: Income quintile share ratio (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2006-2016

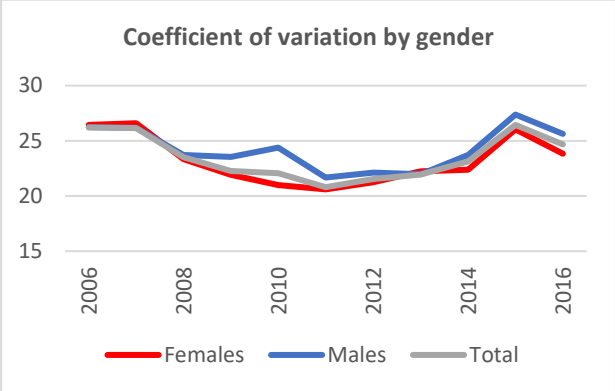


At the country level interesting trajectories can be observed. For example, Bulgaria, Spain, Greece and Italy diverged presenting higher differences at the end of the period. Whereas, other countries such as Croatia, Latvia, Portugal and the UK reduced differences and converged towards the EU average.

Sigma convergence by gender

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the income quintile share ratio by gender. Overall during the period 2006-2016 the convergence trends for men and women are quite similar. However, for women the decrease in the coefficient of variation in the period 2007-2011 is stronger than for men.

Figure 113: Sigma convergence in the EU28 by gender, 2006-2016



Delta convergence

The analysis of **delta convergence shows different trends during the period** under analysis. In fact, an overall reduction of the disparities in the income quintile share ratio with respect to the best performing country is registered between 2006 and 2011 (albeit a sudden increase in 2009), followed by an increase in the disparity between 2011 and 2015.

Figure 114: Delta convergence in the EU28, 2006-2016

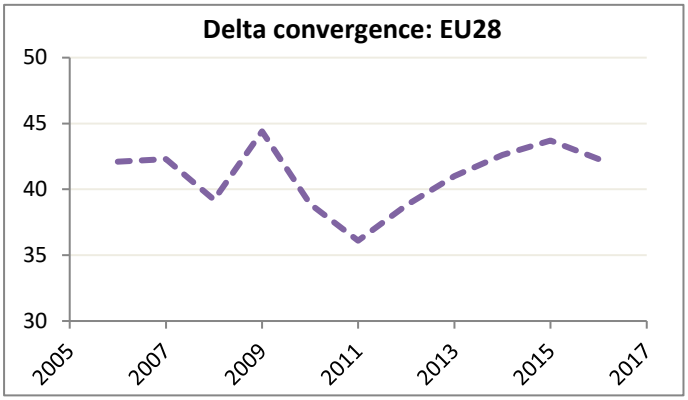
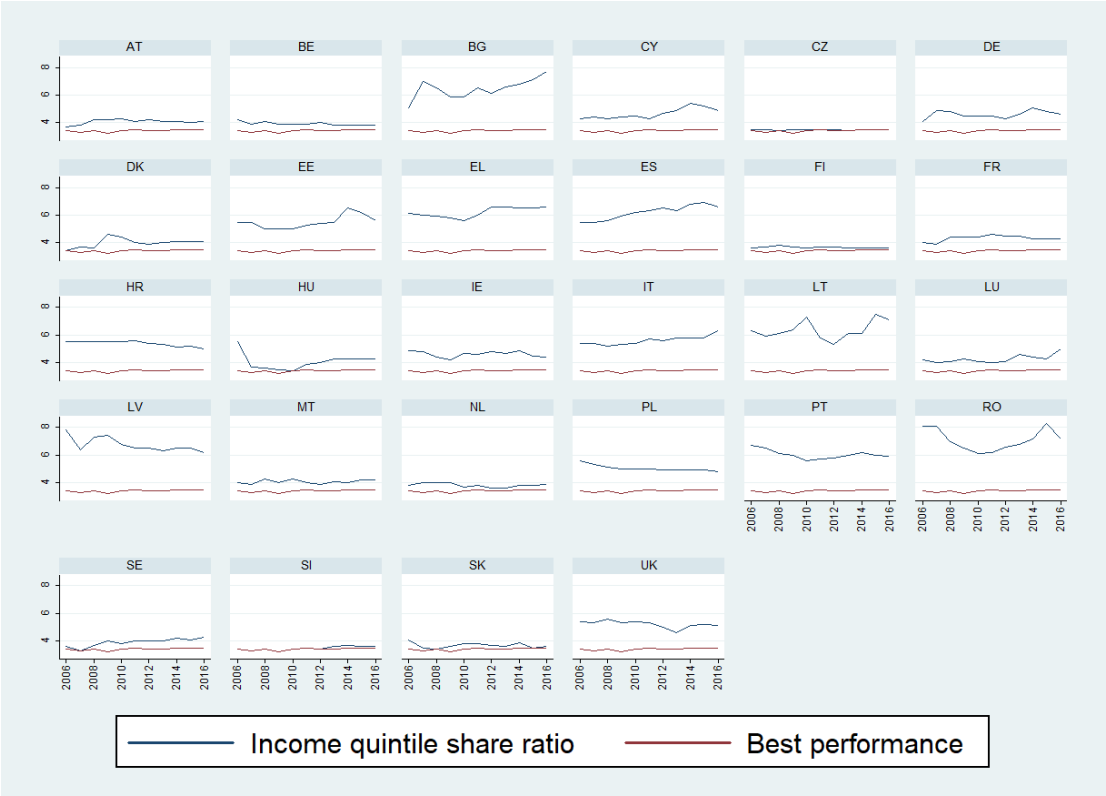


Figure 115 shows that the best performing countries over the period 2006-2016 are, with some exceptions, Slovenia and the Czech Republic. Also, Finland and Slovakia present similar values. During the period under observation Poland and the UK significantly reduced the gap with the best performing countries. On the contrary, Bulgaria, Cyprus, Estonia, Greece, Spain, Italy increased the gap during the period.

Figure 115: Income quintile share ratio of EU28 MSs *versus* Best performance line, 2006-2016

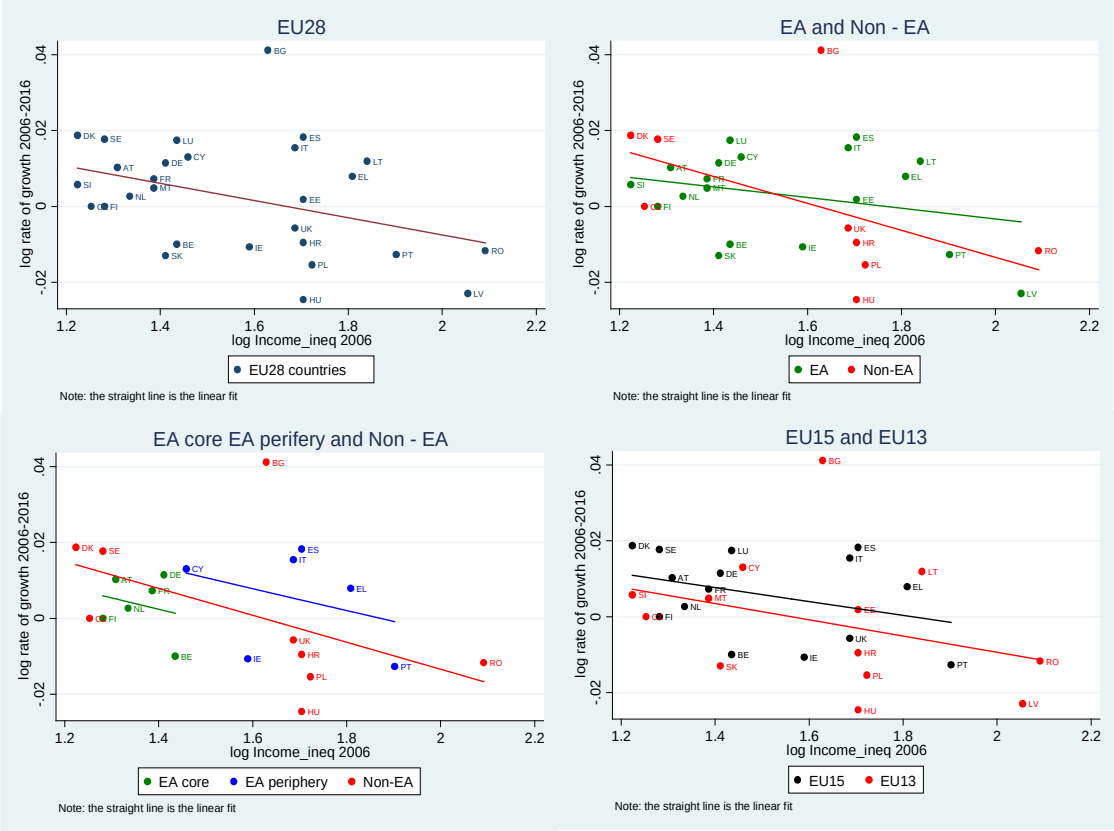


Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2006-2016** shows a convergence process in the EU28 at 2% a year: countries with higher income quintile share

ratios present larger reductions during the period. A significant convergence process is observed only in the EU28 area, but not in the other country groupings.

Figure 116: Unconditional Beta convergence by groups of countries, 2006-2016



Moreover, unconditional beta convergence is only observed in the period before the **launch of the EU 2020 Agenda** (2006-2010). In this period convergence is registered not only in the EU28, but also in other groups of countries: Euro Area and Non-Euro area, the EU15.

Figure 117: Unconditional Beta convergence in the EU28 by periods, 2006-2016

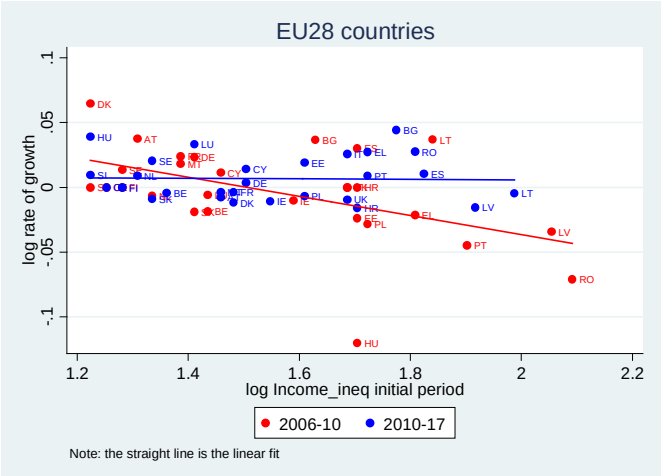
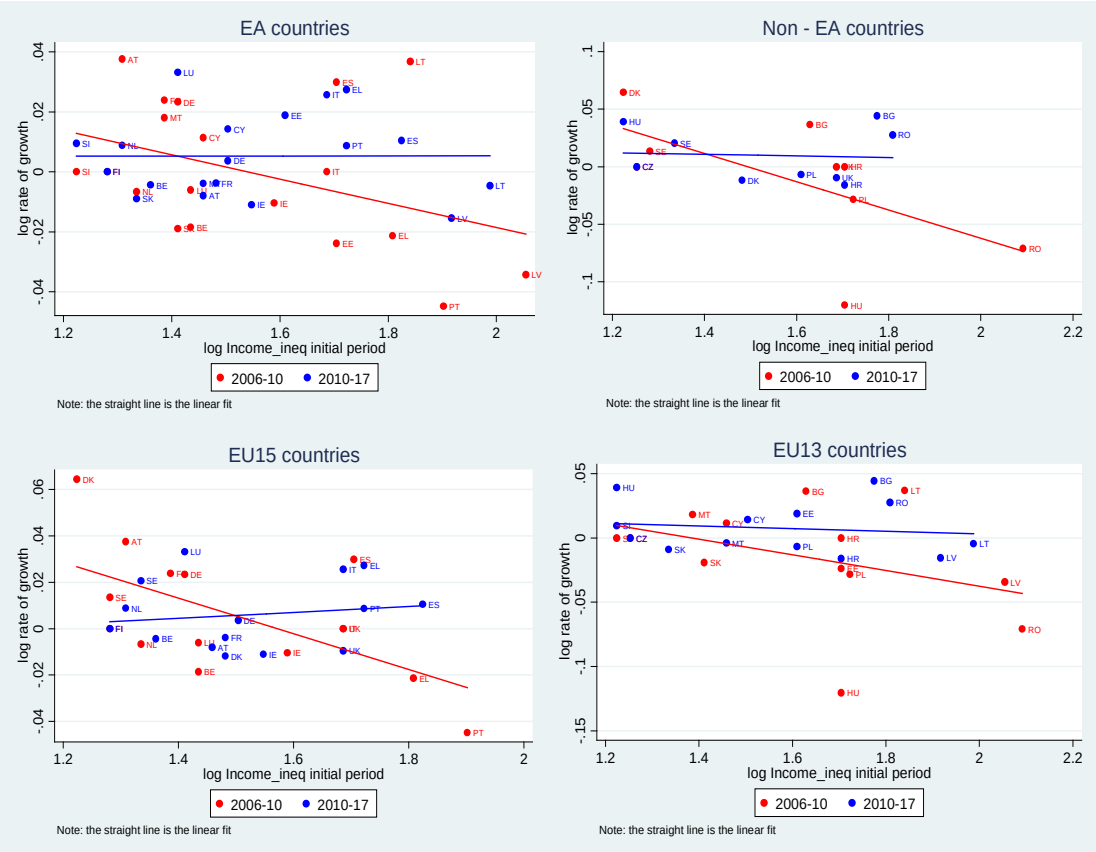


Figure 118: Unconditional Beta convergence by groups of countries and periods, 2006-2016



14. Early school leavers

Definition: share of people aged 18-24 who had completed at most a lower secondary education and were not in further education or training during the four weeks preceding the survey.

Data source: Eurostat – LFS [edat_lfse_14]

Time: 2002-2017

The **analysis of upward convergence** of the early school leavers (ESL) rate in the EU28 shows a weak upward convergence process among the EU countries steadily over the period 2002-2017.

On average the early school leavers rate decreased and the variation among Member States decreased as well. For the Euro and Non-Euro area similar patterns emerge, although the convergence trend is more pronounced in the Euro area, which starts with higher levels in 2002.

Sigma convergence (coefficient of variation) shows a pattern of convergence over the period 2002-2017 both for men and women. However, the convergence trend is more evident for males than for women. In fact, women present more oscillations during the period and a divergence trend is observed from 2012 onwards

Delta convergence shows also an overall reduction between **2002 and 2017 of the distance in the early school leavers rate with respect to the best performing country.**

The analysis of the **unconditional Beta convergence** over the period 2002-2017 shows a convergence process in the EU28 at 3% a year: countries with higher early school leavers rates presenting larger reductions during the period. When distinguishing by groups of countries, the convergence process is evident only in the Eurozone and in particular among the core MSs.

Regional data at NUTS2 level show that variation in early school leavers rates are similar among EU regions and EU countries. They both shows a pattern of convergence since 2004, with a slow down since 2012. However, analysing separately the Euro and Non-Euro area, there emerge a clear convergence trend in the Euro area as opposed to a more variable path in the Non-euro area. In fact, in the latter area an increase of differences among regions since 2013. Moreover, the analysis of **unconditional beta convergence** shows a converging pattern of early school leavers rates among EU regions during the period 2004-2016 (at a 3% a year). The pace of convergence being higher in the period 2010-2016 (following the launch of the EU2020 agenda). Also, the investigation by groups of countries reveals different paces of convergence between regions, which are higher in the Euro area and among old MSs than in the Non-Euroarea or among the new MSs.

Upward convergence

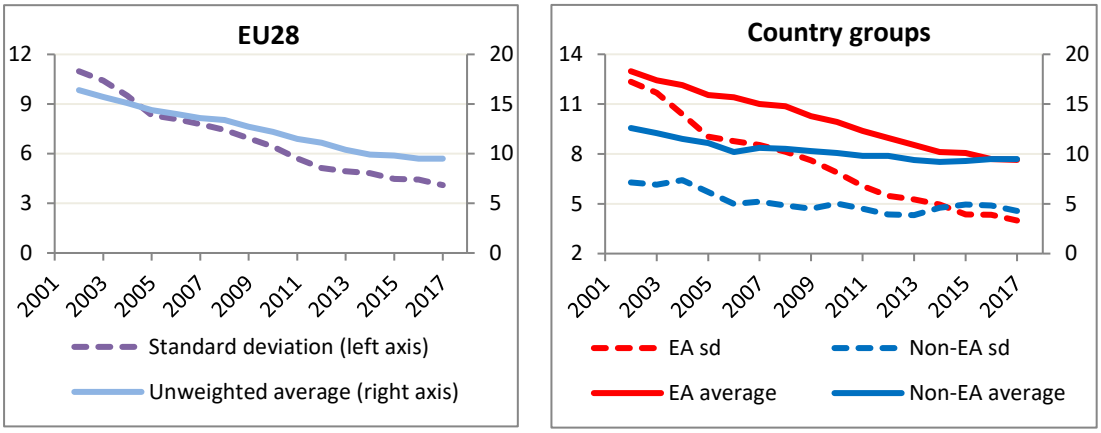
During the 2002-2017 period, the early school leavers (ESL) rate in the EU28 registered a **weak upward convergence process**: on average the early school leavers rate decreased from 15.7% to 9.5% in the EU28 and the variation among Member States decreased as well.

The convergence process is weak since in some countries, over the period considered, the early school leavers rate increased of a few percentage points (the Czech Republic, Hungary and Slovakia).

No different patterns emerge: the proportion of ESL has decreased rather steadily over the period analysed.

For the **Euro and Non-Euro area** similar patterns emerge, although the convergence trend is more pronounced in the Euro area, which starts with higher levels in 2002.

Figure 119: Early school leavers rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2002-2017

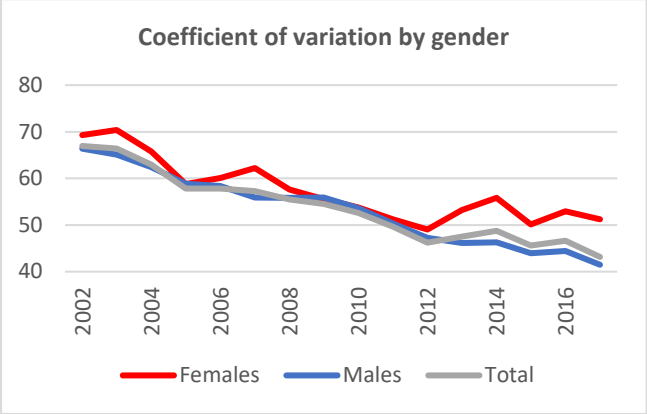


At the country level interesting trajectories can be observed during the period. For instance, there are some MSs with high initial levels of early school leaving which show clear signs of convergence: Malta, Portugal, Spain. Instead, other MSs presenting lower initial levels converge from below to the EU average rate: Austria, Czech Republic, Finland, Croatia, Poland, Sweden, Slovakia and Slovenia.

Sigma convergence by gender

In this section we use the coefficient of variation to measure convergence among EU MSs in the rate of early school leavers by gender. The coefficient of variation shows a pattern of convergence over the period 2002-2017 both for men and women. However, the convergence trend is more evident for males than for women. In fact, women present more oscillations during the period and a divergence trend is observed from 2012 onwards.

Figure 120: Sigma convergence in the EU28 by gender, 2002-2017



Delta convergence

The analysis of delta convergence shows also an overall reduction between 2002 and 2017 of the distance in early school leavers rate with respect to the best performing country. Despite some oscillations, on average European countries converge towards the early school leavers rates of the best performer.

Figure 121: Delta convergence in the EU28, 2002-2017

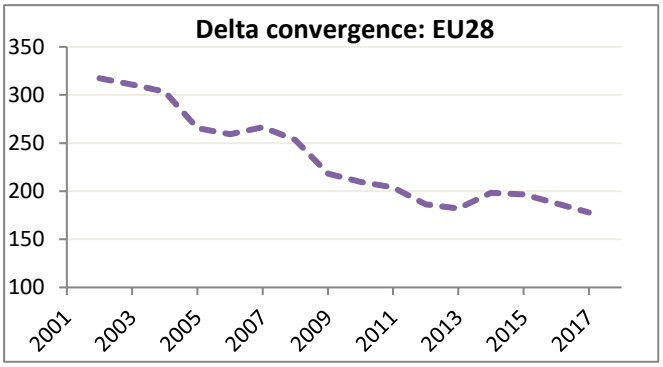


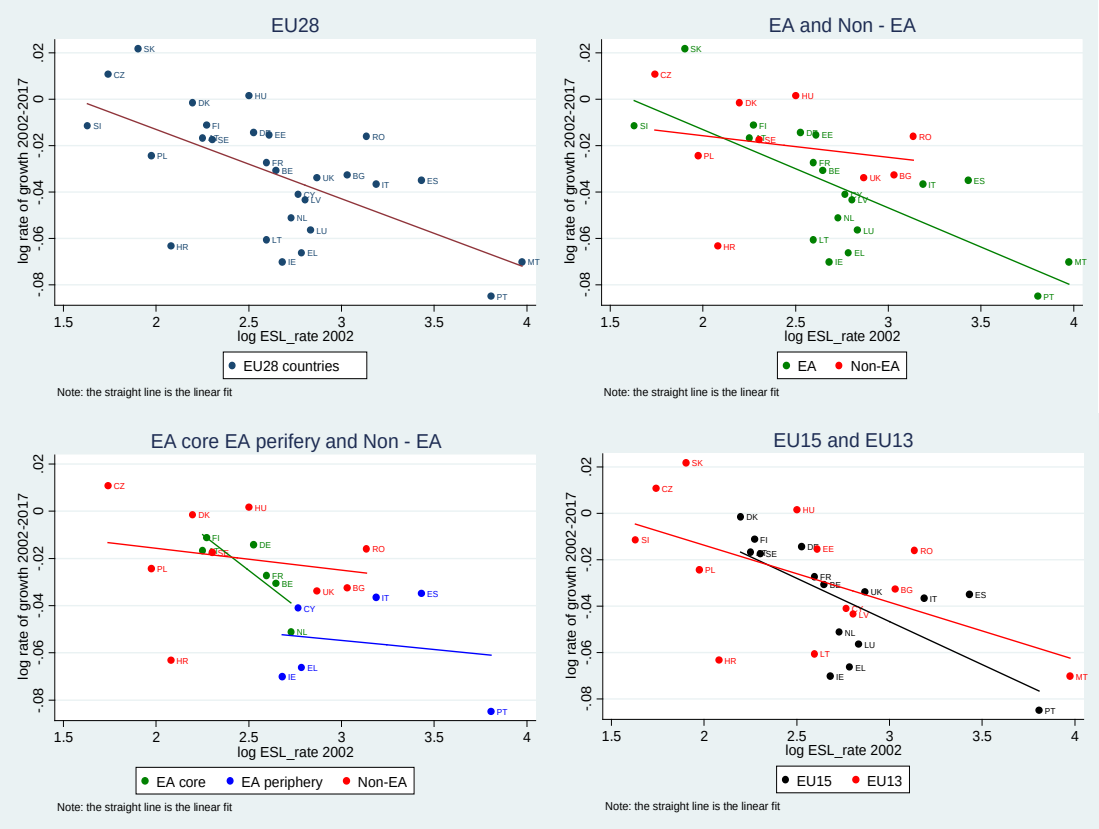
Figure 122 shows that the best performing countries over the period 2002-2017 are Slovenia, Slovakia and Croatia, although there are some other countries which present similar levels (i.e. Scandinavian countries and most of the new accession countries). During the period under observation the MSs which show the largest gap reductions are the Mediterranean countries: Spain, Italy, Malta and Portugal.

Figure 122: Early school leavers rate of EU28 MSs *versus* Best performance line, 2002-2017

Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2002-2017** shows a convergence process in the EU28 at 3% a year: countries with higher early school leavers rates presenting larger reductions during the period. When distinguishing by groups of countries, the convergence process is evident only in the Eurozone and in particular among the core MSs (see figure 123).

Figure 123: Unconditional Beta convergence by groups of countries, 2002-2017



Among the EU 28 countries the pace of convergence in the early school leavers rate rates **is higher in the period following the launch of the EU 2020 Agenda** (5% a year) with respect to the previous period (2% a year). In particular, after 2010 the convergence process is particularly strong in the Euro area. Whereas for the Non-Euro area a significant process of convergence is not observed.

Differences in convergence patterns and rates are also evident when distinguishing between EU15 and EU13 countries. Among new accession countries the pace of convergence in early school leavers rates is lighter and registered only before 2010. Instead, for the EU15 countries a convergence process is observed only after 2010 and at a high pace (6% year).

Figure 124: Unconditional Beta convergence in the EU28 by periods, 2002-2017

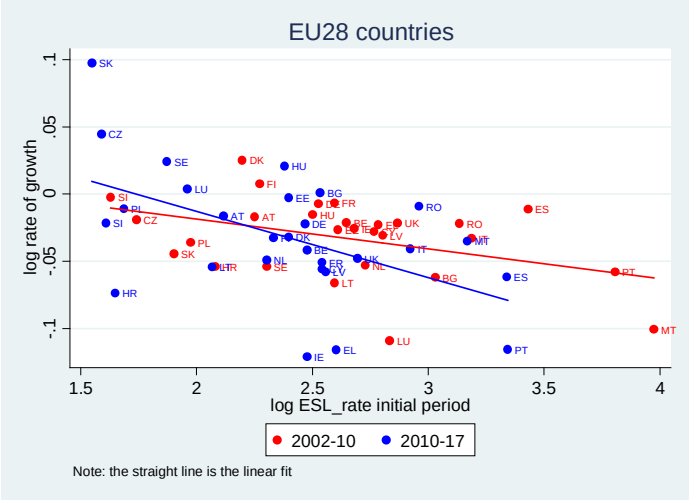
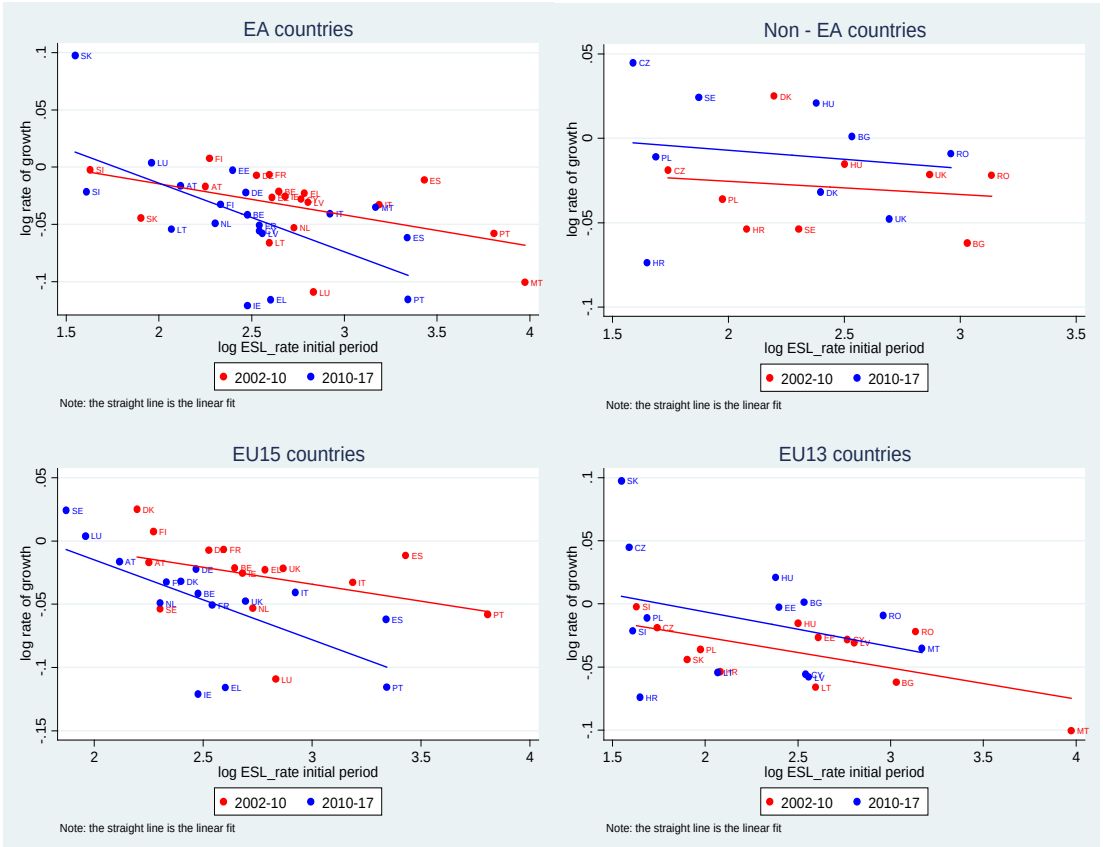


Figure 125: Unconditional Beta convergence by groups of countries and periods, 2002-2017

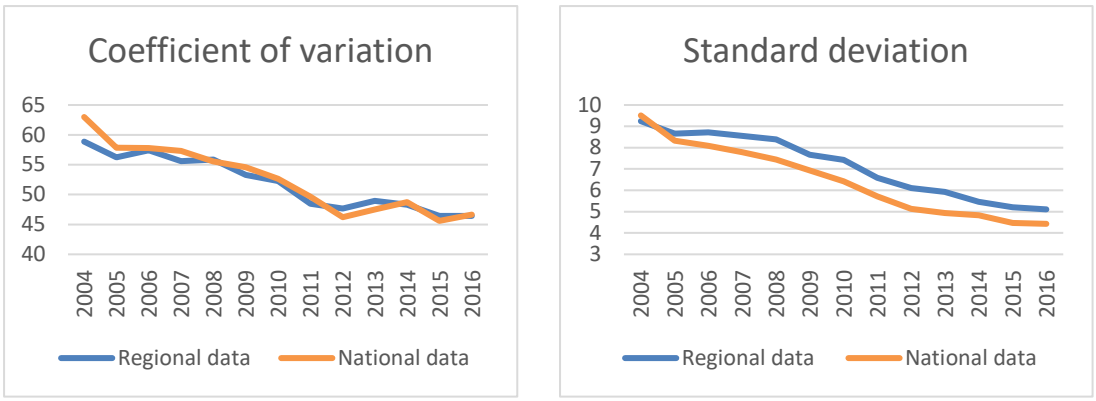


Regional Convergence

Sigma convergence

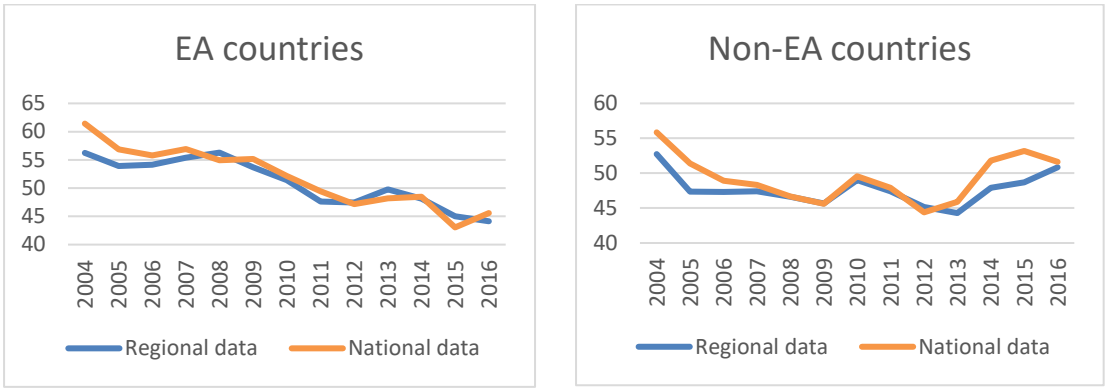
In general, **differences in early school leavers rates are similar among EU regions and EU countries**. They both shows a pattern of convergence since 2004, with a slow down since 2012.

Figure 126: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Analysing separately the **Euro and Non-Euro area**, there emerge a clear convergence trend in the Euro area as opposed to a more variable path in the Non-euro area. In fact, in the latter area an increase of differences among regions since 2013.

Figure 127: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016

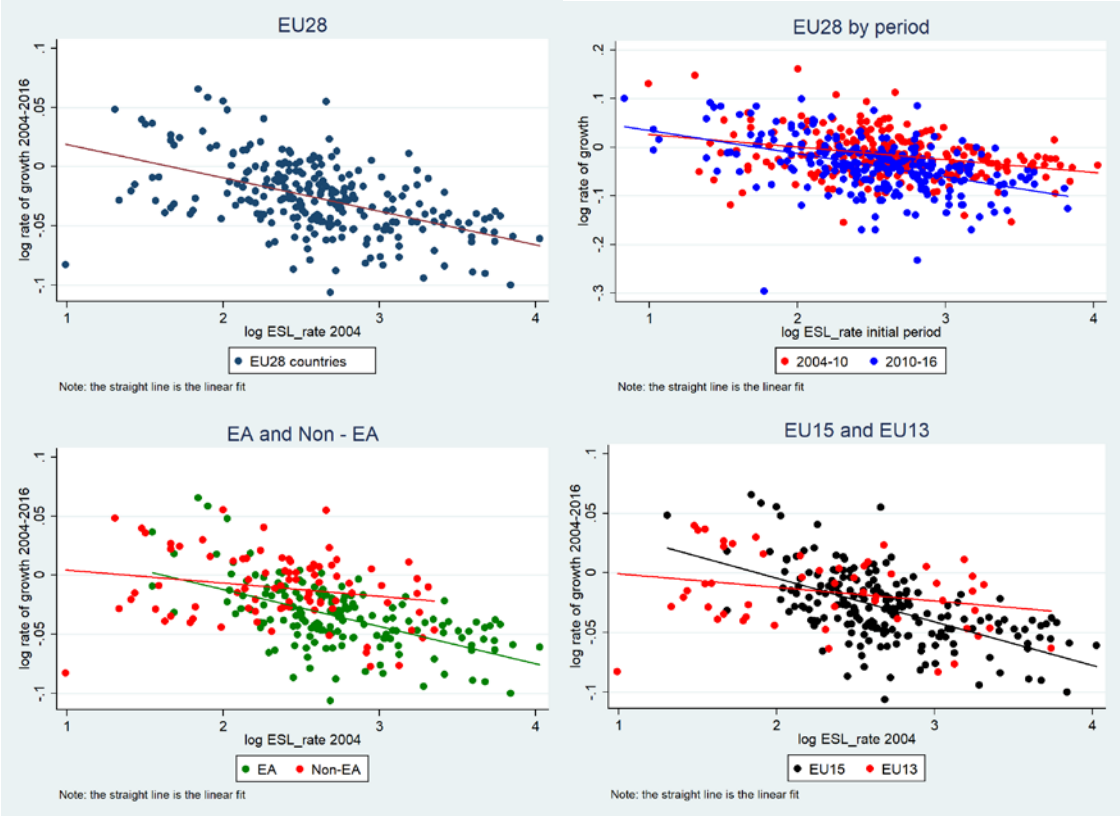


Unconditional Beta convergence

The analysis of unconditional beta convergence shows a **converging pattern of early school leavers rates among EU regions during the period 2004-2016** (at a 3% a year). The pace of convergence being higher in the period 2010-2016 (following the launch of the EU2020 agenda).

Moreover, the investigation by groups of countries reveals different paces of convergence between regions, which are higher in the **Euro area** and among old MSs than in the Non-Euro area or among the new MSs.

Figure 128: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



15. Tertiary education attainment

Definition: Percentage of the population aged 30-34 who have successfully completed tertiary studies (i.e. levels 5-8 of ISCED11 from 2014 onwards and levels 5-6 of ISCED97 up to 2013).

Data source: Eurostat [edat_lfse_03]

Time: 2002-2017

The **analysis of upward convergence** of the rate of tertiary education attainment shows a strict upward convergence process among the EU countries over the period 2002-2017. The share of population who have successfully completed tertiary studies steadily increase over the period, while disparities between countries begin to decrease later on, in 2006. No relevant differences emerge between the Euro and Non-Euro area.

Sigma convergence (as measured by the coefficient of variation) shows a strong convergence trend over the period 2002-2017 both for men and women.

Although with some oscillations, **also delta convergence** shows an overall reduction between 2000 and 2017 of the distance in the tertiary education attainment rate with respect to the best performing countries (Finland, Ireland, Lithuania).

The analysis of the **unconditional Beta convergence** reveals a convergence process over the period 2000-2017 (at 4% a year). In particular, among EU15 countries the rate of convergence is higher after the launch of the EU 2020 Agenda than in the period 2002-2010. On the contrary, among new accession countries (EU13) the rate of convergence is higher over the period 2002-2010 compared to the period 2010-2017.

The **analysis on regional data** (NUTS2) reveals that differences in tertiary education rates are higher among EU regions than among EU countries, although the patterns of convergence are similar. Moreover, some differences emerge when analysing separately the Euro and Non-Euro area. In fact, in the Non-Euro area national and regional variation register similar level, especially in the period 2007-2013. The analysis **of unconditional beta convergence** shows a converging trend of tertiary education rates among EU regions during the period 2004-2016 (at 4% a year), with a higher pace of convergence in the period 2010-2016. Furthermore, the investigation by groups of countries reveals similar pace of convergence among regions for the Euro and Non-Euro areas, as well as for the EU15 and the EU13. Finally, the **Theil index** confirms a reduction of variation in tertiary education attainment among EU regions and shows that the reduction is mainly determined by a reduction of variation between MSs rather than a within MSs. In fact, at the end of the period observed differences are accounted for a larger share by variation within countries.

Upward convergence

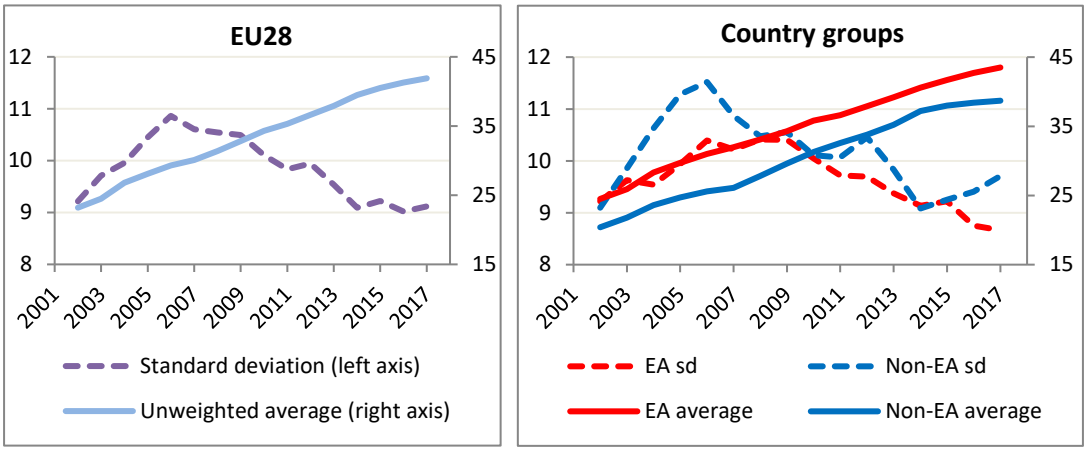
During the 2002-2017 period, the tertiary education attainment rate in the EU28 registered a **strict upward convergence process**: in all the MSs tertiary education attainment among

people aged 30-34 increased and the variation among Member States decreased. On average in the EU28 the rate steadily grew from 23.2% in 2002 to 41.9% in 2017.

Some differences emerge when looking at **sub-periods**. In fact, the overall increase in the tertiary education attainment rate has been consistent over the period 2000-2017. However, the variation between the countries starts to decrease only in 2006.

For the **Euro and Non-Euro area** similar trends of the average tertiary education attainment rate were observed during the period. However, some differences emerge in the patterns of variation of the indicator. In fact, among countries outside the Eurozone there were several changes in the direction of the measure of dispersion, whereas in the Eurozone the variation among countries increased up to 2009 and then started to decline steadily.

Figure 129: Tertiary education attainment rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2002-2017



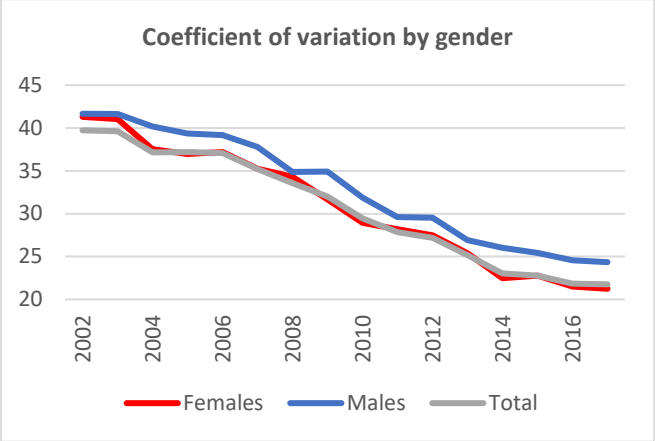
A look at the country trajectories compared to the EU28 average shows some **interesting cases**.

Bulgaria, as well as Germany, started from rates near the EU28 average in 2002 but had a flatter trajectory diverging from the EU average in the observed period. Belgium, Denmark, France, Spain and Finland converged to the EU average from above, having higher average levels at the beginning of the period but then growing at a slower pace. On the contrary, Poland and Latvia initiated below average but recorded a higher increase overcoming the EU28 average level in 2017. In Ireland, Lithuania, Luxembourg and Sweden the tertiary education attainment rate was above the average at the beginning of the period and it grew faster during the observed period, diverging from the EU28 average.

Sigma convergence by gender

In this section we use the coefficient of variation to measure convergence by gender among EU MSs in the rate of tertiary education attainment among people aged 30-34. The coefficient of variation shows a strong convergence trend over the period 2002-2017 both for men and women.

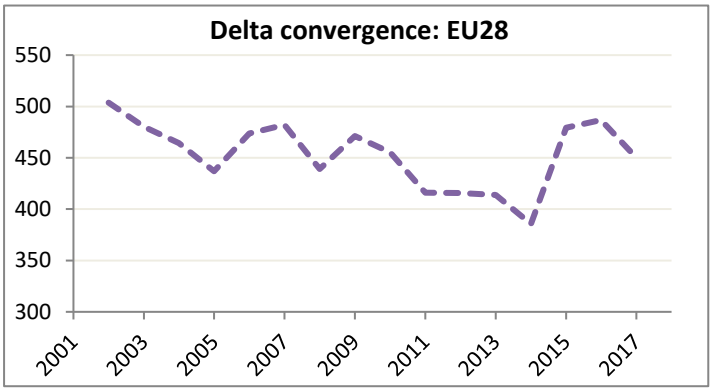
Figure 130: Sigma convergence in the EU28 by gender, 2002-2017



Delta convergence

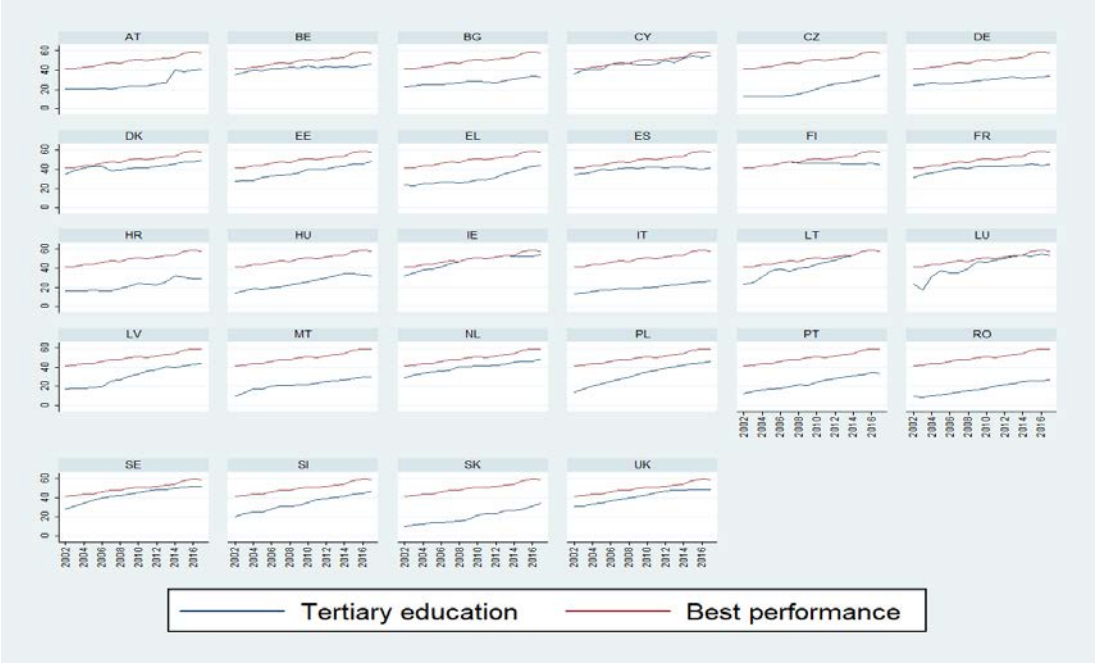
The analysis of convergence of the tertiary education attainment rate show also **an overall reduction between 2002 and 2017 of the distance with respect to the best performing country**. During the observed period, on average, European countries converge towards the tertiary education attainment rate of the best performer until 2014, then a step increase is registered in 2015-2016 (due in part to a break in time series), followed by a newly decline between 2016 and 2017.

Figure 131: Delta convergence in the EU28, 2002-2017



As can be seen from figure 132, the best performing countries over the period 2002-2017 are Finland, Ireland, Lithuania. Compared to initial year there are several MSs that significantly reduced the gap with the best performing Member States: Austria, Luxemburg, Latvia, Poland and Slovenia. On the contrary, a number of countries, despite an increase in the tertiary education attainment rate, maintained a large gap with respect to the best performers. These are: Bulgaria, the Czech Republic, Germany, Croatia, Hungary, Italy, Malta and Slovakia.

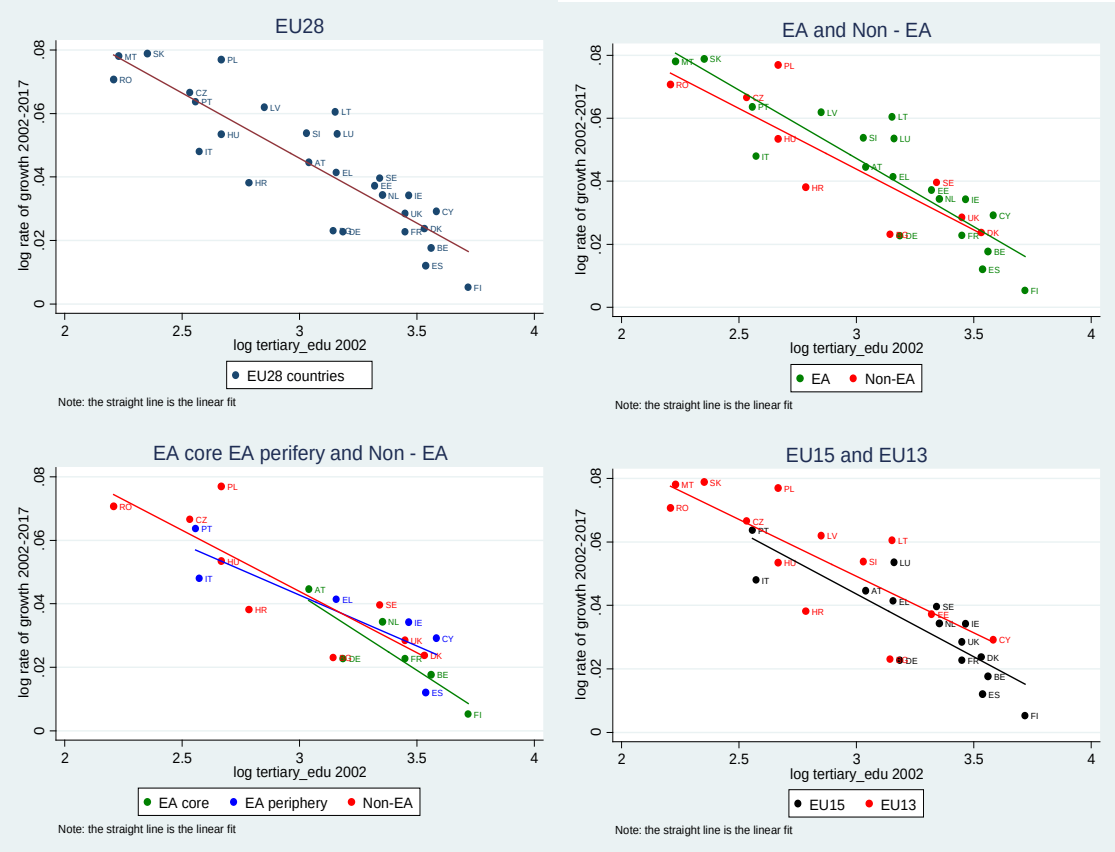
Figure 132: Tertiary education attainment rate of EU28 MSs *versus* Best performance line, 2002-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence of the tertiary education attainment rate over the period 2002-2017** shows that the sign and the pace of convergence is similar in the Euro and Non-Euro zone (at 3% a year). A similar pace of convergence is also observed among EU15 countries and among EU13 countries (MSs of more recent EU accession).

Figure 133: Unconditional Beta convergence by groups of countries, 2000-2017



Among the EU28 countries the convergence pattern in tertiary education attainment rates is constant over the whole period analysed: **no difference emerges in the period before and after the launch of the EU 2020 Agenda**. On the contrary, when analysing different groups of countries, differences are evident between EU15 and EU13 countries. In particular, among EU15 countries the rate of convergence is higher after the launch of the EU 2020 Agenda than in the period 2002-2010. On the contrary, among new accession countries (EU13) the rate of convergence is higher over the period 2002-2010 compared to the period 2010-2017.

Figure 134: Unconditional Beta convergence in the EU28 by periods, 2002-2017

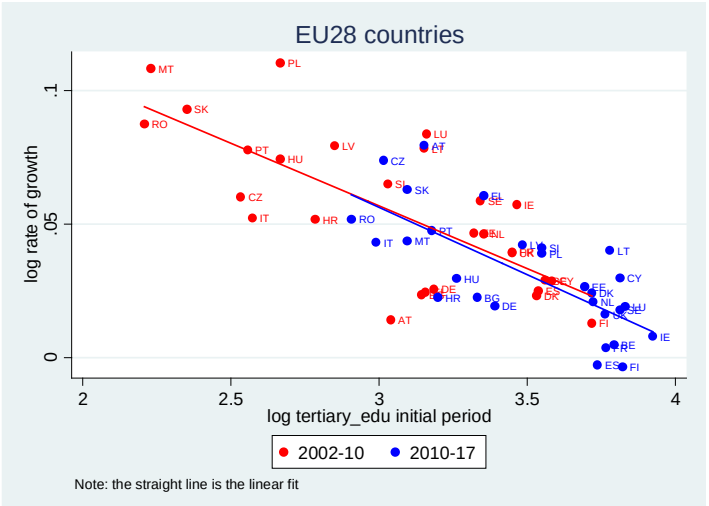
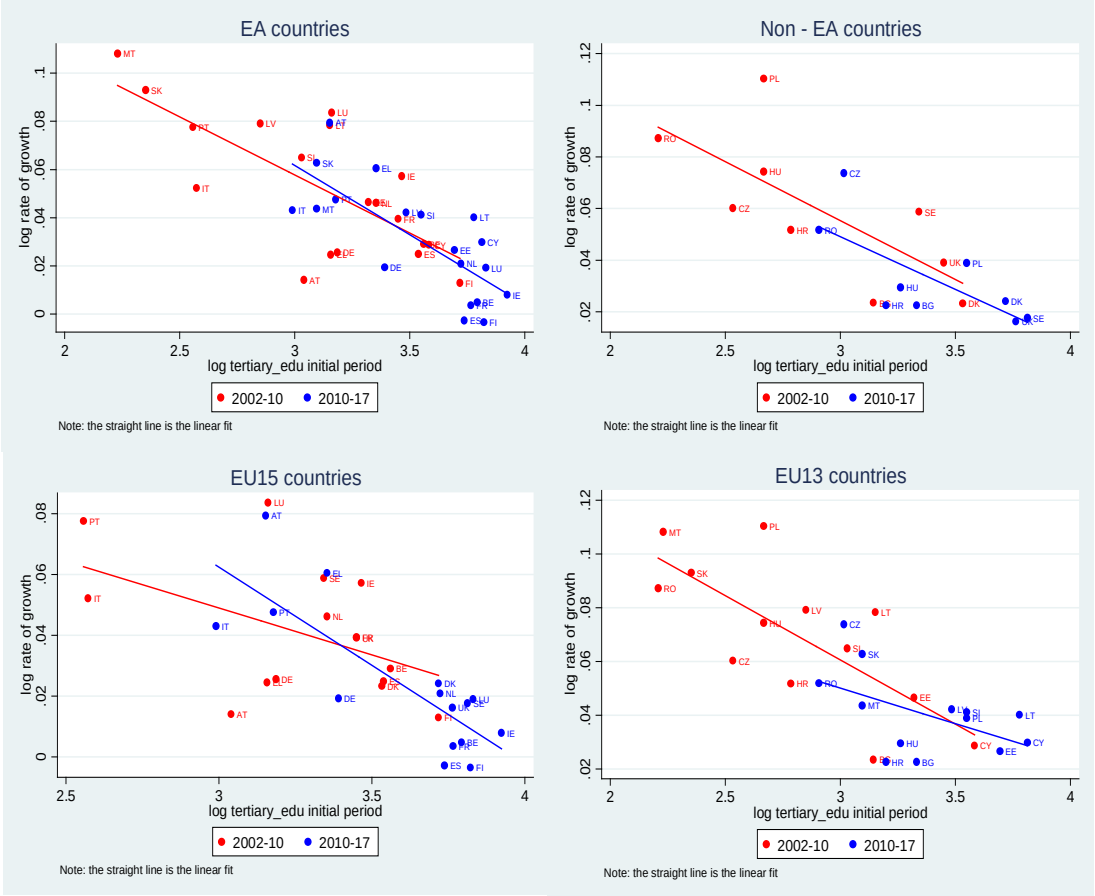


Figure 135: Unconditional Beta convergence by groups of countries and periods, 2002-2017

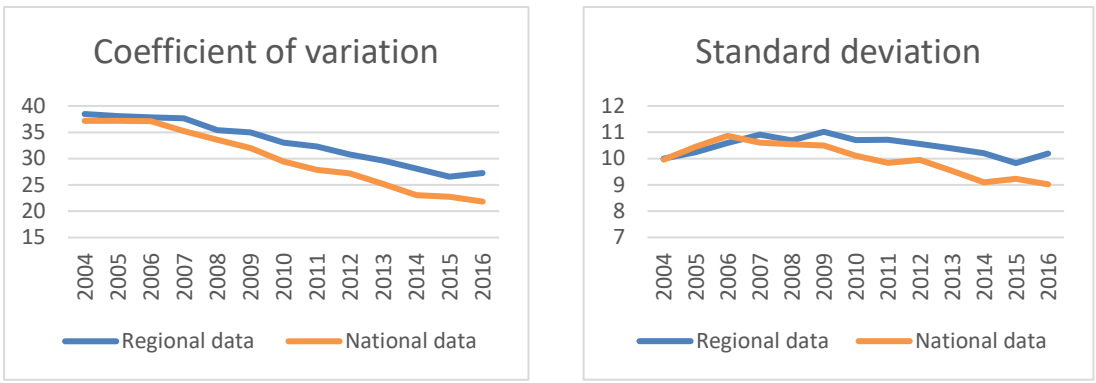


Regional Convergence

Sigma convergence

In general, **differences in tertiary education rates are higher among EU regions than among EU countries** (this holds true when using either the standard deviation or the coefficient of variation) and the patterns of convergence are similar.

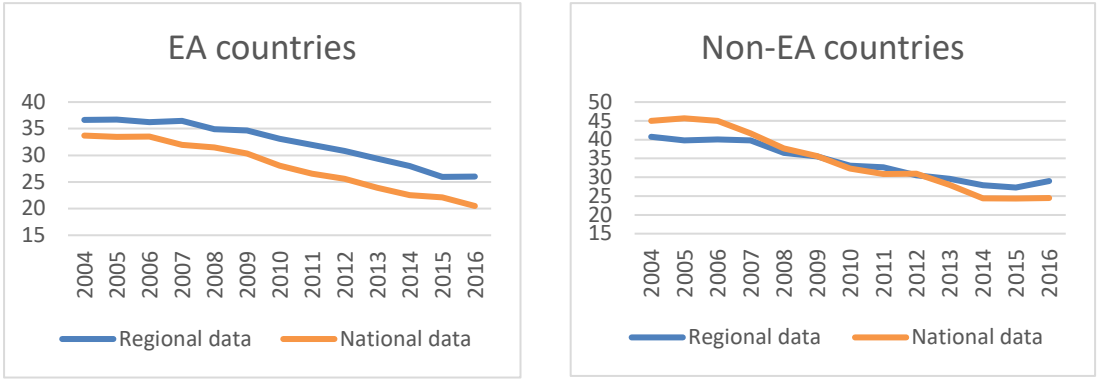
Figure 136: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Moreover, some differences emerge when analysing separately the **Euro and Non-Euro area.** In fact, while in the Euro area regional variations are always higher than the ones observed at

national level, in the Non-Euro area national and regional variations register similar level, especially in the period 2007-2013.

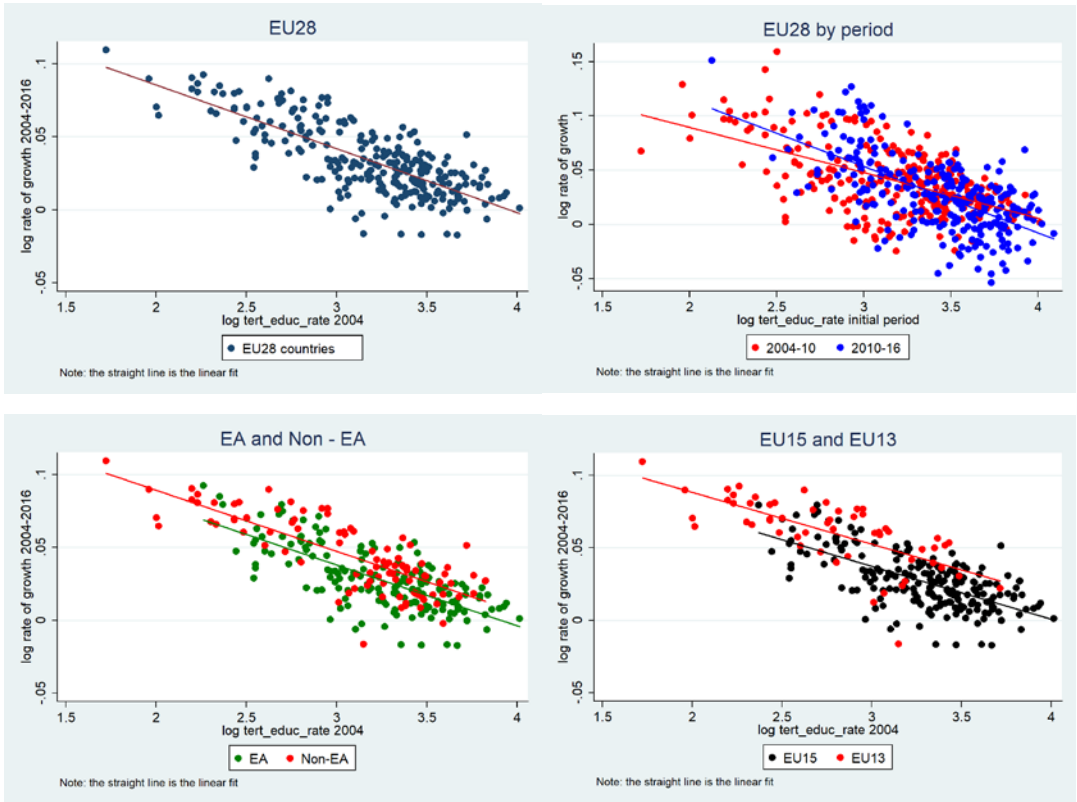
Figure 137: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016



Unconditional Beta convergence

The analysis of unconditional beta convergence shows a **converging trend of tertiary education rates among EU regions during the period 2004-2016** (at 4% a year), with a higher pace of convergence in the period 2010-2016. Furthermore, the investigation by groups of countries reveals similar pace of convergence among regions for the Euro and Non-Euro areas, as well as for the EU15 and the EU13.

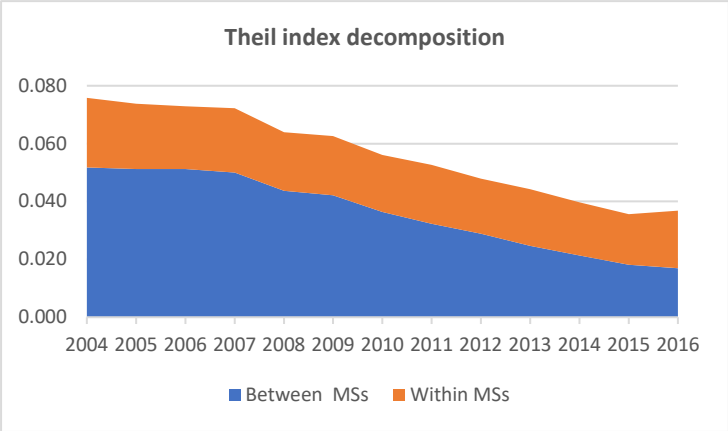
Figure 138: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



Theil index

The Theil index (another measure of sigma convergence) shows a reduction of the variation in tertiary education attainment; result which is in line with the ones obtained above with other measures. In particular, the observed reduction of the distance among European regions between 2004 and 2016 is mainly due to a reduction of differences between MSs rather than a reduction of differences among regions within MSs. In fact, at the end of the period observed differences are accounted for a larger share by distances within countries.

Figure 139: Theil index decomposition, 2004-2016



16. Unmet needs for medical care

Definition: proportion of people (age 16+) that report unmet needs for medical care because it is too expensive or too far to travel or in waiting list. Medical care refers to individual healthcare services (medical examination or treatment excluding dental care) provided by or under direct supervision of medical doctors or equivalent professions according to national healthcare systems.

Data source: Eurostat – EU SILC [hlth_silc_08]

Time: 2008-2016

The **analysis of upward convergence** of the unmet needs for medical care between 2008-2016 shows a weak upward convergence process among the EU28 countries. However, over the period different trends emerge, with a deterioration of the indicator during the peak of the economic crisis.

Sigma convergence, measured by the **coefficient of variation,** show also different trends over the period analysed and no mayor differences emerge between males and females.

Delta convergence shows also an overall reduction between 2008 and 2016 of the distance with respect to the best performing country (Slovenia and then Austria since 2014). However, during the years of the economic and financial crisis, on average, the distance with respect to the best performers increased.

The analysis of the **unconditional Beta convergence** over the period 2008-2016 shows a convergence process in the EU28 at 4% a year: countries with higher proportion of people with unmet medical needs (new accession countries) presenting larger reductions during the period. Moreover, during the period the pace of convergence is particularly high (6% a year) in the Non-Euro area.

Upward convergence

During the 2008-2016 period, the proportion of people with unmet medical needs in the EU28 registered a **weak upward convergence process**: on average the proportion of people with unmet medical needs decreased from 3.4% to 3.1% in the EU28 and the variation among Member States slightly decreased. The convergence process is weak since in several countries the proportion of people with unmet medical needs increased over the period considered. Particularly high the increase registered by Greece and Estonia: around 8 percentage points.

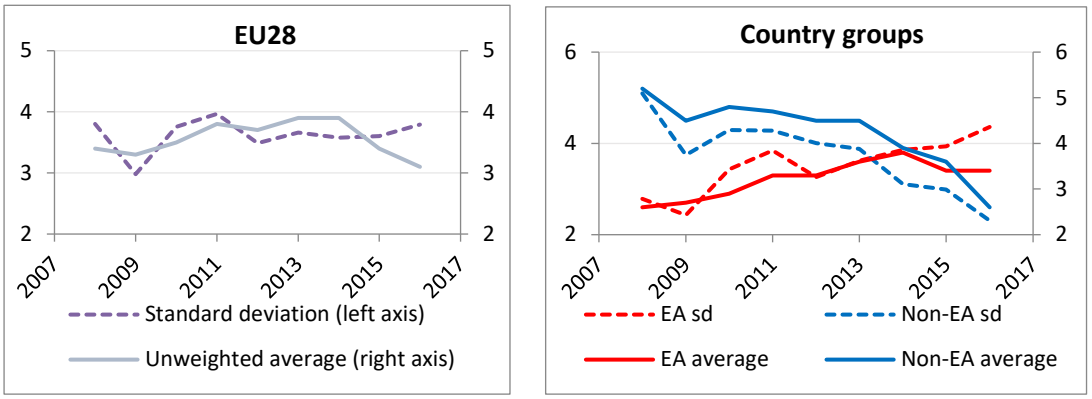
When looking at **sub-periods** different patterns emerge. Specifically, from 2009 to 2011 a downward divergence trend is observed: a deterioration of the indicator during the peak of the economic crisis. Then from 2011 to 2014 the variation among countries decreased although the average unmet needs for medical care continued to increase (downward convergence). Finally, since 2014 an upward divergence trend is in act.

Differences in the trends between the Euro area (EA) and the non-EA show patterns which are measure sensitive. However, both the standard deviation and the coefficient of variation

indicate that variation in the EA has increased. The measures also coincide in showing variation was larger in the non-EA than in the EA from 2010 to 2013.

The **Euro and Non-Euro area** show different trends during the period. In fact, the Euro area is characterised by downward divergence: the average proportion of people with unmet medical needs grew from 2.7% in 2008 to 3.4% in 2016, and the differences among MSs have grown a lot. On the contrary, in the Non-Euro area an upward convergence process took place: both the average level and variations almost halved between 2008 and 2016.

Figure 140: Proportion of people with unmet medical needs (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2008-2016

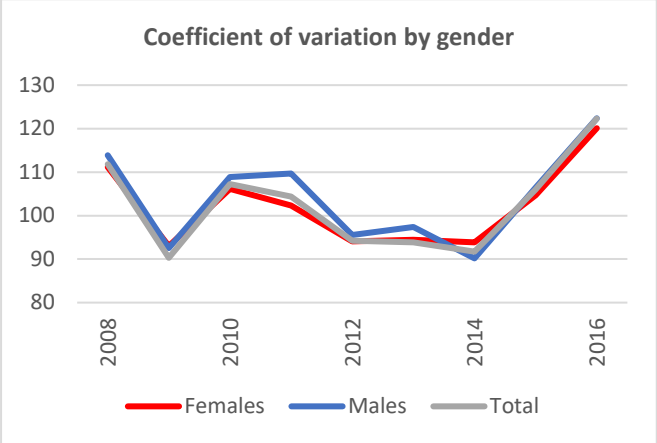


At the country level interesting trajectories can be observed. For example, some Member States show negative developments with increased percentage of population with unmet needs for medical care; these include both countries with low initial levels (Belgium, Portugal), and countries which already high initial levels (Estonia, Greece). There are also other MSs which show positive developments with a steady reduction of the indicator: Bulgaria, Croatia, Romania.

Sigma convergence by gender

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the proportion of people with unmet medical needs by gender. During the period 2008-2016 the convergence trends for men and women are very similar: the coefficient of variation decreases (convergence) between 2010 and 2014; while a step increase is observed since 2014 onwards.

Figure 141: Sigma convergence in the EU28 by gender, 2008-2016



Delta convergence

The analysis of delta convergence shows an overall reduction between 2008 and 2016 of the differences in the proportion of people with unmet medical needs with respect to the best performing country. However, during the years of the economic and financial crisis, on average, the distances with respect to the best performers increased.

Figure 142: Delta convergence in the EU28, 2008-2016

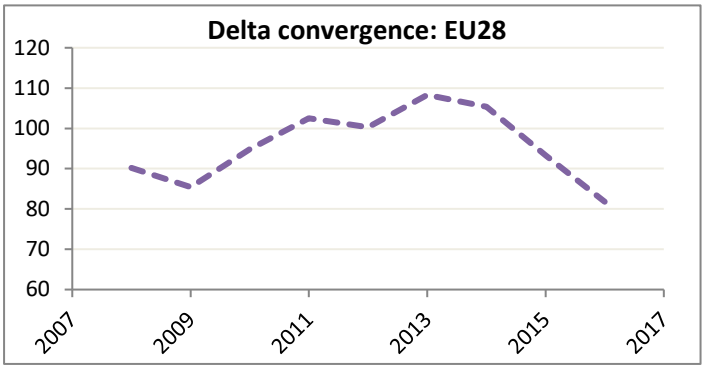
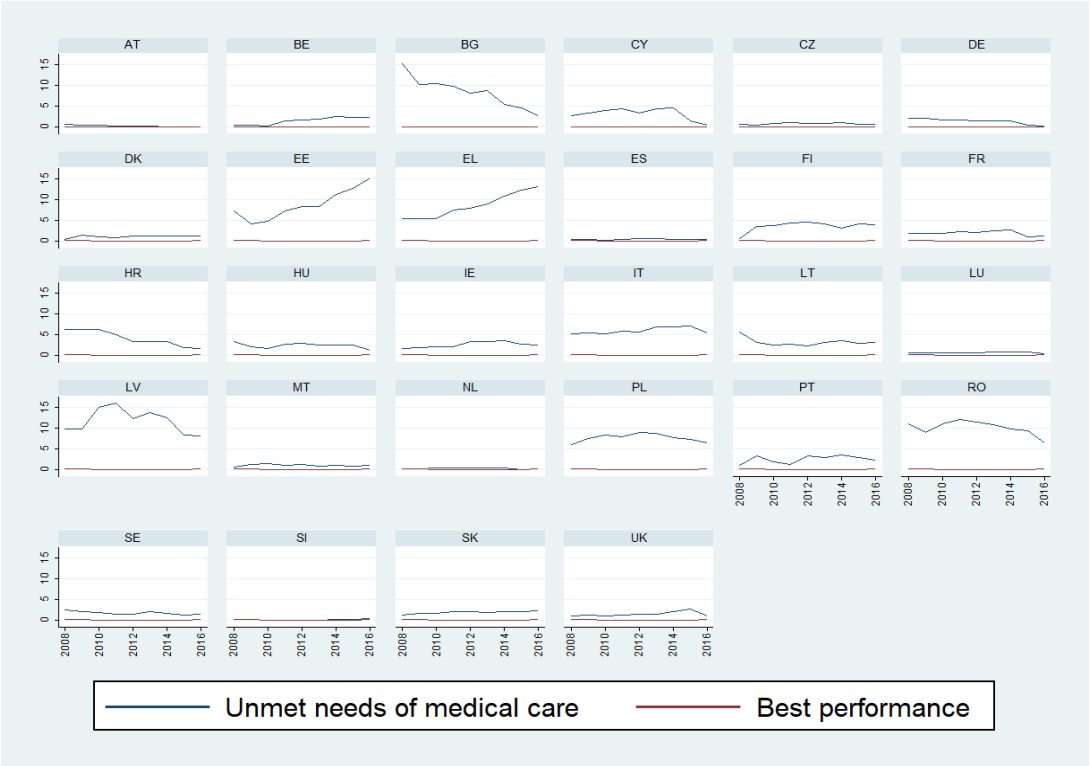


Figure 143 shows that the best performing countries over the period 2008-2016 are Slovenia up to 2013 and then Austria. However, there are many countries that present low levels of unmet need over the entire period, for example: Spain, the Czech Republic, the Netherlands, Luxemburg, etc.

During the period under observation, Bulgaria, Hungary, Cyprus and Croatia almost close the gap with the best performing country. Whereas, other countries such Estonia, Greece increased by far the gap.

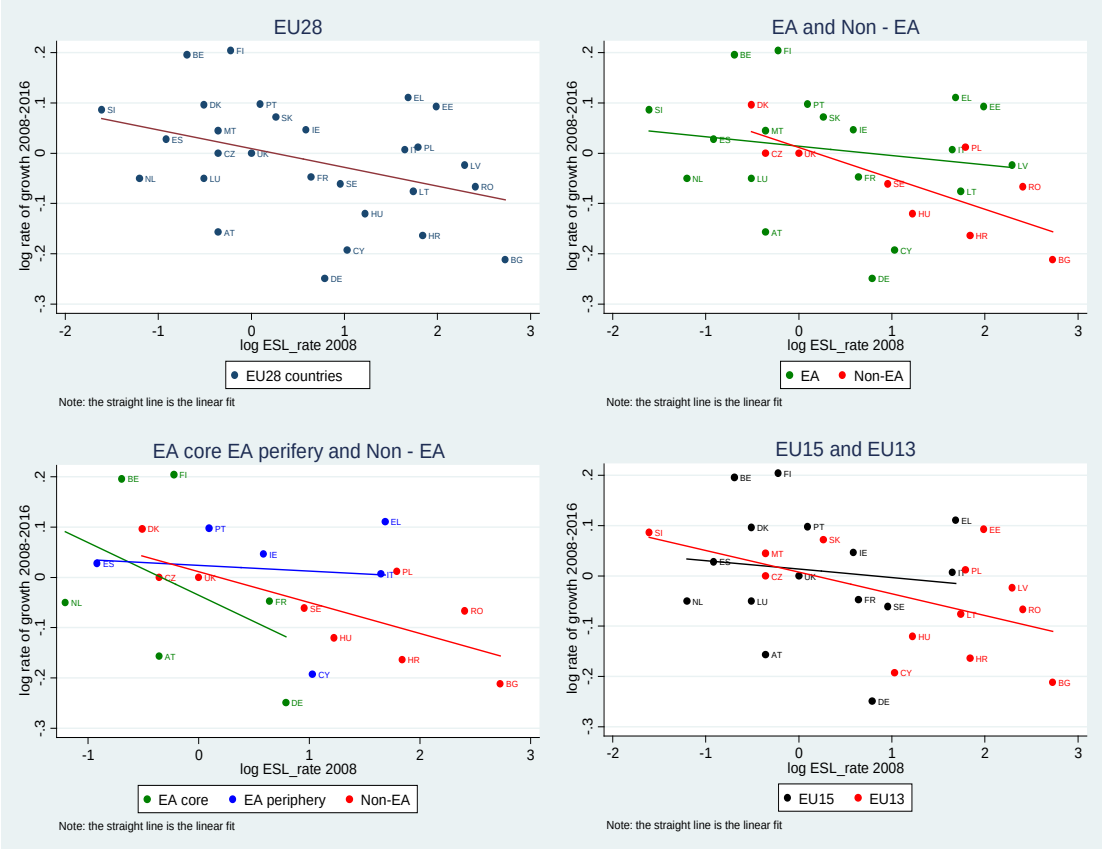
Figure 143 Proportion of people with unmet medical needs of EU28 MSs *versus* Best performance line, 2008-2016



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2008-2016** shows a convergence process in the EU28 (at 4% a year): countries with higher proportion of people with unmet medical needs present larger reductions during the period; these are essentially new accession countries. When distinguishing by country area, the convergence process is only evident in the Non-Euro area and among the EU13 countries. The pace of convergence is particularly high (6% a year) in the Non-Euro area.

Figure 144: Unconditional Beta convergence by groups of countries, 2008-2016



17. Children in formal care

Definition: Children aged less than 3 years old in formal care as a percentage over the population of the same age group.

Data source: Eurostat [ilc_caindformal]

Time: 2010-2016

The **analysis of upward convergence** of the share of children less than 3 years old in formal care shows a weak upward convergence process among the EU28 countries in the period 2000-2017. On average the share steadily increased and the variation across countries decreased, albeit some oscillations during the period.

Sigma convergence, measured by the **coefficient of variation** confirms convergence among European MSs. The convergence patterns are similar in the Eurozone and in the Non-Eurozone, although convergence is more evident in the latter, which also present higher variation among countries.

Delta convergence shows also an overall reduction between 2010 and 2016 of the distance with respect to the country with the highest share of children in formal care (Denmark).

The analysis of the **unconditional Beta convergence** over the period 2010-2016 does not show any convergence process among the EU28 in the indicator. A convergence process, at relatively high rates, is only evident for subgroups of countries. In particular: among countries outside the Eurozone and among countries of the EU15. Convergence seems in act also in the Eurozone, but only among core countries (i.e. AT, BE, DE, FR, NL, SE).

Upward convergence

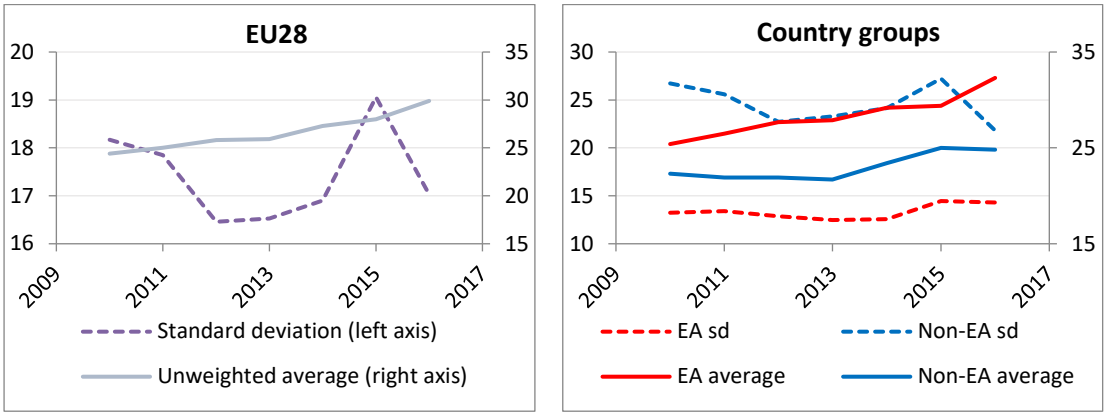
During the 2010-2016 period, the proportion of children less than 3 years in formal care in the EU28 registered a **weak upward convergence process**: on average the proportion of children in formal care increased from 24.4% to 29.9% and the variation among Member States decreased, despite a peak in 2015. The convergence process is weak since in some countries (Cyprus, Denmark, Slovakia and the UK) the proportion of children in formal care decreased over the period considered.

Different patterns emerge when looking at **sub-periods.** In fact, during the period the variation among countries presents some oscillations: it decreases between 2010 and 2012 and then between 2015 and 2016 (upward convergence); whereas it increases between 2012 and 2015 (upward divergence).

During the 2010-2016 period different convergence patterns in the proportion of children in formal care were observed for the **Euro and Non-Euro area**. Specifically, an upward divergence process is recorded in the Euro area: the proportion of children cared increase but also the variation among countries. Instead, in the Non- Eurozone an upward convergence process is recorded between 2010 and 2016, albeit some oscillations in the standard deviation. Moreover, it has to be noted that different levels in the averages and

variation are registered between the Euro and Non-Eurozone. In particular, the Eurozone present a higher proportion of children in formal care and less variation among countries than the Non-Eurozone.

Figure 145: Percentage of children (< 3 years old) in formal care (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2010-2016

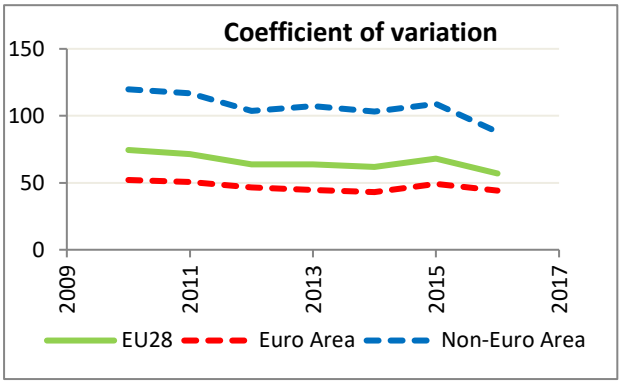


At country level some interesting trajectories can be observed. For example, for Romania and Malta there was a catch-up towards the EU average. Instead, Denmark and Sweden, presenting a higher proportion of children in formal care, converged from above to the EU28 average, especially in the last years. Other countries, such as Greece and Slovakia, having participation rates to formal childcare below the average, continue to diverge.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the share of children less than 3 years old by area. Overall, the analysis of the coefficient of variation confirms convergence among European MSs. The convergence patterns are similar in the Eurozone and in the Non-Eurozone, although convergence is more evident in the latter, which also present higher variation among countries.

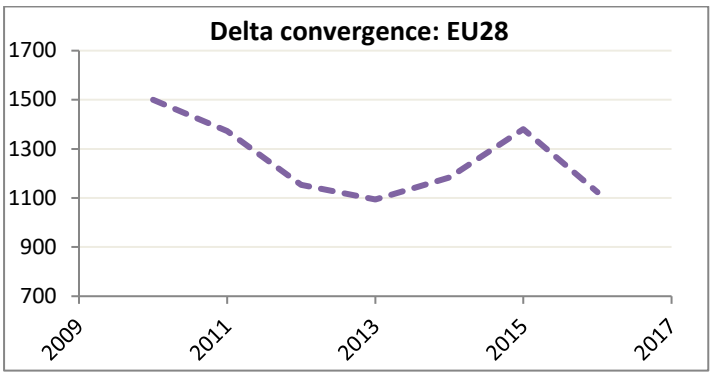
Figure 146: Sigma convergence in the EU28 by area, 2010-2016



Delta convergence

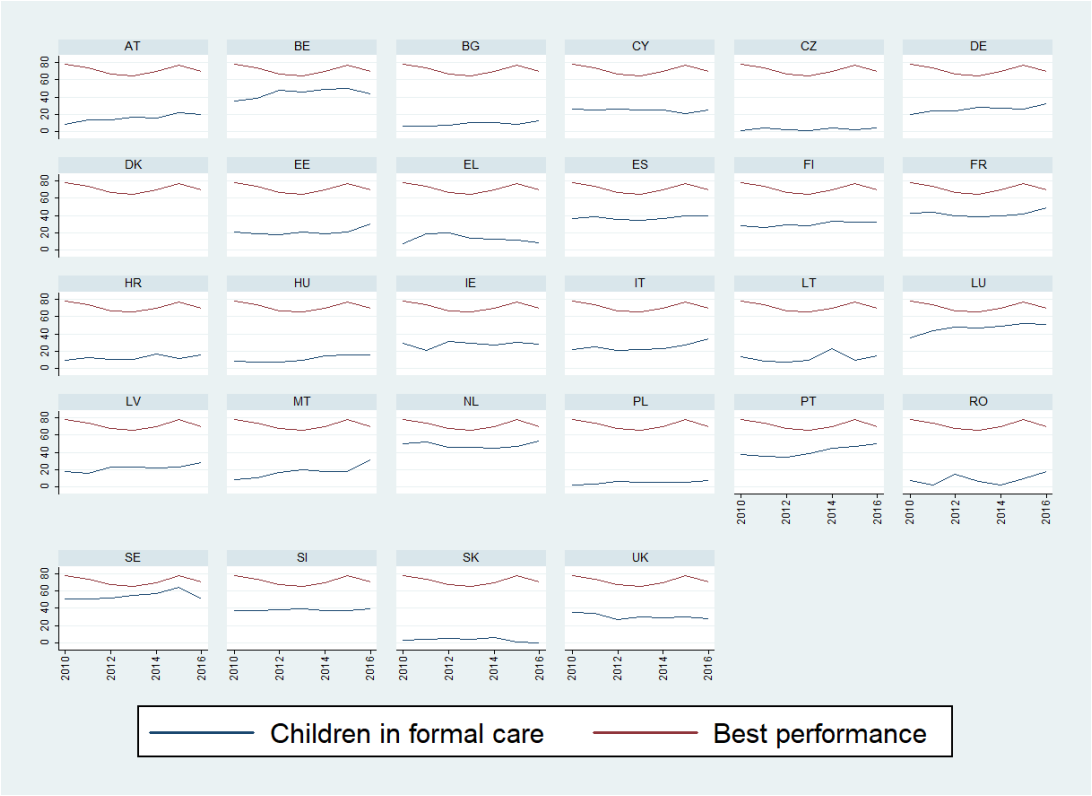
The analysis of delta convergence shows **an overall reduction between 2010 and 2016 of the distances from the best performing country**. Despite some oscillations, on average European countries converge towards the rates of the best performer (i.e. a reduction in the sum of the distances from the best performer is observed).

Figure 147: Delta convergence in the EU28, 2010-2016



As can be seen from figure 148, the best performing country over the entire period is Denmark, which outperform all other EU countries: the proportion of children less than 3 years old ranging around 70%. Between 2010 and 2016 all the MSs reduced the gap with Denmark. The countries with the most remarkable gap reduction are Italy, Luxemburg, Germany, Portugal (over 20 percentage points) and Malta (30 pp). Other counties, instead, present low participation rates and no convergence trends during the period: Bulgaria, Greece, Poland, The Czech Republic, Slovakia.

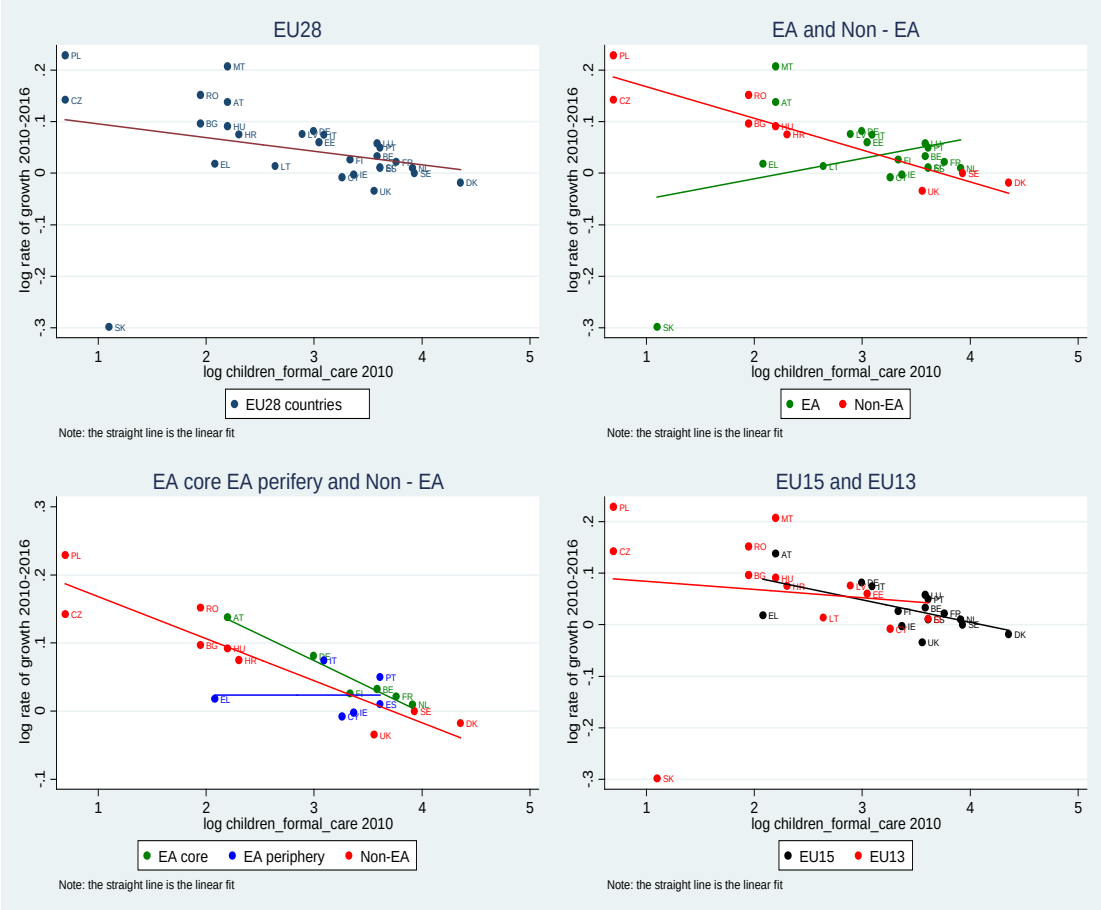
Figure 148: Percentage of children (< 3 years old) in formal care of EU28 MSs *versus* Best performance line, 2010-2016



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2010-2016 does not** show any convergence process among the EU28 in the indicator. A convergence process, at relatively high rates, is only evident for subgroups of countries. In particular: among countries outside the Eurozone and among countries of the EU15. Convergence seems in act also in the Eurozone, but only among core countries (i.e. AT, BE, DE, FR, NL, SE).

Figure 149: Unconditional Beta convergence by groups of countries, 2010-2016



18. Gender employment gap

Definition: Difference in the employment rates between men and women aged 20-64.

Data source: Eurostat – LFS [lfsa_ergaed]

Time: 2000-2017

The **analysis of upward convergence** of the gender gaps in employment rates in the EU28 shows a weak upward convergence process among the EU countries in the period 2000-2017, with almost no differences among sub-periods, apart from a moderate increase in 2008 and 2009 in the variation. While in the Non-EA the average gender employment gap remains constant as well as it does the variation among countries, in the EA an upward convergence pattern is more evident, with a pronounced decrease of the average gap and of the variation among countries.

The analysis of **sigma convergence** (as measured by the coefficient of variation) shows a reduction of differences between 2000 and 2017. However, an increase of variation is observed during the years of the economic crisis, especially in the Eurozone. Instead variations in the Non-Eurozone show a lower but constant increase since 2008.

Delta convergence shows also an overall reduction between 2000 and 2017 of the distance in the gender gaps in employment rates with respect to the best performing country. The convergence process is interrupted in the period 2008-2010 and from 2013 onward.

The analysis of the **unconditional Beta convergence** over the period 2000-2017 does not show a clear catching-up among EU28 countries, which is evident only among EU15 countries. However, some patterns of convergence emerge when considering the period following the launch of the EU 2020 Agenda for the EU28 as a whole, as well as in the Eurozone and among EU13 countries.

The analysis on **regional data** shows that differences in gender gaps in employment rates are higher among EU countries than among EU regions. Moreover, the crisis had a larger impact on national variation than on regional variations. The analysis of unconditional **Beta convergence** shows a converging pattern of the gender gap in employment rates among EU regions during the period 2004-2016 (at 2% a year), although the pace of convergence is higher in the pre-crisis period. In addition, the investigation by groups of countries reveals a high pace of convergence among regions in the Non-Euro area and among regions of new Member States.

Upward convergence

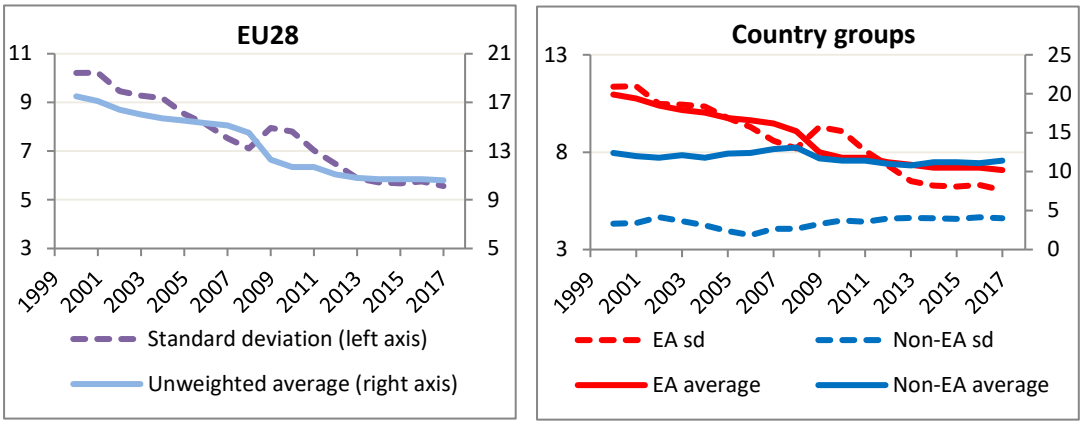
During the 2000-2017 period, the gender employment gap in the EU28 registered a **weak upward convergence**: on average the gender employment gap decreased from 17.5 pp to 10.6 pp in the EU28 and also the variation among Member States decreased. The convergence process is weak since in a few MSs the gap increased over the period

considered: less than 1 pp in Hungary, Sweden and Slovakia; Poland (+1.2 pp); Romania (+5.5 pp).

Apart from a moderate increase in 2008 and 2009 in the variation **no different patterns** emerge when looking at **sub-periods**.

For the **Euro and Non-Euro area** different patterns emerge. While in the Non-Euro area the average gender employment gap remains constant as well as it does the variation among countries, in the Euro area an upward convergence pattern is more evident, with a pronounced decrease of the average gap and of the variation among countries (albeit an increase between 2008 and 2009).

Figure 150: Gender employment gap (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2000-2017

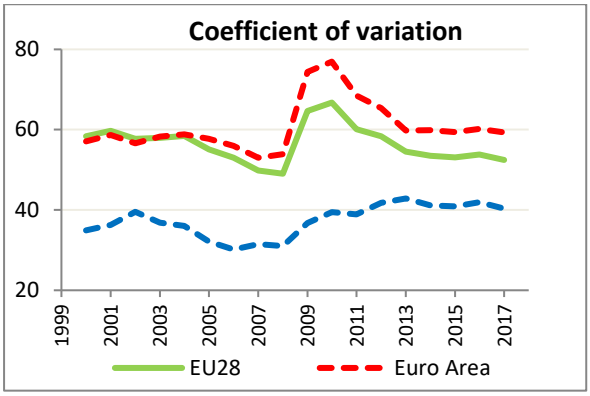


At the country level interesting trajectories can be observed. For instance, Malta, Greece, Spain, and to a lesser extent also Italy, consistently caught up with the EU average over the entire period observed. Instead, other countries with a low initial level gender employment gap converged to the higher EU average; these are Bulgaria, Denmark, Finland, Sweden, Slovenia, Estonia and Latvia.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the gender gaps in employment rates by area. Overall, the analysis of the coefficient of variation confirms convergence among European MSs over the period 2000-2017. However, an increase of differences is observed during the years of the economic crisis, especially in the Eurozone. Instead variation in the Non-Eurozone show a lower but constant increase since 2008.

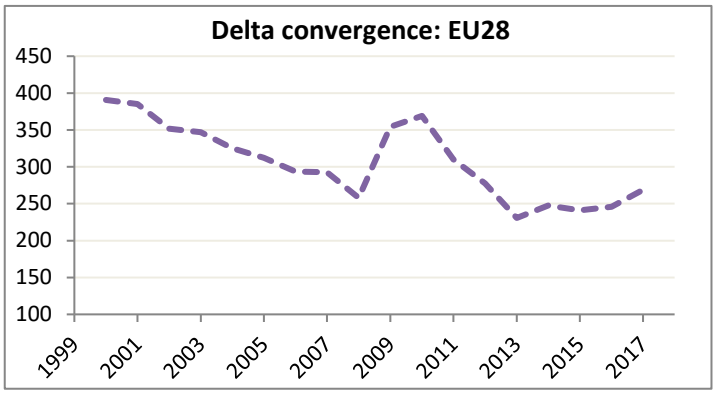
Figure 151: Sigma convergence in the EU28 by area, 2001-2017



Delta convergence

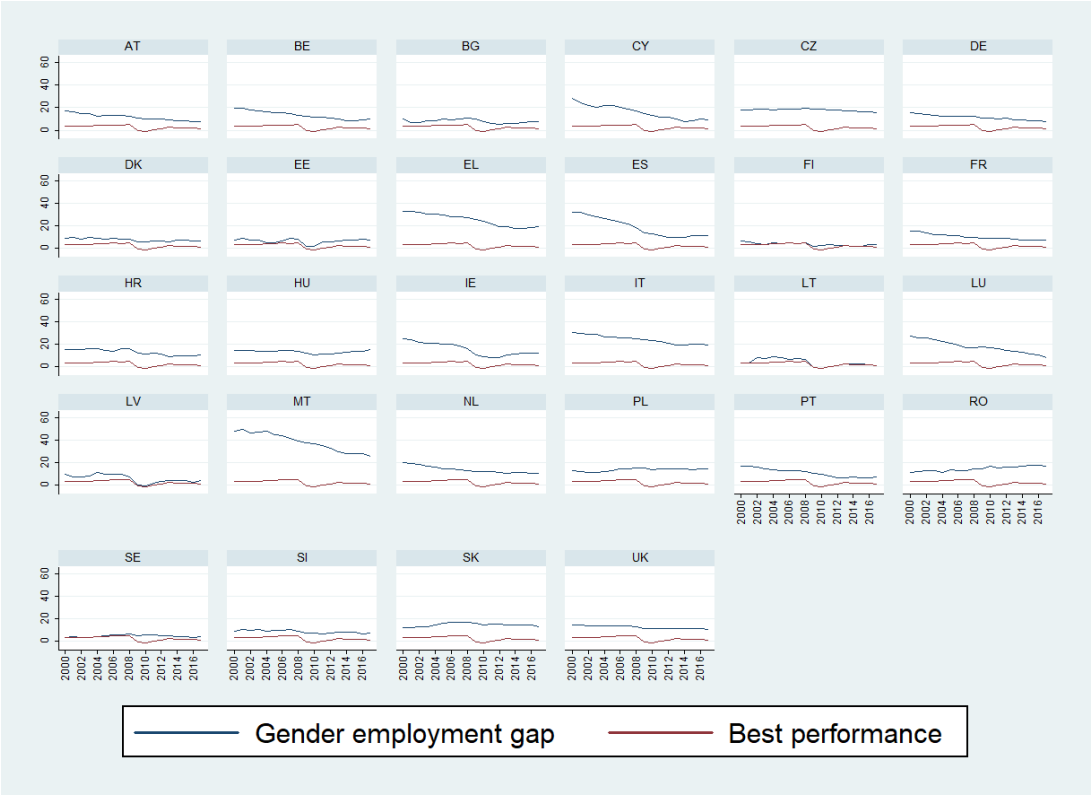
The analysis of delta convergence shows also **an overall reduction between 2000 and 2017 of the distance in the gender employment gap with respect to the best performing country**. The convergence process is interrupted in the period 2008-2010 and from 2013 onward. In these periods on average European countries diverge with respect to the gender employment gaps registered by the best performing country.

Figure 152: Delta convergence in the EU28, 2000-2017



During the period 2000-2017 three countries show alternatively the lowest gap in employment rate between males and females: Finland, Sweden and Lithuania. Most of the countries presenting the largest employment gap at the beginning of the 2000s converge toward the levels of the best performing countries. Only Romania increase the gap.

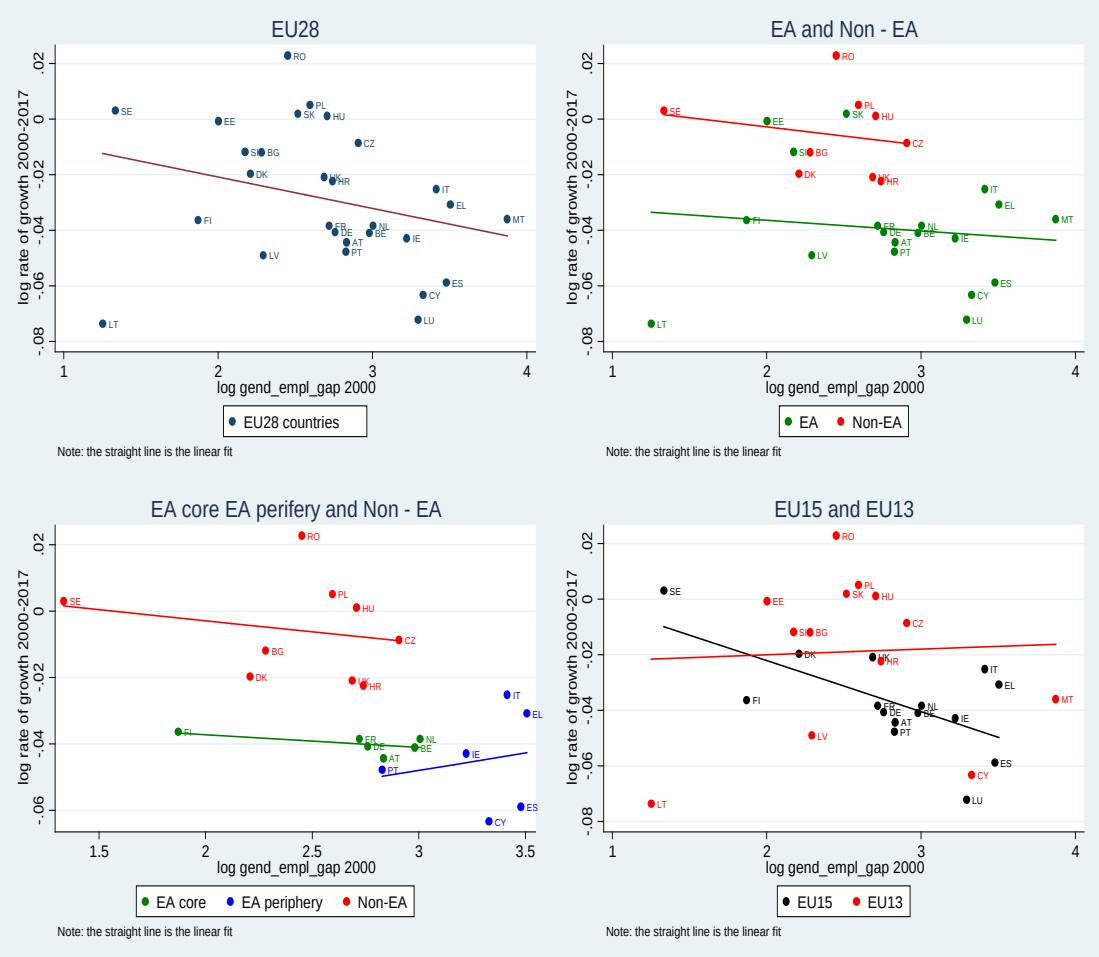
Figure 153: Gender employment gap of EU28 MSs *versus* Best performance line, 2000-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2000-2017 does not show a clear** catching-up among EU28 countries. Over the whole period 2000-2017 a catching-up process is only evident among EU15 countries, at a 2% a year (see figure 154).

Figure 154: Unconditional Beta convergence by groups of countries, 2000-2017



However, when considering **separate periods of time** some patterns of convergence emerge (see figure 155). In particular, the pace of convergence is significant and high in the period following the launch of the EU 2020 Agenda for the EU28 as a whole, as well as in the Eurozone (7% a year) and among EU13 countries (8% a year).

Figure 155: Unconditional Beta convergence in the EU28 by periods, 2000-2017

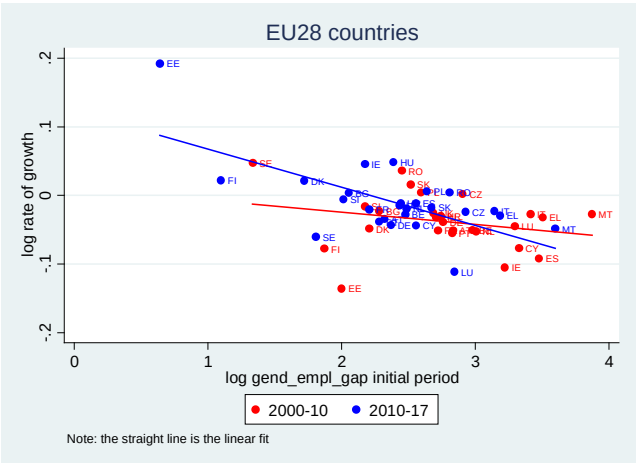
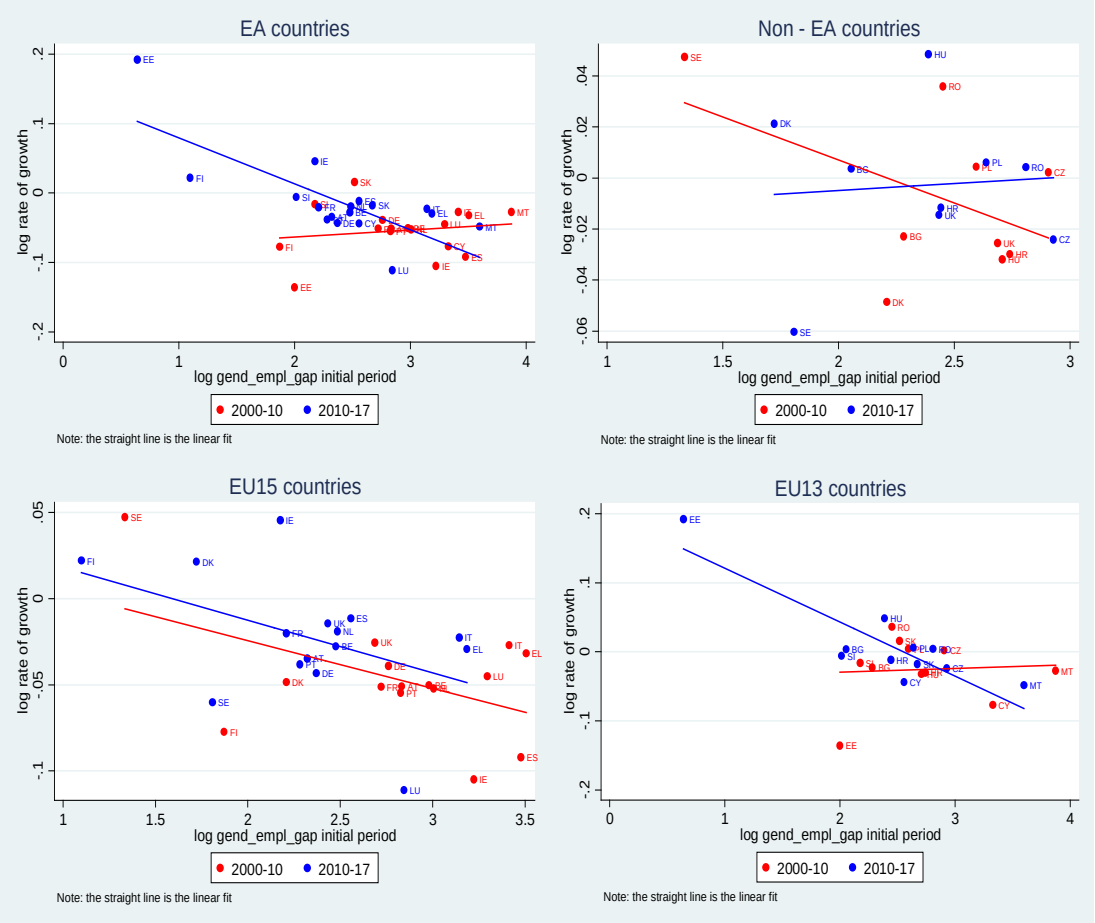


Figure 156: Unconditional Beta convergence by groups of countries and periods, 2000-2017

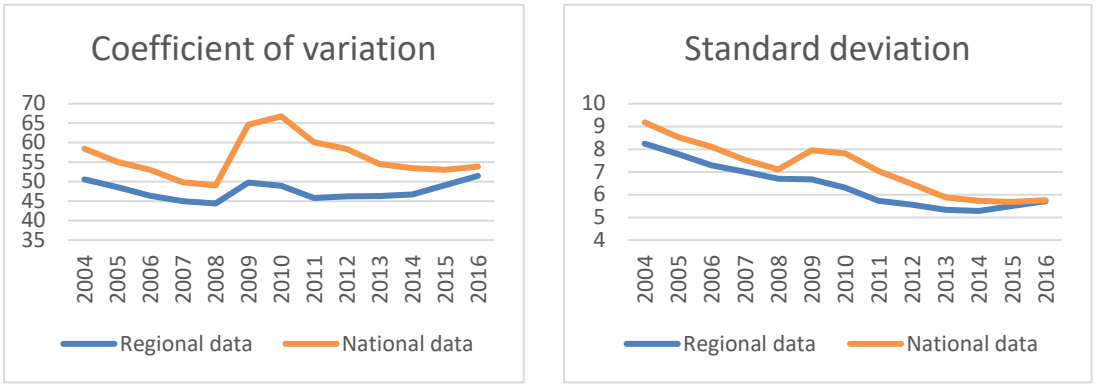


Regional Convergence

Sigma convergence

In general, **differences in gender gaps in employment rates are higher among EU countries than among EU regions**. Moreover, the crisis had a larger impact on national variations than on regional variations.

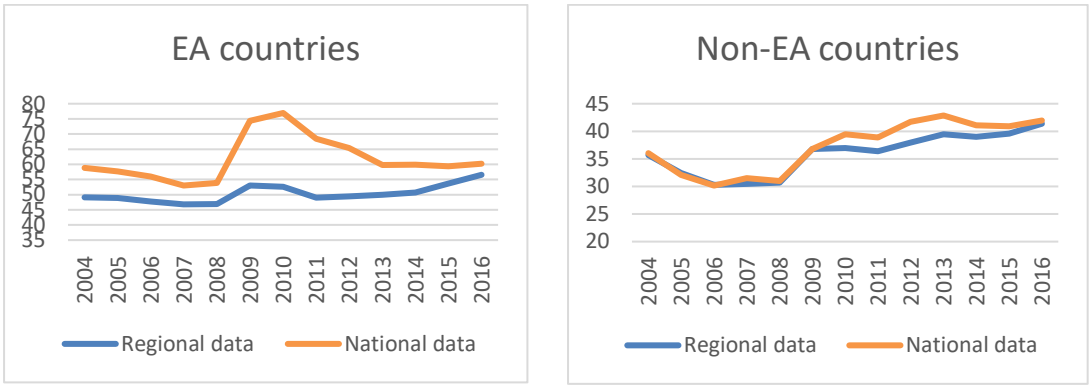
Figure 157: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016



Differences emerge also when analysing separately the **Euro and Non-Euro area**. In fact, in the Non-Euro the level of variations among regions and countries are similar and increase

since 2008. Whereas, in the Euro area the evolution of the coefficient of variation is strongly influenced by the economic and financial crisis.

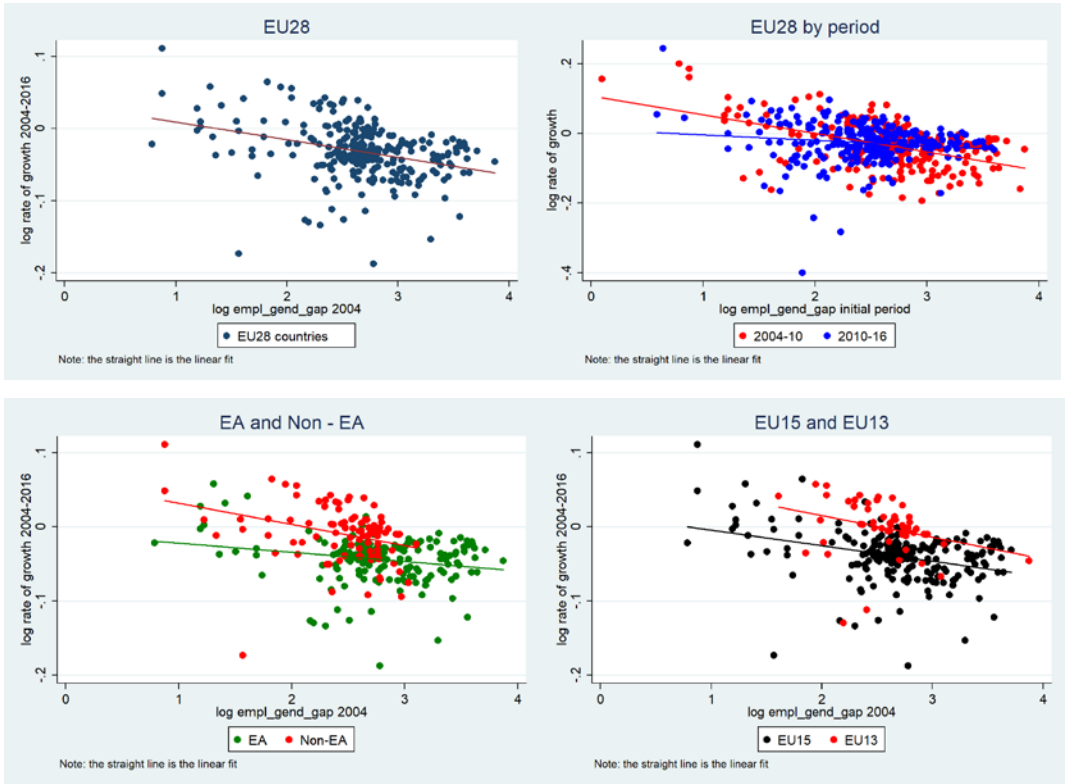
Figure 158: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016



Unconditional Beta convergence

The analysis of Beta convergence shows a **converging pattern of the gender gap in employment rates among EU regions during the period 2004-2016** (at 2% a year), although the pace of convergence is higher in the pre-crisis period. Moreover, the investigation by groups of countries reveals a high pace of convergence among regions in the Non-Euro area and among regions of new Member States.

Figure 159: Unconditional Beta convergence among EU28 regions by groups of countries and periods, 2004-2016



19. Gender gap in national parliaments

Definition: The indicator measures the gender gap in the share of men and women who are member of the national parliament.

Data source: EIGE- Gender Statistics Database

Time: 2005-2018

The **analysis of upward convergence** of the gender gap in national parliaments shows a weak upward convergence process among the EU28 countries in the period 2005-2018. However, some difference in the levels and trends by groups of countries. In particular, the gap and the distances among countries are higher in the Non-Eurozone compared to the Eurozone. Moreover, the reduction of the gender gap is on average higher in the Eurozone.

Sigma convergence, measured by the **coefficient of variation** shows a divergent trend in the EU28 for the gender gap in national parliaments, since the variation between countries reduces less than proportionally than the average value does. This is the case in the Eurozone; while in outside the Eurozone sigma convergence is observed.

Delta convergence shows also an overall reduction between 2005 and 2018 of the distance with respect to the country with the lowest gender gap in parliament over the period (Sweden).

The analysis of the **unconditional beta convergence** does not show a convergence process in the EU28 over the period 2005-2018. In fact, in the EU28 unconditional beta convergence is observed only in the period 2001-2018, following the launch of the EU 2020 Agenda. Analysing groups of countries, over the period 2005-2018 a catching-up process is instead evident and significant in the EU15 and in the EU13.

Upward convergence

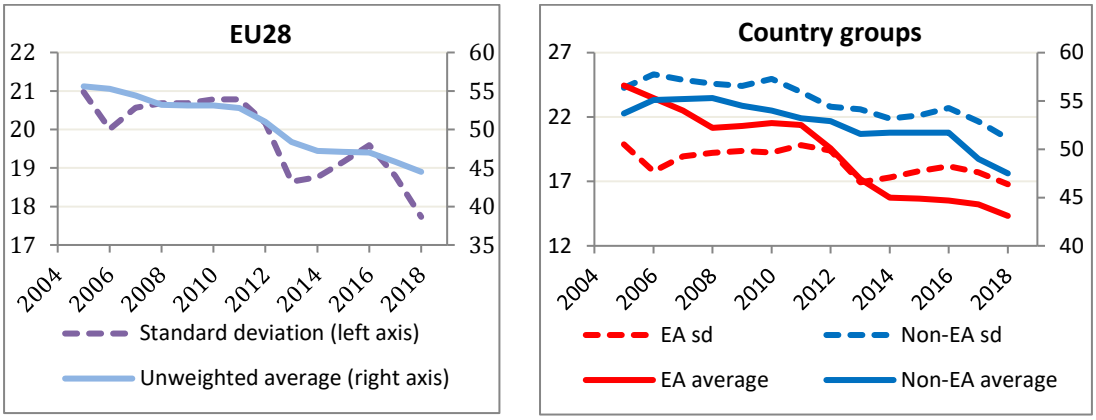
During the 2005-2018 period the gender gap in national parliaments in the EU28 registered a **weak upward convergence process**: on average gender gap in national parliaments decreased from 55.6 pp to 44.5 pp in the EU28 and the variation among Member States decreased as well. The convergence process is weak since in some countries the gap increased; these are Latvia (+6.4 pp), Bulgaria, the Netherlands, Hungary (+3/+4 pp), Latvia (+1.4pp).

Looking at **sub-periods** different patterns can be identified. In fact, sub-periods in which the variation in the EU28 increased are observed between 2006 and 2011 and between 2013 and 2016.

For the **Euro and Non-Euro area** similar patterns of upward convergence emerge. However, some difference in the levels and trends between the two areas are evident. In particular, the gap and the differences among countries are higher in the Non-Eurozone compared to

the Eurozone. Moreover, the reduction of the gender gap is on average higher in the Eurozone, declining from 56.6 pp in 2005 to 43.1 pp in 2018.

Figure 160: Gender gap in National Parliament (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2005-2018

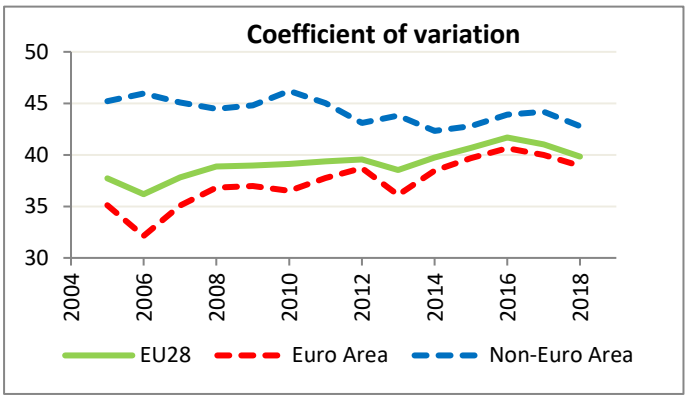


At the country level interesting trajectories can be identified. In fact, some countries presented a significant improvement in women's relative position in national politics; these are Italy, Slovenia, France, Greece, Portugal, the UK, Ireland and Estonia.

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence among EU MSs in the gender gap in national parliaments by area. Overall, the analysis of the coefficient of variation show a divergence process, since the variation between countries reduces less than proportionally than the average value does. This is the case in the Eurozone; while in outside the Eurozone sigma convergence is observed.

Figure 161: Sigma convergence in the EU28 by area, 2005-2018



Delta convergence

The analysis of delta convergence shows also an overall reduction between 2005 and 2018 of the distance in gender gap in National Parliament with respect to the best performing country. Despite some oscillations, on average European countries converge towards gender gap in National parliaments of the best performer.

Figure 162: Delta convergence in the EU28, 2005-2018

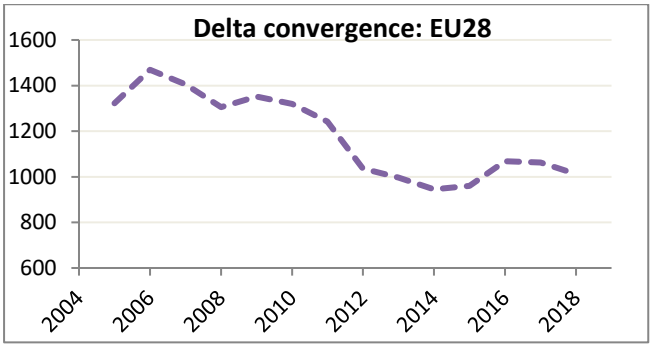
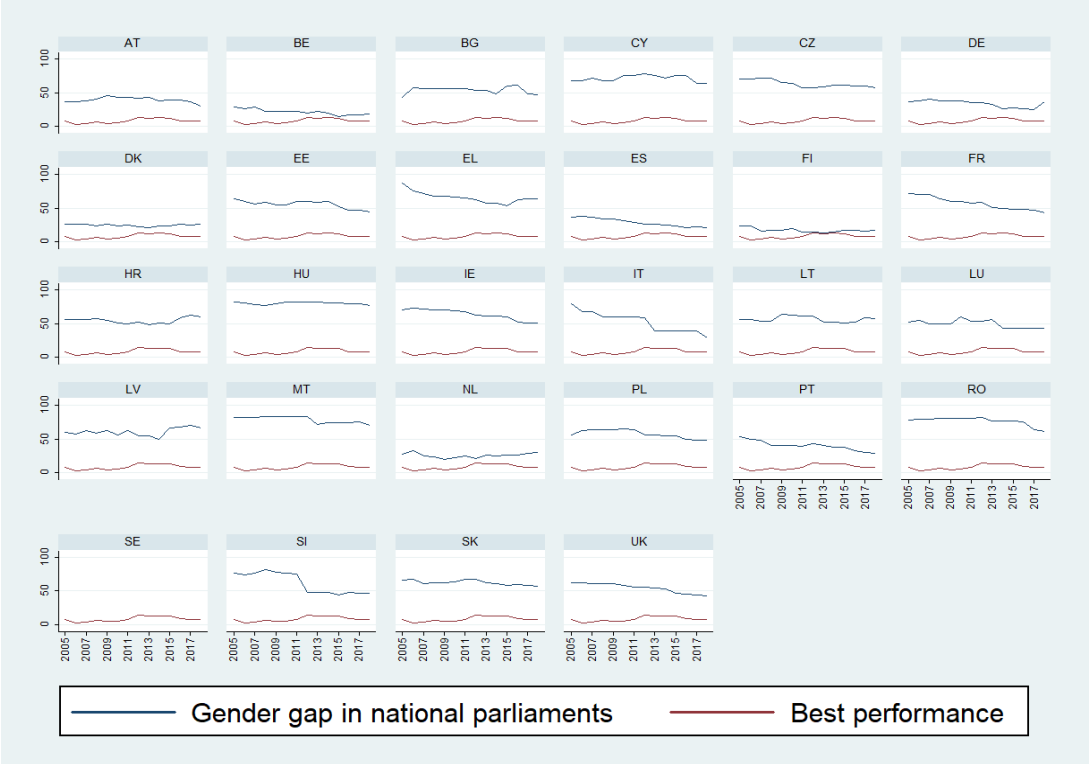


Figure 163 shows that the best performing country is Sweden, which albeit some oscillation remain the country with the lowest gap over the entire period 2005-2018. In 2018 almost all MSs have reduced the gap with Sweden, with some countries presenting large improvements; for example: Italy, France, Slovenia, Portugal, Greece. On the contrary, other countries increased the gap during the period: Bulgaria, Latvia, Croatia.

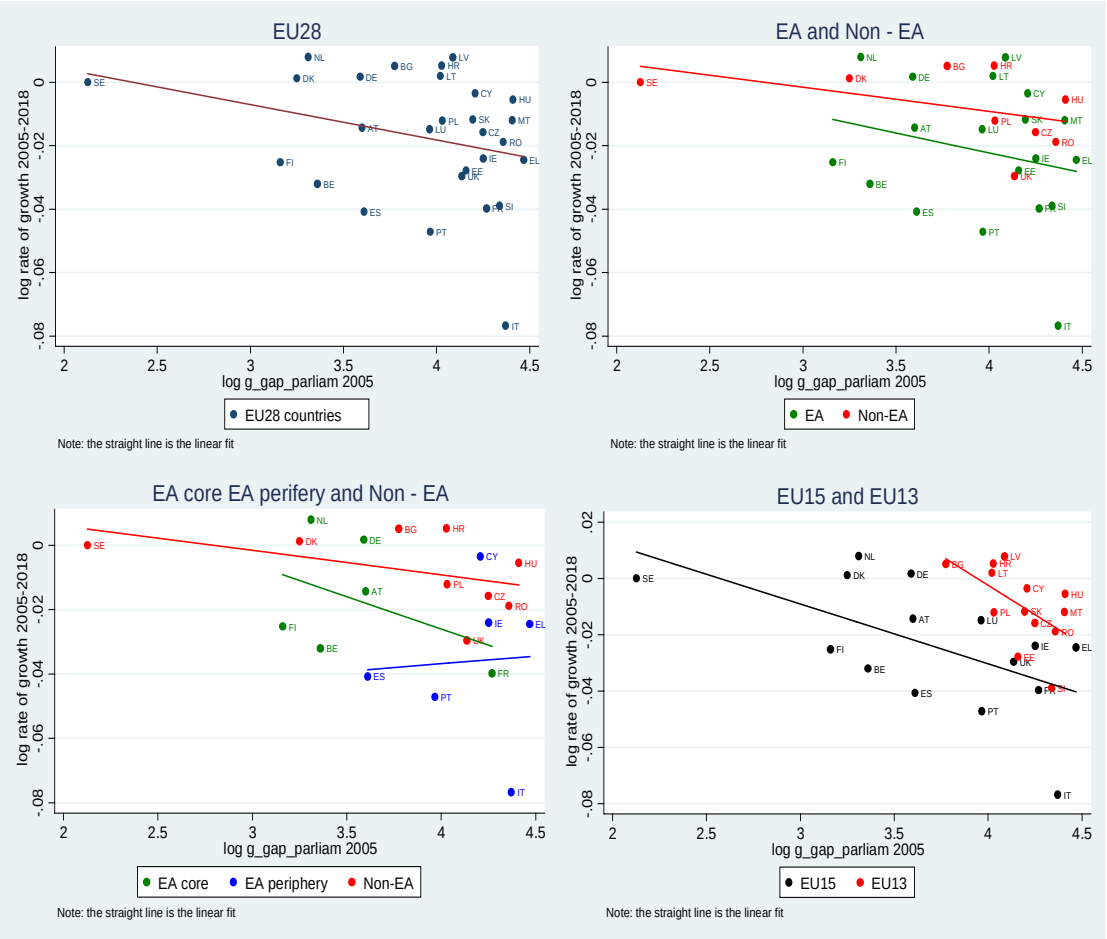
Figure 163: Gender gap in National Parliament of EU28 MSs *versus* Best performance line, 2005-2018



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2005-2018 does not** show a convergence process in the EU28. Instead, the convergence process is evident and significant among the EU13 countries (4% a year) and among the EU15 countries (2% a year).

Figure 164: Unconditional Beta convergence by groups of countries, 2005-2018



However, when analysing sub-periods an unconditional beta convergence process emerges also in the EU28; specifically **in the period following the launch of the EU 2020 Agenda** (3% a year). Whereas, before 2010 a convergence process emerges only in the EU13.

Figure 165: Unconditional Beta convergence in the EU28 by periods, 2005-2018

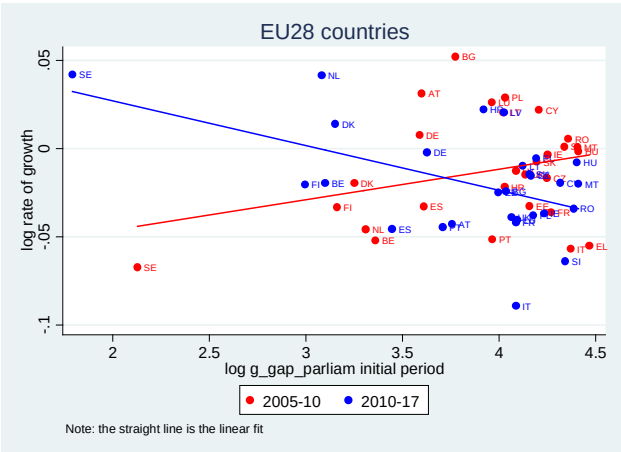
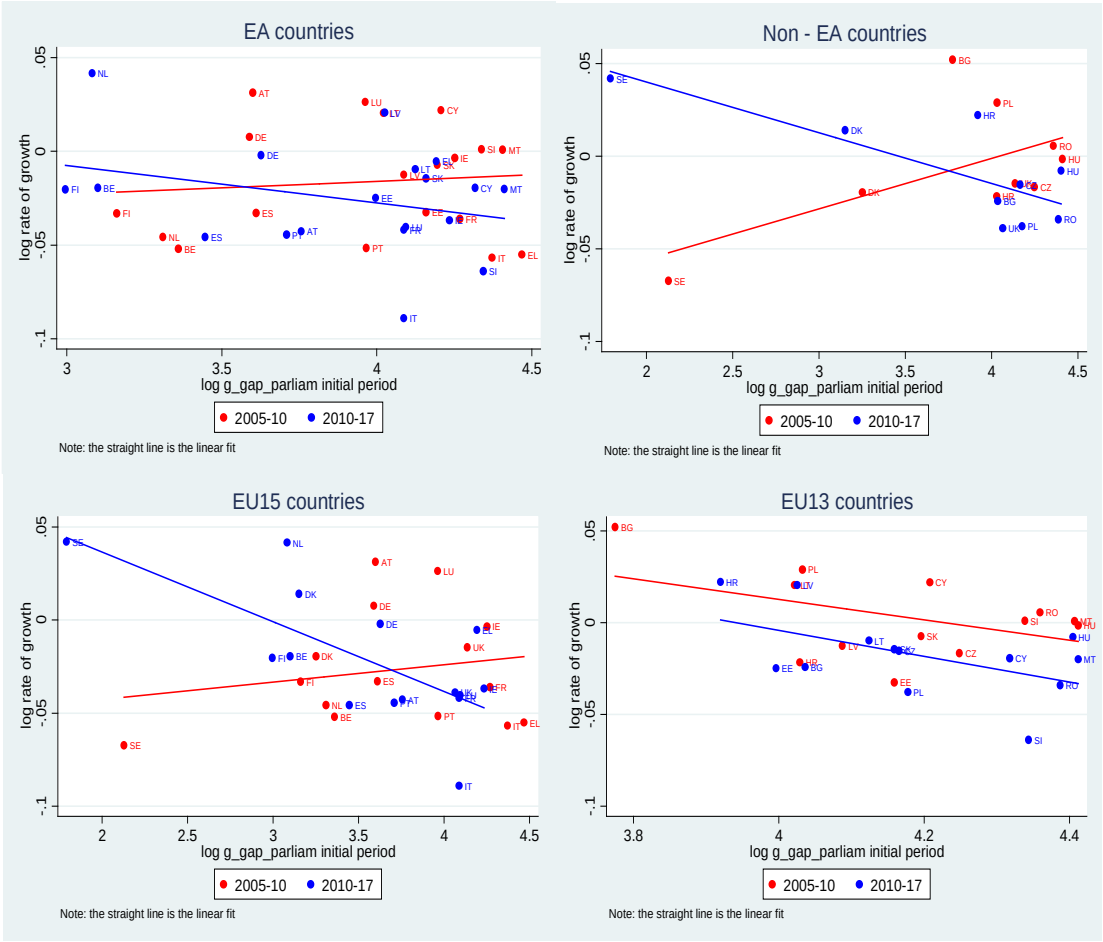


Figure 166: Unconditional Beta convergence by groups of countries and periods, 2005-2018



20. Gender gap in early school leavers

Definition: The indicator measures the gender gap (calculated as a difference between males and females) in the share of people aged 18-24 who had completed at most a lower secondary education[5] and were not in further education or training during the four weeks preceding the survey.

Data source: Eurostat – LFS [edat_lfse_14]

Time: 2002-2017

The **analysis of upward convergence** of the gender gap in ESL rate in the EU28 shows a weak upward convergence process among the EU countries in the period 2002-2017. However, while between 2002 and 2007 the average EU gender gap in ESL increased, in spite of a reduction in the variation among countries, from 2007 onwards the average gender gap in ESL consistently decreased, albeit with some oscillations. In the Non-Euro area, the gender gap remained more or less at the same low level while the variation among countries increased. On the contrary, in the Euro area, characterised by high initial gaps in ESL between man and females, a clear upward convergence process emerges.

Delta convergence shows an overall reduction between 2002 and 2017 of the distance in the gender gap in ESL rate with respect to the best performing country, despite some oscillations.

The analysis of the **unconditional Beta convergence** over the period 2002-2017 shows a convergence process in the EU28 at 5% a year: countries with higher gender gap in ESL rates present larger reductions during the period. When distinguishing by groups of countries, the convergence process is only evident among EA core countries and among EU15 countries.

At regional level, sigma convergence shows that differences in gender gap in early school leavers rates are higher among EU regions than among EU countries. At regional level convergence among EU28 regions is observed during the period 2004-2016 if we consider the standard deviation. Differently, the analysis of the coefficient of variation shows a fluctuating trend of convergence and divergence. Differences in convergence patterns of between EU countries and EU regions are observed for both Euro area and Non-Euro area.

Upward convergence

During the 2002-2017 period, the gender gap in ESL rate in the EU28 registered a **weak upward convergence process**: on average the gender gap in ESL rate decreased from 4.3 percentage points to 3 pp in the EU28 and the variation among Member States decreased as well. The convergence process is weak since in some countries, over the period considered,

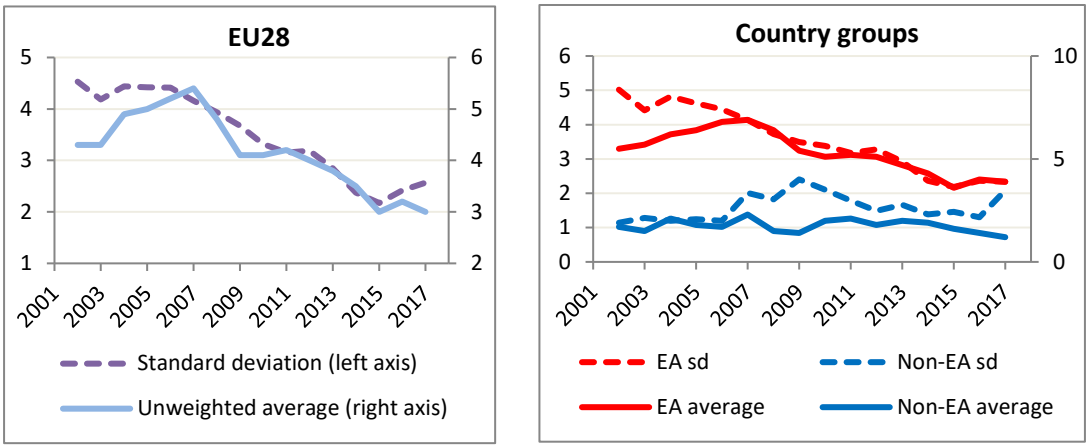
[5] Lower secondary education refers to ISCED (International Standard Classification of Education) 2011 level 0-2 for data from 2014 onwards and to ISCED 1997 level 0-3C short for data up to 2013

the gender gap in ESL rate increased (Austria, Germany, Denmark, Luxemburg, the Netherlands and the UK).

Analysing **sub-periods** different patterns emerge, especially in the trend of the average gap. In fact, between 2002 and 2007 the average EU gender gap in ESL increased up to 5.5 pp, in spite of a reduction in the variation among countries. Then from 2007 onwards the average gender gap in ESL consistently decreased, albeit with some oscillations.

For the **Euro and Non-Euro area** different patterns emerge. Indeed, in the Non-Euro area the gender gap remained more or less at the same low level (at around 1.5 pp), while the variation among countries increased. On the contrary, in the Euro area, characterised by high initial gaps in ESL between man and females, a clear upward convergence process emerges.

Figure 167: Gender gap in ESL rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2002-2017

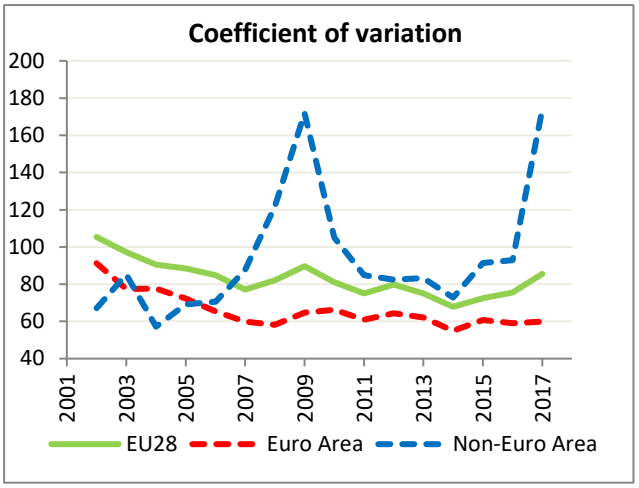


At the country level interesting trajectories can be observed during the period. Portugal, Spain and Cyprus recording high gender gaps in 2002, improved their performance over time, getting closer to the EU average. Whereas, other countries, such as Austria, Germany and the UK converged towards the EU average due to a progressive increase in the gender gap in ESL.

Sigma convergence by area

In this section we use the coefficient of variation to measure convergence by groups of countries. The coefficient of variation clearly depicts a convergence among countries in the Eurozone; while the evolution of the coefficient of variation in the Non-Eurozone is erratic: showing a high peak in 2008-2010 and in 2017.

Figure 168: Sigma convergence in the EU28 by area, 2002-2017



Delta convergence

The analysis of delta convergence shows also an overall reduction between 2002 and 2017 of the distance in the gender gap in ESL rate with respect to the best performing country (i.e. the country with the gap nearest to zero). Despite some oscillations, on average European countries converge towards the gender gap in ESL rates of the best performer.

Figure 169: Delta convergence in the EU28, 2002-2017

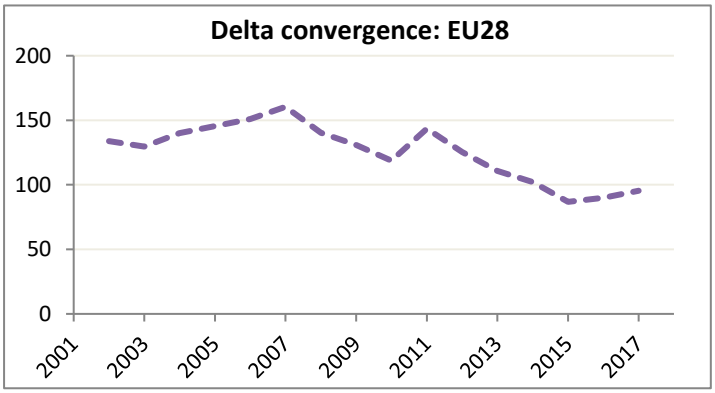
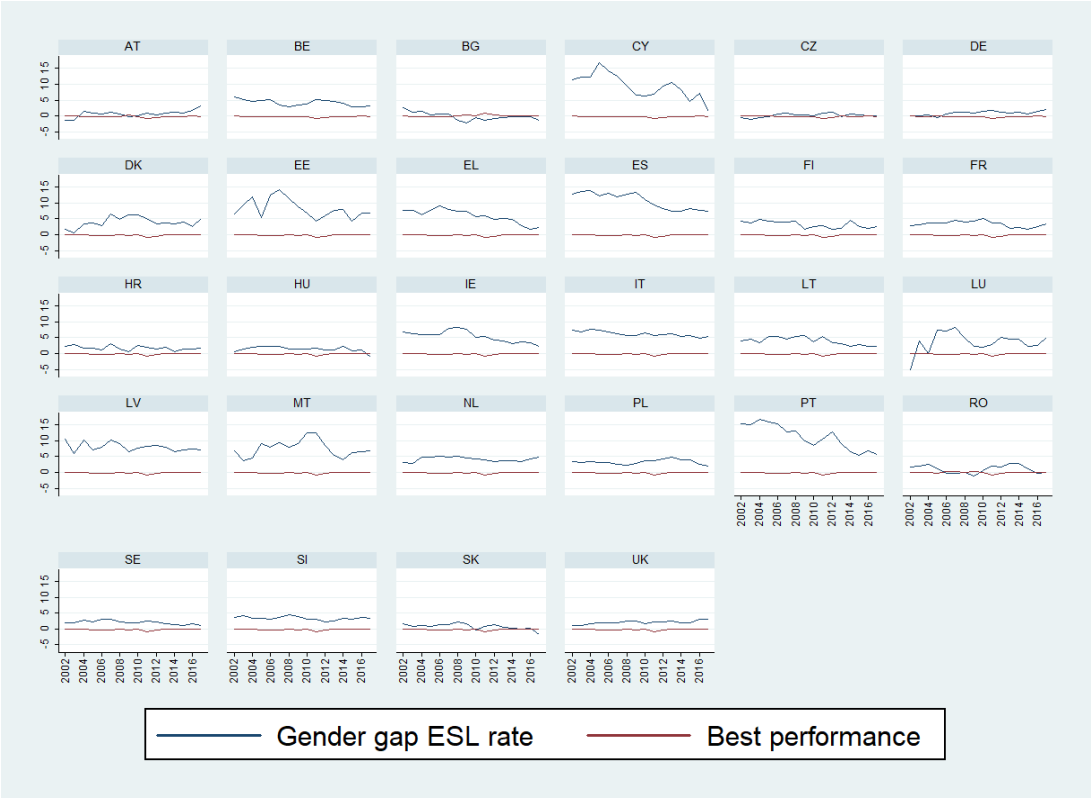


Figure 170 shows that the best performing countries over the period 2002-2017 are alternatively: Austria, Germany, Bulgaria, Romania, the Czech Republic and Slovakia. There are many countries having high early school leavers rate which significantly reduced the gap: Cyprus, Greece, Italy, Spain, Portugal and Ireland.

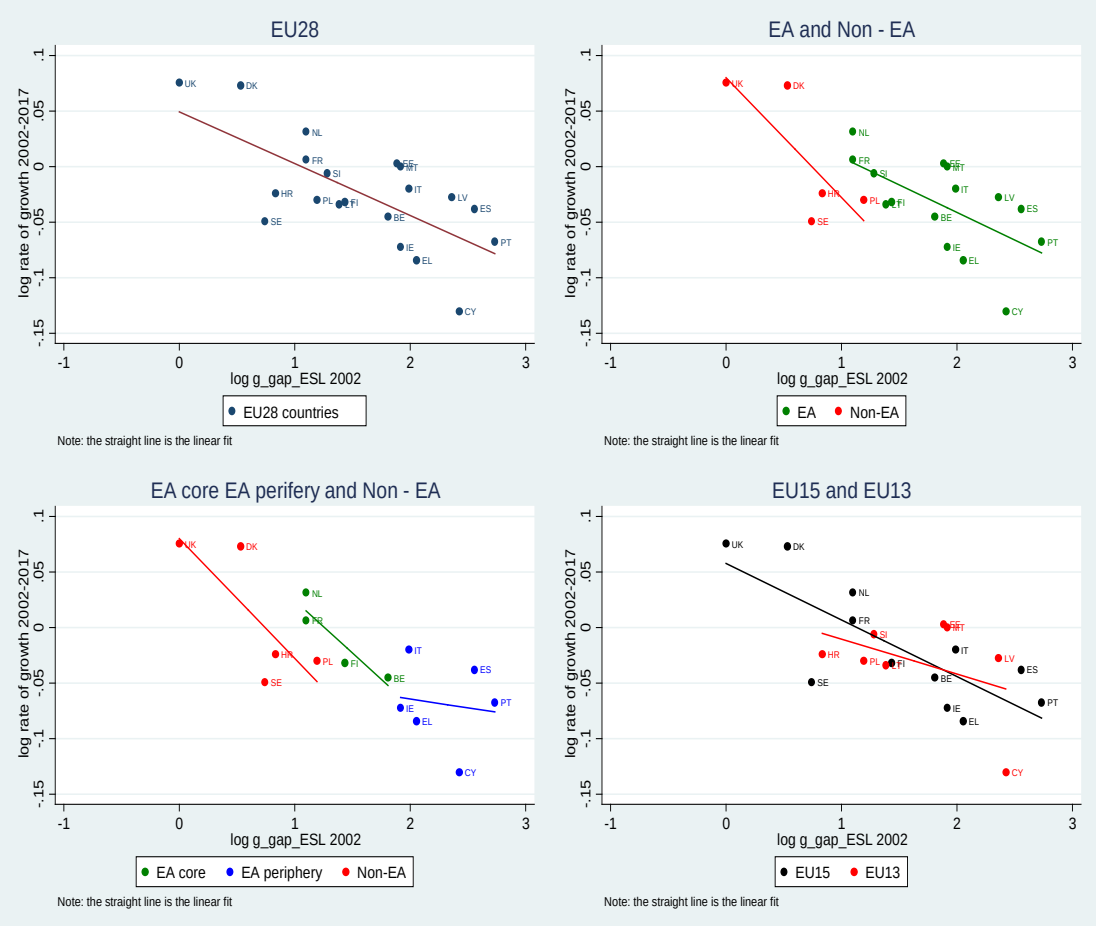
Figure 170: Gender gap in ESL rate of EU28 MSs *versus* Best performance line, 2002-2017



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence over the period 2002-2017** shows a convergence process in the EU28 at 5% a year: countries with higher gender gap in ESL rates present larger reductions during the period. When distinguishing by groups of countries, the convergence process is only evident among EA core countries and among EU15 countries.

Figure 171: Unconditional Beta convergence by groups of countries, 2002-2017



The analysis by sub-periods reveals that the pace of convergence in the gender gap in ESL rate rates **is higher in the period following the launch of the EU 2020 Agenda** with respect to the previous period. In particular, in the EU28 it is estimated at 7% a year; whereas in the Euro-area and in the EU15 it reaches 12% a year. On the contrary, in the Non-Euro area and among EU13 countries no convergence process is observed either in the first period, or in the second one.

Figure 172: Unconditional Beta convergence in the EU28 by periods, 2002-2017

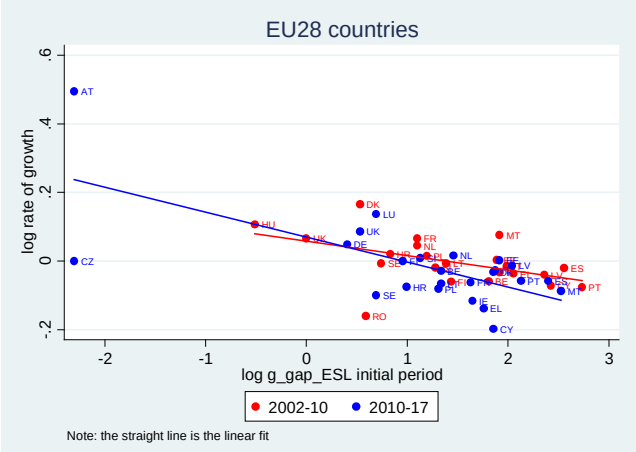
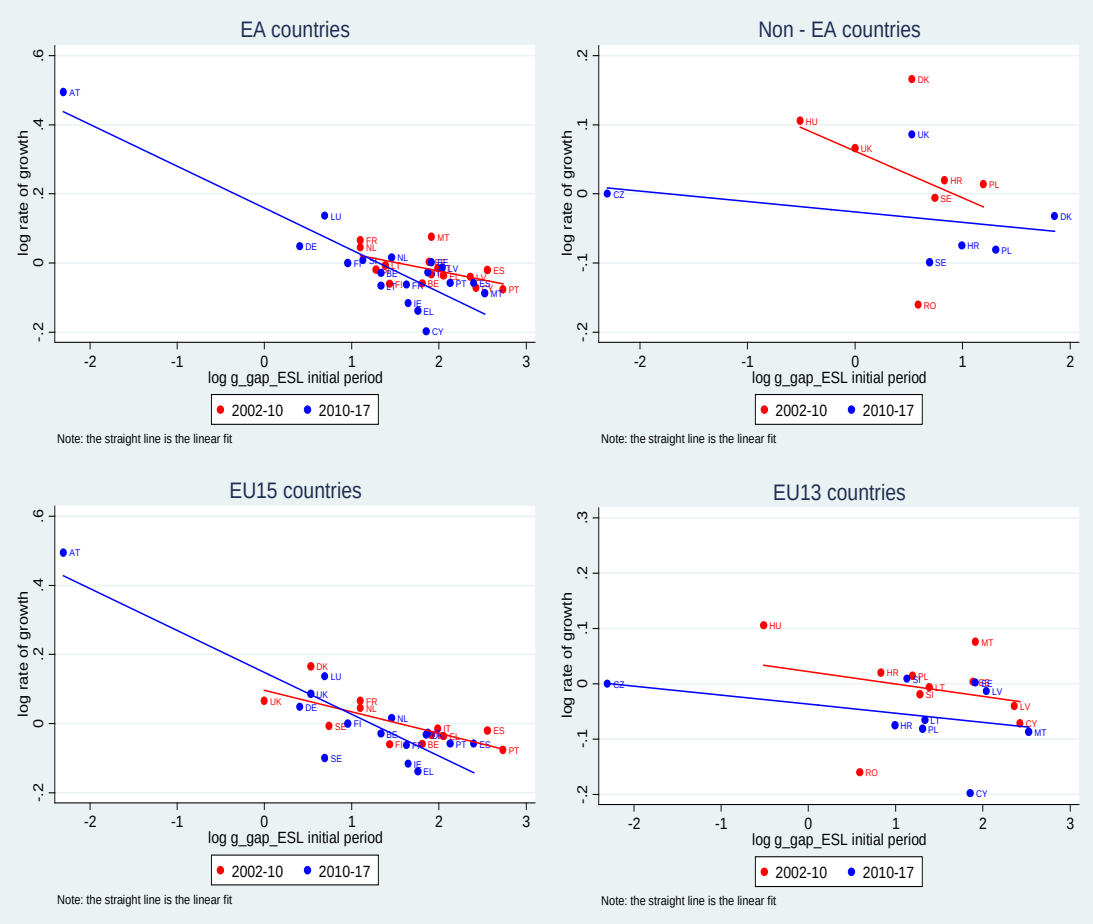


Figure 173: Unconditional Beta convergence by groups of countries and periods, 2002-2017

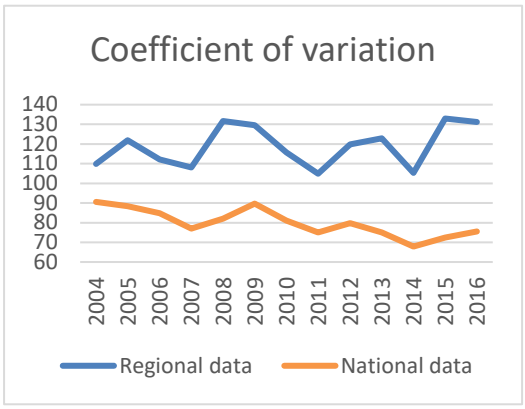


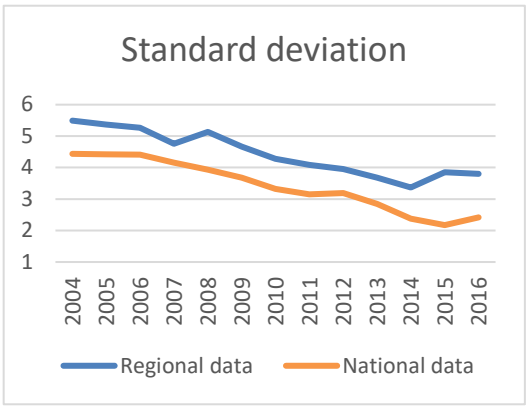
Regional Convergence

Sigma convergence

In general, **differences in gender gap in early school leavers rates are higher among EU regions than among EU countries** (this holds true when using either the standard deviation or the coefficient of variation). Variation among countries (standard deviation) decrease not only at national level, but also at regional level. However, when analysing the evolution of the coefficient of variation the pattern is volatile and shows a fluctuating trend of convergence and divergence.

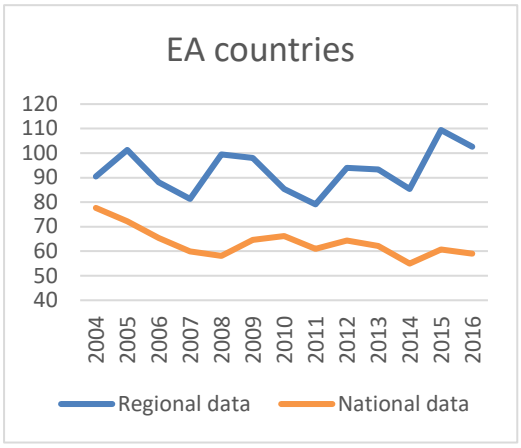
Figure 174: Regional data *versus* national data: standard deviation and coefficient of variation in the EU28, 2004-2016

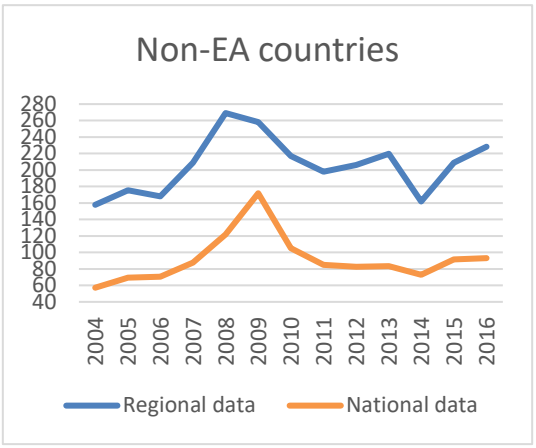




Concerning the **Euro and Non-Euro area**, differences in convergence patterns between EU countries and EU regions are observed for both Euro area and Non-Euro area countries (figure 175).

Figure 175: Regional data *versus* national data: coefficient of variation by groups of countries, 2004-2016





21. Gender gap in AROPE

Definition: Difference in the AROPE rate between women and men. The AROPE rate measures the proportion of people considered at risk of poverty or social exclusion and includes those who are at-risk-of-poverty after social transfers (income poverty), severely materially deprived or live in households with very low work intensity.

Data source: Eurostat EU SILC [ilc_peps01]

Time: 2005-2016

The **analysis of upward convergence** of the gender gap in the in the risk of poverty or social exclusion shows a weak upward divergence trend among the EU countries in the period 2005-2016. In particular, while the average gender gap decreases over time (women present on average a higher risk of poverty and social exclusion), variations between countries strongly increase in 2010, due to the effects of the economic and financial crisis. In the Euro and Non-Euro area similar divergence patterns are registered.

Sigma convergence, measured by the **coefficient of variation,** confirms a divergence trend both in the Eurozone and outside.

Delta convergence also register an overall increase between 2005 and 2016 of the distance with respect to the countries presenting a low gender gap.

The analysis of the **unconditional beta convergence** of the gender gap in the AROPE rate over the period 2005-2016 does not show a convergence pattern in the EU28. Unconditional beta convergence is only evident in the Euro-area among periphery countries and in the EU15 area. However, when analysing separate subperiods a convergence process emerges also in the EU28 before 2010, and the pace of convergence is particularly relevant among EU13 countries. Whereas, after 2010 the convergence pace is higher in the Euro area than in the other country groupings.

Upward convergence

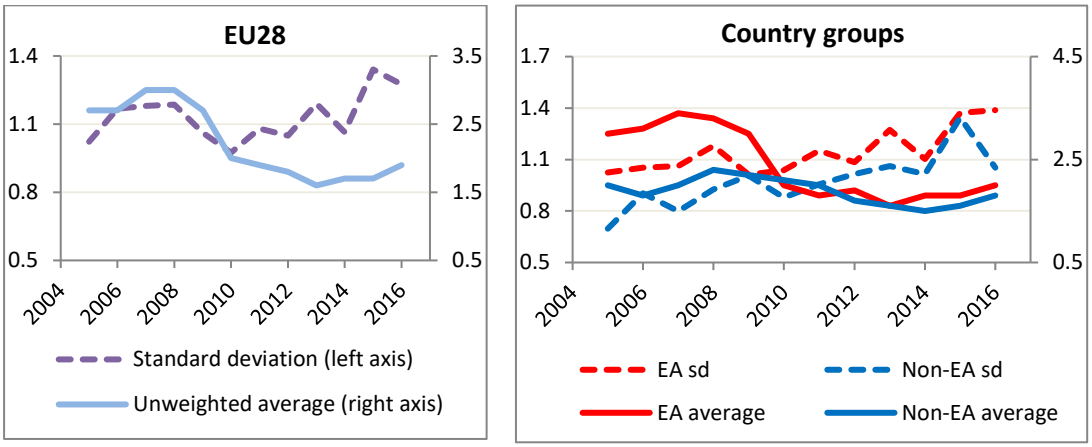
During the 2005-2016 period, the gender gap in the AROPE rate in the EU28 registered a **weak upward divergence trend**: on average the gender gap decreased from 2.7 percentage points to 1.9 pp in the EU28, whereas the variation among Member States increased. The divergence process is weak since in some countries the gap increased over the period considered. The increase was particularly relevant for Bulgaria (+2 pp) and Estonia (+2 pp). Instead in other MSs (Belgium, Germany, Ireland, Luxemburg, Portugal, Romania, and Sweden) the increase was less than one percentage point.

Looking at **sub-periods** different convergence patterns emerge. Specifically, between 2005 and 2008 the gap and the variation among countries increase (downward divergence), then between 2008 and 2010 upward convergence is registered, followed by a short period (2010-2013) of upward divergence, and by a downward divergence trend in more recent years (2013-2016).

For the **Euro and Non-Euro area** similar divergence patterns are registered. However, some differences emerge in the gap levels and in the trends of the variations among countries. In

fact, before 2010 the gender gap was higher in the Eurozone than in the Non-Euro zone, then since 2010 onwards the gender gaps registered in the two areas are pretty similar.

Figure 176: Gender gap in the AROPE rate (unweighted average, right axis) and standard deviation (left axis) in the EU28, 2005-2016

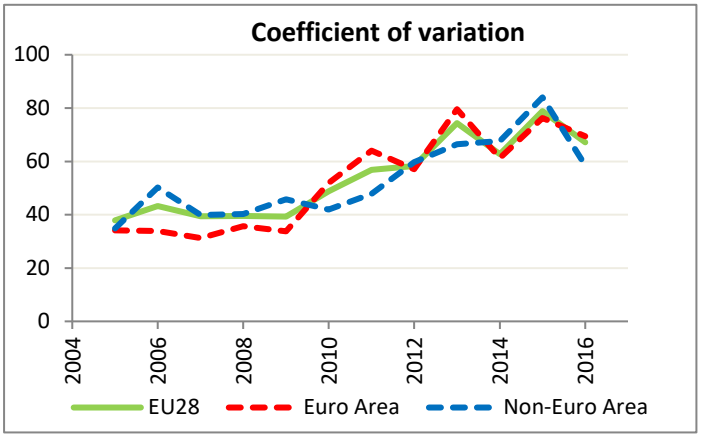


At the country level **interesting trajectories** can be observed. For instance, in the Baltic Republics the gender gap in the AROPE rate moved widely: starting form high levels in 2005/2006 then reaching very low levels during the crisis and the widening again. Instead, other countries present during the period 2005-2016 a continuous reduction of the gap (e.g. Italy, Finland, Spain and Slovakia) or a constant growth (e.g. Bulgaria, Germany, Portugal).

Sigma convergence by area

In this section we use the **coefficient of variation** to measure convergence by groups of countries. The coefficient of variation clearly depicts a divergence process in the gender gap in the AROPE rate among European countries. The evolution of the coefficient of variation is similar in the Euro and Non-Euro areas and present several oscillations.

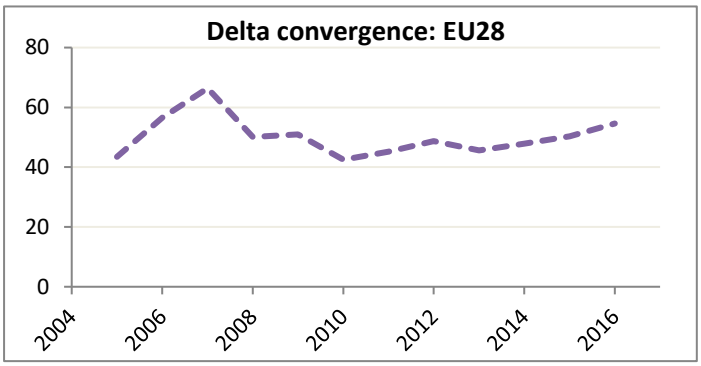
Figure 177: Sigma convergence in the EU28 by gender, 2002-2017



Delta convergence

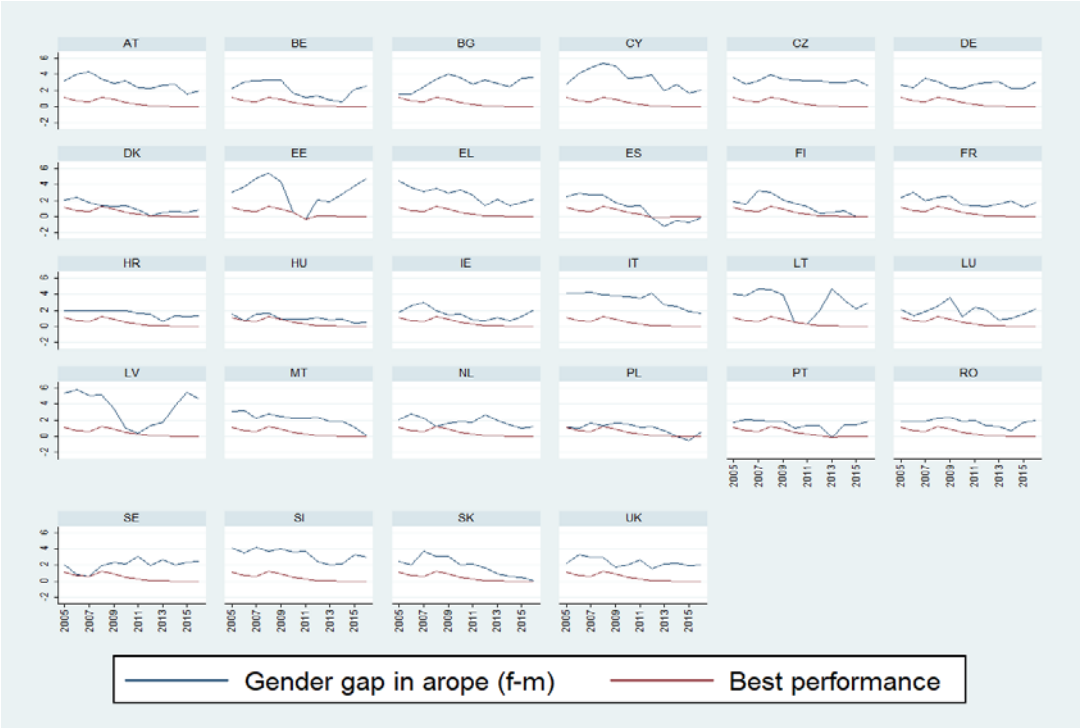
The analysis of convergence of the gender gap in the AROPE rates also show **an overall increase between 2005 and 2016 of the distances with respect to the best performing countries**. Despite a reduction between 2007 and 2010, on average European countries do not converge towards the rates observed by the best performing countries.

Figure 178: Delta convergence in the EU28, 2005-2016



Over the period 2005-2016 there are several countries presenting low gender gaps in the risk of poverty or social exclusion. However, there are some MSs that present low gender gap during the entire period: Denmark, Hungary, Poland, Portugal, Romania. On the contrary there are some countries that show high and increasing gaps: Bulgaria, Latvia, Estonia, Lithuania.

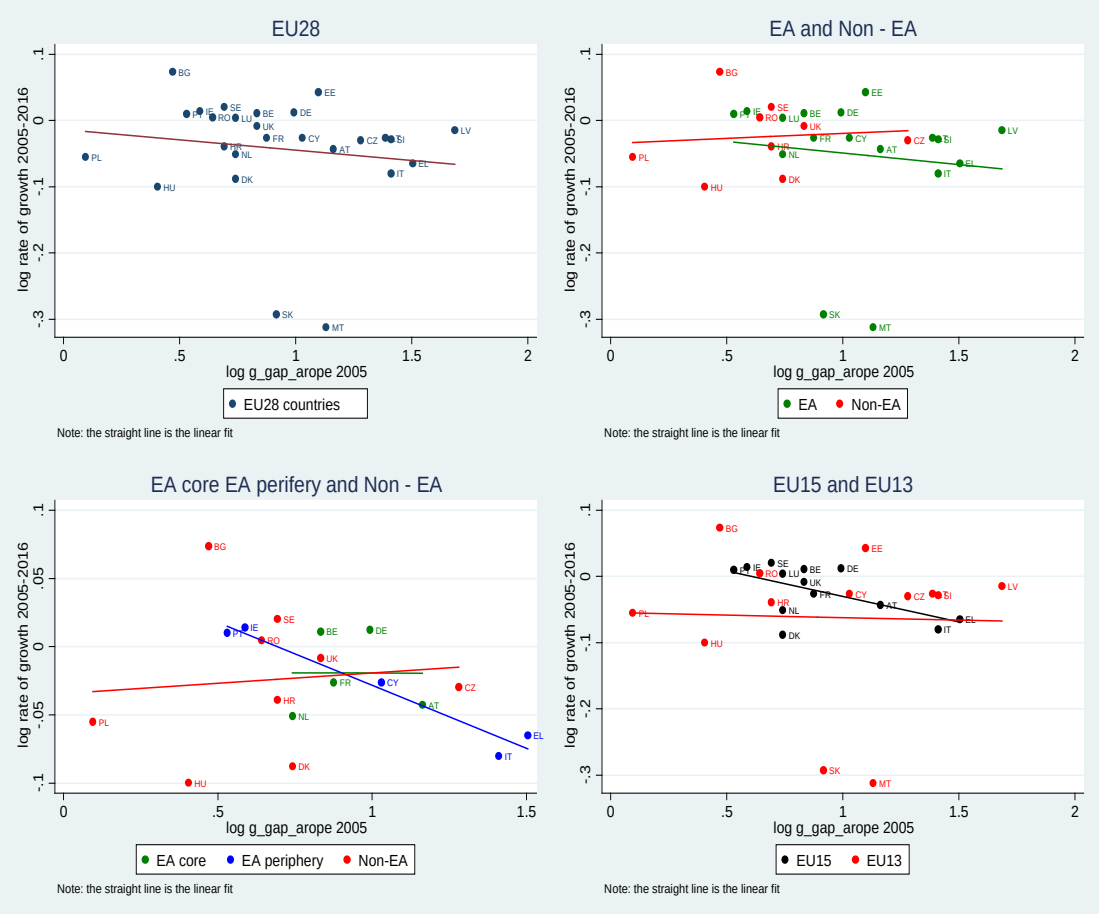
Figure 179: Gender gap in the AROPE rate of EU28 MSs *versus* Best performance line, 2005-2016



Unconditional Beta convergence

The analysis of the **unconditional Beta convergence of the gender gap in the AROPE rate over the period 2005-2016** does not show a convergence pattern in the EU28. Unconditional beta convergence is only evident in the Euro-area among periphery countries and in the EU15 area.

Figure 180: Unconditional Beta convergence by groups of countries, 2005-2016



However, when analysing separate subperiods a convergence process emerges in the EU28. In particular, before the **launch of the EU 2020 Agenda** convergence is particularly relevant among EU13 countries. Whereas, after 2010 the convergence pace is higher in the Euro area than in the other country groupings.

Figure 181: Unconditional Beta convergence in the EU28 by periods, 2005-2016

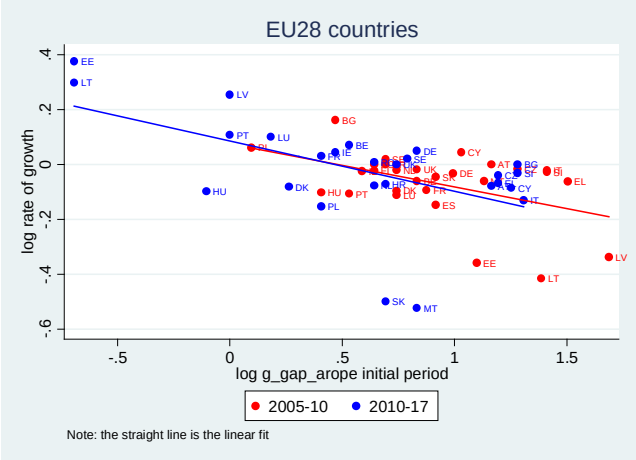
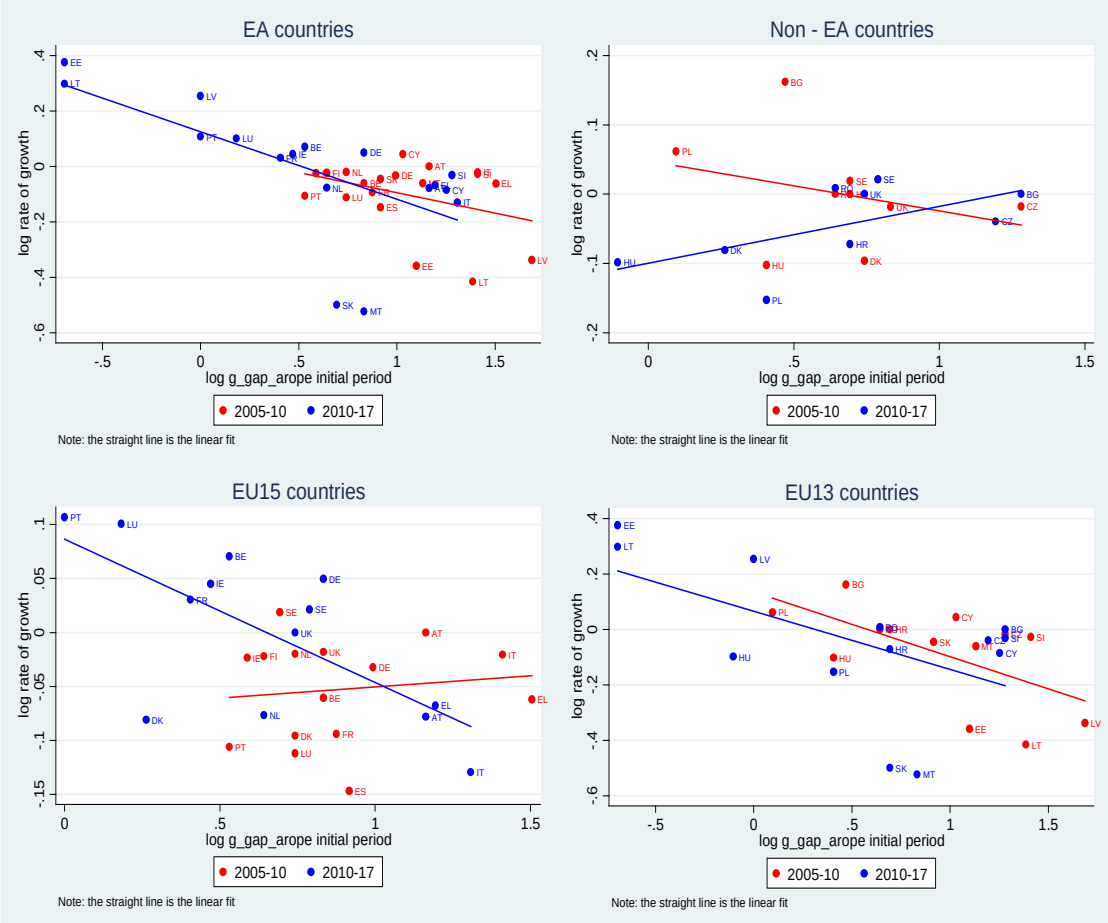


Figure 182: Unconditional Beta convergence by groups of countries and periods, 2005-2016



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