RESEARCH REPORT

Eurofound

Monitoring convergence in the European Union

Upward convergence in the EU: Concepts, measurements and indicators

2018

Contents

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Executive summary

Introduction

In the context of rising concern over disparities in the social progress of EU Member States, Eurofound in its 2017–2020 work programme committed to investigating whether and where socioeconomic trends are converging or diverging across countries. This report is the first output of the research strand dedicated to this investigation, entitled 'Monitoring convergence in the European Union'. It presents the results of a study to establish a conceptual framework to support Eurofound's research on convergence.

The report clarifies the concept and meaning of convergence, and provides an overview of the current policy debate around the topic. It formally defines 'upward convergence' and develops a methodological strategy to measure it. This methodological strategy is then applied to examine convergence patterns across the EU in 37 indicators encompassing four areas of the social domain: employment, working conditions, living conditions and socioeconomic factors.

Policy context

The EU is committed to balanced and sustainable economic growth, as well as social and territorial cohesion. Prior to the 2008 economic crisis, Member States experienced both economic and social convergence. The recession caused the process to slow or even to reverse in some outcomes. The performance of some Member States began to diverge in certain dimensions – in aspects of employment and living conditions, for instance. Convergence trends were restored for the most part in 2013, but diverging performance among Member States remains a concern.

Persistent economic divergence across Member States may erode the promise of shared economic prosperity. Social divergence and increasing disparities within Member States undermine the European integration project and progress towards improved living and working conditions within the single market.

However, while the concept of economic convergence is embedded in the European treaties and has been at the forefront of European policy discussion for some time, the importance of upward social convergence has only recently gained traction. Central to the current debate is the need to foster socioeconomic convergence at all levels; there exists a shared conviction that the future of the EU lies in preserving diversity but correcting possible asymmetries while moving closer together. In this regard, supporting upward convergence among Member States in socioeconomic outcomes is the ultimate goal of the European Pillar of Social Rights and is central to the discussion on reforming the Economic and Monetary Union (EMU).

Key findings

- While the concept of upward convergence has become a central topic in EU policy discourse following the crisis, no formal definition of the term exists in the literature. This study defines upward convergence as improving performance of Member States in terms of employment, working and living conditions – moving closer to a policy target – alongside decreasing disparities between them. (A policy target may be an explicit EU target, such as 75% of the working age population in employment. Or it may be implicit, where there is a societal consensus that an increase or a decrease in an indicator is 'good' (or 'upward') – for example, falling unemployment.) This report therefore fills the gap by mathematically defining upward convergence as a normative characterisation of convergence.
- Measuring convergence, and upward convergence in particular, is not straightforward. The literature review identifies several methods that can be applied to measure convergence, each with its own pros and cons. Since this study aimed to investigate the reduction of disparities among Member States, sigma-convergence was adopted as the measure of convergence, where the reduction in disparities is examined through changes in the standard deviation or the coefficient of variation. Furthermore, the improvement of Member States is monitored through yearly changes in performance. Upward convergence is then assessed by combining both.

2000–2008

- Upward convergence took place in all four areas of investigation until the economic crisis. The severe recession that followed the crisis halted or reversed this trend in most of the indicators examined, highlighting the asymmetric impact on Member States not only in the economic domain but also the social domain.

2008–2013

- Over 2008–2013, downward divergence – a decrease in performance of the EU together with an increase in disparities between Member States – was prevalent in the indicators. It was particularly apparent in the employment indicators, especially participation in and exclusion from the labour market. The living conditions indicators also exhibited this trend, particularly material deprivation, social exclusion, trust in government and poverty. Trends were more stable in working conditions and socioeconomic factors. Interestingly, even during the crisis, upward convergence remained steady in the indicators measuring access to services and gender equality.

Post-2014

- While the effect of the crisis was profound, with the recovery in 2014, upward convergence was restored in most of the indicators. This was particularly the case for those monitoring employment: the employment rate and labour market exclusion indicators (the unemployment rate, the long-term unemployment rate and the rate of young people not in employment, education or training (NEET)). For the activity rate and involuntary part-time employment rate, the trend was one of upward divergence – an improvement of performance in the EU as a whole together with an increase of disparities across Member States. The only indicator where a trend of downward divergence persisted was involuntary temporary work.
- Trends in the working conditions indicators continued to be stable, while several of the living conditions indicators followed a pattern of upward convergence: trust in government, social exclusion, at risk of poverty or social exclusion (AROPE), material deprivation and life expectancy. On the other hand, downward divergence occurred in four indicators: life satisfaction, quality of government, civic engagement and in-work poverty.
- Finally, there was a strong trend of upward convergence in education-related and gender gap indicators. At the same time, upward divergence was recorded for the indicators measuring the proportion of people with unmet medical needs and for the share of children in formal care.

Policy pointers

This study highlights the importance of looking at the results of convergence analysis in reference to the business cycle of economic expansion and contraction. For one group of indicators, upward convergence trends were steady and robust even during the crisis; fluctuations in the EU average and the variability across Member States over the business cycle were very limited. This set of indicators includes: the activity rate, education-related indicators (early school-leavers and tertiary educational attainment rates), gender gaps in education and in employment, and the job-quality indicators. Conversely, for other indicators, upward convergence was greatly affected by the business cycle. For these, it is possible to see a cyclical evolution in both averages and variability, suggesting that in good times there is upward convergence (with improvement in the EU average and reduced disparities) while in bad times there is downward divergence (with falls in the EU average and growing disparities). This pattern was identified for employment rate, all labour market exclusion indicators, in-work poverty and material deprivation. These are the indicators for which the resilience of Member States should be strengthened in order to prevent future asymmetric shocks.

Introduction

The European Union is committed to economic, social and territorial cohesion, balanced economic growth, and upward economic convergence across the Member States. Over recent decades, convergence has been achieved in both its economic and social dimensions. However, the economic crisis of 2008–2010 brought these trends to a sudden halt on some indicators, stalling patterns of convergence or causing Member States to diverge in their performance. Despite this slowdown, from 2013, convergence restarted in those areas of the economy and society worst affected by the economic crisis.

Diverging performance across Member States as well as increasing inequalities within them are a concern for several reasons. Firstly, these developments are at odds with the expectation that deepening European integration leads to growing cohesion at national and pan-European levels. Secondly, they may give rise to feelings of social injustice and unfairness among citizens, fuelling anti-European sentiment and undermining the solidity and legitimacy of the European project. Finally, divergence is unsustainable from the economic point of view, especially in a monetary union.

In the context of increasing concern over divergence in the progress of Member States, Eurofound in its 2017–2020 work programme committed to investigating whether or not these trends signal a general lowering of living and working conditions. To this end, it established a new strategic area of intervention entitled 'Monitoring convergence in the European Union' (Eurofound, 2016).

This report is based on a study to lay the groundwork for monitoring convergence in the EU. Its objectives are threefold.

- To distinguish the different possible meanings of convergence and to provide an overview of the policy debate surrounding the topic. An extensive literature review of policy documents and academic articles has been carried out to understand how the concept of convergence has entered into the policy debate and which statistical tools are commonly used to measure it.
- To formally define 'upward convergence' and, building on the evidence collected, to develop a methodological toolbox with which to measure it.
- To apply this toolbox to investigate the patterns of upward convergence in four areas: employment, working conditions, living conditions and socioeconomic factors. This analysis is based on a set of selected indicators, some of which are taken from the Social Scoreboard used by Eurostat to monitor societal progress within the context of the European Pillar of Social Rights.[1] Several complementary indicators, which give a different perspective to the discussion of convergence within the social dimension of the EU, have also been included.

Structure of the report

The results of the study are structured in two main parts. The first part, comprising Chapters 1 to 3, clarifies the concept of convergence and presents the methodological strategy adopted to monitor convergence.

- Chapter 1 discusses the policy context of convergence and describes the renewed interest in convergence in the European policy debate.
- Chapter 2 briefly discusses the definition and meaning of the term 'convergence'. It also presents the most common statistical methods used to monitor convergence and formally defines the concept of upward convergence.
- Chapter 3 describes the research strategy developed to monitor upward convergence in the EU. It discusses the methodological approach to investigating the process of upward convergence and the impact of the dynamics of Member States on patterns of convergence and divergence.

The second part, comprising Chapters 4 to 8, describes the four areas selected for investigation and presents the results of the analysis into whether upward convergence of Member States is evident in these areas.

Chapter 9 closes the report with concluding remarks and an overview of the next steps and further areas of research.

1 https://composite-indicators.jrc.ec.europa.eu/social-scoreboard/

1 Convergence as a concept

The global financial and economic crisis that started in 2008 in the United States shook Europe to its core. Gross domestic product (GDP) fell abruptly in several Member States, employment levels decreased dramatically in most, and living conditions deteriorated considerably for certain groups within the EU population.

Almost a decade later, the EU economy is back on a more stable footing, and in the last quarter of 2016, for the first time since 2008, all Member States recorded positive growth in GDP and rising employment. Still, this economic recovery is unevenly distributed across society and regions, and addressing the legacy of the crisis remains an urgent priority (European Commission, 2017a).

One adverse effect of the crisis is that it has amplified differences in social and economic outcomes among the Member States. For example, the ratio of debt to GDP is twice as high in Portugal as it is in the Netherlands. Unemployment in Greece is more than seven times higher than in the Czech Republic. Italy's long-term youth unemployment rate is more than 20 times higher than the figure for Denmark. The incidence of unmet need for medical care is significantly higher in Estonia (15.3% in 2016) than in the Netherlands and Austria (0.2% in both) (Eurostat, n.d.-a). Such marked differences are unlikely to be sustainable.

There has always been an expectation that EU membership would eventually lead to balanced development across its Member States. One of the aims of the Treaty of Rome in 1957 was to reduce 'the differences existing between the various regions and the backwardness of the less favoured regions', and the Five Presidents' Report of 2015 states that 'the notion of convergence is at the heart of our Economic Union' (European Commission, 2015a, p. 7).

However, the reality of convergence is much more complex. While market integration tends to bind Member States together and can potentially increase living standards in all participating countries, it by no means guarantees convergence in their performance. Some wealthier Member States or regions may benefit more than others from the process of integration – in part due to the effects of specialisation and of centre–periphery dichotomies. Market integration can also give rise to inequalities within Member States, with some sectors gaining and others losing. Free trade threatens uncompetitive sectors, and European competition policy means that such sectors cannot be protected with national state aid. The single currency and the loss of the devaluation option also removes perhaps the most powerful means to regain competitiveness – in the short term at least (Eurofound, 2017a).

Restoring and promoting social and economic upward convergence is paramount for the EU. Upward convergence is fundamental to sustaining the political cohesion and legitimacy of the Union. The consequences of divergence between Member States are potentially grave. Economic divergence undermines the promise of shared economic prosperity, which was central to the creation of the EU in the first place. Social divergence and increasing levels of inequality within Member States are contradictory to the goals of the European integration project.

It is a legitimate expectation of Member States and their citizens that the EU supports them to reach various economic and social objectives. If only a few countries benefit from the single market and the Economic and Monitory Union (EMU), the EU ceases to be a union and risks fragmentation. If there is a feeling that the single market impedes the growth of Member States and prevents low-income countries from developing, efforts will be made to undermine its functioning (Andor, 2017).

While convergence – in terms of the relative pace of economic growth in Member States – has always been at the forefront of European policy discourse, more recently the term has gained other meanings and nuances. Initially, it was used solely in relation to the convergence of monetary and fiscal indicators, as a prerequisite for countries to join and remain in the EMU. The trials of the euro in the early period of the financial crisis demonstrated that convergence in just these nominal indicators was not sufficient for stability of the EMU nor for ensuring real convergence among Member States. The focus has shifted more recently, giving greater emphasis to the need to promote social convergence as well as economic convergence.

With the assumption that economic and social convergence should go hand in hand, the social dimension of the EU has entered into the policy discourse on an equal footing with the economic dimension (Eurofound, 2017a). Current opinion advocates fostering socioeconomic convergence through action at all levels, with the shared conviction that the key to the future of the EU lies in preserving diversity and correcting imbalances and asymmetries that persistently emerge from diverging trends or differences. The ultimate goal of the European Pillar of Social Rights is to support upward convergence among Member States, as restoring convergence in economic and social outcomes is central to the discussion on reforming the EMU (European Commission, 2017b, 2017e).

This chapter outlines the evolution of the term 'convergence' in the European policy debate and describes where and how it appears in the EU treaties. Following this, the chapter reconstructs how the debate around convergence developed as the focus moved from economic convergence to economic and social convergence. The chapter then discusses the relationship between convergence and the European Pillar of Social Rights, and outlines the relationship between convergence and the concept of socioeconomic resilience.

Convergence in the treaties

The concept of convergence is at the heart of the EU and is embedded within the economic, monetary and social dimensions of the EU treaties.

The 1992 Maastricht Treaty on European Union (TEU) explicitly introduced the terminology of convergence, calling on Member States 'to achieve the strengthening and the convergence of their economies and to establish an economic and monetary union including … a single and stable currency'. As such, the term convergence tends to be associated in the EU legal framework with economic performance as opposed to social conditions.

The euro convergence criteria, or the Maastricht criteria, ensure that a Member State is ready to adopt the euro and that doing so is not going to cause economic risks for the Member State itself or the entire zone. The criteria are set out in Article 140 (1) of the Treaty on the Functioning of the European Union (TFEU). These criteria, which define the so-called nominal convergence, include the areas of price stability, government finances, exchange rates and long-term interest rates (Council of the European Union, n.d.).

While the term is explicitly mentioned only in reference to the common currency in the EU treaties, the full history of the concept of convergence in the EU can be found in the origins of the European project. For example, after stating that federal integration is necessary to preserve peace in Europe, the 1950 Schuman Declaration outlined not only how production of and trade in coal and steel should be organised, but also highlighted the need for 'the equalisation and improvement of the living conditions of workers in these industries' (Schuman, 1950). Equalisation was a very important concept here, and this sentence affected subsequent key documents.

The founding fathers of the European project were convinced that social convergence would arise spontaneously through economic convergence. However, the 1957 Treaty of Rome included the creation of the European Social Fund (ESF) and stated that Member States 'agree upon the necessity to promote improvement of living and working conditions of labour so as to permit equalisation of such conditions in an upward direction' (Article 117) (Vandenbroucke, 2017b). The treaty also included the right to free movement of workers and the abolition of any discrimination based on nationality as regards employment, remuneration, and other conditions of work and employment, including gender equality for equal pay and equal work (Articles 48 and 119).

In spite of this start, the EU social acquis was the result of a long process that evolved over time. Important steps were taken from the 1980s onward through the Single European Act (1986) and the TEU, often with the aim of completing the EU single market.

Furthermore, the Treaty Establishing the European Community states that economic prosperity and improved living and working conditions among and within Member States are among the main priorities of the EU. These goals are to be achieved through the promotion of growth-enhancing conditions and the reduction of disparities between the levels of development of EU regions and Member States, which are key targets of the European cohesion policy. In this regard, Leonardi (2006) argues that convergence is a policy process towards cohesion, which is the ultimate political objective.

The objective of European cohesion policy is defined in Articles 2 and 4 and Title XVII of the Treaty Establishing the European Community. According to Article 2, cohesion policy should 'promote economic and social progress and a high level of employment, and achieve balanced and sustainable development'. Article 158 adds:

> *in particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas.*

Since the inception of the policy and the first programming period (1989–1993), this objective has often been translated as the promotion of convergence between EU regions and, specifically, their regional levels of GDP.

In order to promote harmonious development, cohesion policies are being delivered through the five European structural and investment funds: the European Regional Development Fund, the Cohesion Fund, the ESF, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund. By directing these funds to particular areas, sectors and less developed regions, cohesion policies aim to reduce the significant economic, social and territorial disparities between European regions and, ultimately, Member States.

Furthermore, Article 121(3) of the TFEU outlines the EU's commitment to achieving 'closer coordination of economic policies and sustained convergence of the

economic performance of the Member States' as one of the main operational priorities of the EU.

More recently, the 2007 Lisbon Treaty introduced a 'horizontal social clause' (Article 9 of the TFEU). This clause adds a social dimension by stating that all of the EU's policies and activities

> *shall take into account requirements linked to the promotion of a high level of employment, the guarantee of adequate social protection, the fight against social exclusion, and a high level of education, training and protection of human health.*

Moreover, with the Europe 2020 strategy, the EU heads of governments and states committed to quantifiable social, employment and environmental goals for the first time. Tracking more than just the macroeconomic progress of Member States is the first step in monitoring their performance and observing social convergence or divergence trends.

From nominal to social convergence

Upward convergence between Member States has been achieved over several decades across both the economic and social dimensions. EU membership has led to an improvement in the average standard of living across all Member States (Eurofound, 2017a). Although pace and timing have varied, new, lower-income Member States have caught up and transformed into middle- or higher-income economies.

However, the 2008 financial crisis halted or even reversed some of these converging trends, leading to dramatic social and economic divergence between countries. Unemployment rates and the share of young people not in employment, education or training (NEETs) increased unevenly among Member States, while trends in the distribution of GDP per capita diverged (Eurofound, 2017a). The effect of large divergences may spread across countries: a sharp increase in unemployment and poverty rates in one country can increase inflows of labour and decrease exports to other countries.

While it is not expected that all dimensions of a country's economy and society must follow a path of convergence all the time, lasting divergence in major outcomes should be prevented in order to maintain the promise of shared prosperity of the EU. For this reason, any consideration of the sustainability of the EMU had to address the issue of convergence (Andor, 2017).

The renewed debate around convergence started as a result of these considerations. Initially focusing on nominal convergence and the EMU, the scope was later extended to include social convergence and the whole of the EU. The so-called Four Presidents' Report, published in 2012, represented an important shift in the policy debate as it recognised that the EMU had to be reformed in order to sustain the euro and to reconcile the way it functioned with the broader objectives of the EU.

The report outlined the need for banking, fiscal and political union in order to make monetary integration sustainable. It also discussed economic, social and structural imbalances.

> *In an economic union, national policies should be orientated towards strong and sustainable economic growth and employment while promoting social cohesion. Stronger economic integration is also needed to foster coordination and convergence in different domains of policy between euro area countries, address imbalances, and ensure the capacity to adjust to shocks and compete in a globalised world economy.*
>
> (Council of the European Union, 2012)

The report emphasised that maintaining an appropriate level of competitiveness, coordination and convergence was essential in order to ensure sustainable growth without large imbalances between countries.

At the same time, the Commission produced the *Blueprint for a deep and genuine economic and monetary union*, which had a strong macroeconomic focus (European Commission, 2012). A separate initiative was then launched in October 2013 to monitor the performance of the Member States and to strengthen the social dimension of the EMU. This was the first time a scoreboard of key employment and social indicators was introduced in order to measure and monitor social divergence in the EMU. The results were immediately used in the Joint Employment Report and the European Semester in general (European Commission, 2013).

The debate around socioeconomic convergence received further input with the election of the Juncker Commission in 2014, with upward convergence forming part of President Juncker's agenda, entitled 'A new start for Europe'. The agenda highlighted the need to continue reform of the EMU in order to preserve the stability of the common currency. It also discussed the importance of enhancing the convergence of economic, fiscal and labour market policies within the Member States sharing the common currency. The concept of upward social convergence became explicit in many of President Juncker's speeches from 2015 onwards, with the publication of the Five Presidents' Report, a follow-up to the Four Presidents' Report (European Commission, 2015a).

The Five Presidents' Report looked at the labour market and social convergence in more detail than its predecessor. It explained the importance of analysing convergence and why divergence was a problem. In particular, the report discussed how economic and structural convergence was necessary in order to achieve social cohesion and avoid social imbalances.

The need for social and economic convergence within the EU and the EMU was also discussed as part of the same agenda for the first time.

In 2017, the *White Paper on the future of Europe* presented different future scenarios for the EU (European Commission, 2017g). Although it mentioned convergence only once, this mention was crucial as it gave economic and social convergence equal prominence, highlighting 'the need to complete the Economic and Monetary Union and strengthen the convergence of economic and social performances' (European Commission, 2017g, p. 4).

The White Paper was accompanied by a series of reflection papers, one of which discussed deepening the EMU, while another specifically focused on the social dimension (European Commission, 2017e, 2017f). The concept of economic and social convergence was central to both papers. In the reflection paper on deepening the EMU, the term convergence was used 54 times, and the paper stated that economic and social convergence needed to be fully aligned. This was also clearly indicated in the proposed possible roadmap for the completion of the EMU. Similarly, the reflection paper on the social dimension of the EU explicitly mentioned the need for convergence in order to ensure better living standards, social conditions and social standards.

The call for economic and social convergence was echoed in the Rome Declaration, signed on 25 March 2017 by the leaders of all the Member States, the European Council, the European Parliament and the European Commission. It called for an EU 'based on sustainable growth' that 'promotes economic and social progress as well as cohesion and convergence'. The Declaration also set out to 'make the European Union stronger and more resilient, through even greater unity and solidarity' (Council of the European Union, 2017).

Upward convergence and the European Pillar of Social Rights

The Rome Declaration was followed in November 2017 by the proclamation of the European Pillar of Social Rights, which represents a response to the damaging impact of the 2008 economic crisis on EU society. The business cycle is a pattern of expansion, contraction and recovery in the economy. As the economy cannot grow indefinitely, there will always come a time when the upward trend ends and the downward trend begins. Recessions are therefore inevitable, and sooner or later another will descend on Member States. The EU cannot afford to experience another setback as drastic as that of 2008, however, and its leaders have recognised that it must prepare to avoid such an event. This is the ultimate goal of the European Pillar of Social Rights.

The Pillar comprises 20 principles in the form of rights, and its aim to increase resilience to economic shocks by ensuring upward economic and social convergence across the Member States. It builds on principles and rights that were set out at different times, in different ways and in different forms. It aims to make them more visible and explicit for citizens and stakeholders at European, national, regional and local levels. These principles are grouped into three main categories:

- **equal opportunities and access to the labour market**, including education, training, lifelong learning, gender equality, non-discrimination and active support to employment
- **fair working conditions**, including secure and adaptable employment, wages, information about employment conditions and protection in case of dismissals, social dialogue and involvement of workers, work–life balance, and occupational health and safety
- **social protection and inclusion**, including childcare and support to children, social protection, unemployment benefits, minimum income, old age income and pensions, healthcare, inclusion of people with disabilities, long-term care, housing and assistance for the homeless, and access to essential services

The Pillar represents an important shift in perspective, with economic performance and social performance now seen as interdependent, a move away from the traditional thinking that regarded economic performance as a precondition for social development (Vandenbroucke, 2017a). According to this philosophy, social policies are an investment in citizens that will help to improve both social inclusion and economic growth. The Pillar extends the thinking underlying the 2013 Social Investment Package, which focused on social investment, human capital and equal opportunities. The Pillar does not aim to harmonise welfare systems, however, but to improve them and prepare them for the new challenges that the EU is facing, such as globalisation, the digital revolution, changing patterns of work, migration and an ageing population (European Commission, 2017f).

In order to monitor the performance of Member States, an online Social Scoreboard accompanies the Pillar. It is composed of 14 headline indicators and an additional 28 indicators to capture the situation in the Member States regarding the three Pillar categories (Eurostat, 2018 n.d.-b). The scoreboard is expected to feed into the annual European Semester process of economic policy coordination, generating input for country-specific recommendations.

Convergence and resilience

Economic and social resilience refer to a country's ability to withstand a negative economic event (such as a recession) and to adjust and recover quickly. The 2008 financial crisis showed how a lack of resilience in one or more euro zone countries can have a significant and persistent effect not only on the countries concerned, but also on the euro zone and the EU as a whole.

Convergence towards resilient economic and social structures that are better able to react to macroeconomic shocks should be seen as a prerequisite for strengthening the EU. This is particularly relevant to the EMU, where policy instruments addressing the effects of economic events are more limited due to, for example, the single monetary policy, limited fiscal policies and no possibility of fiscal transfers.

Resilient economic and social structures across Member States may boost the effectiveness of the single monetary policy by fostering cyclical convergence, meaning that business cycles across countries are of similar length. This is important in the EMU, because the conduct of the single monetary policy is less effective if countries are in different stages of the economic cycle and experiencing significantly different inflation rates. While the lengths of business cycles remain different among Member States, they have become increasingly synchronised in the euro zone – mostly due to policy convergence and trade integration. This means that these Member States move through recessions and expansion phases simultaneously.

Furthermore, resilient economic and social structures are better able to support sustainable long-term growth and promote better social outcomes. Insufficiently resilient economies may experience long and persistent downturns, which can affect long-term growth and social cohesion. Convergence towards resilient economic structures is seen as a necessary condition to realise the other dimensions of convergence in a sustainable way (European Commission, 2018). The lack of real convergence seen in recent years in the euro zone suggests that the effects can be important for cohesion not only within countries, but across euro zone Member States and the EU in general. Resilient economic structures help contain the negative consequences of recessions, and promote social outcomes by combining the positive employment effects of well-functioning labour and product markets with quality education systems and active labour market policies. Moreover, sustainable and well-targeted social security systems are among the key means to cater for social needs in the face of economic transitions.

The Pillar, with its 20 principles, can be seen as a first step towards resilient economic and social structures. Implementing these principles may equip Member States with the right framework to better prevent and absorb the effects of future economic events, and support social convergence in the EU.

2 Measuring upward convergence

Meaning of convergence

While renewed interest in convergence has brought the term to the centre of the European agenda, there is still a lack of clarity over its meaning. The origin of the term convergence traces back to Latin and derives from the term *convergere*, namely having a common direction. In modern English, it means 'the act of moving toward union or uniformity' (Merriam-Webster). It has a more technical meaning in mathematics and probability theory, where it refers to a process of moving towards the same point while gradually reducing differences or disparities. In time series theory, the concept of convergence requires the ratio of two time series to converge to unity in the long run (Kong et al, 2017). But in the European policy debate, the term is used with different meanings in different contexts.

Generally speaking, the meaning of convergence varies along two axes: convergence of what and convergence to where. While convergence of what is often intended to mean the convergence of geographical entities, such as Member States or regions, the meaning of convergence to where is far less exact.

Several types of convergence are discussed in the European policy debate. They can broadly be separated into two main types: convergence in outcomes and convergence requirements for EU projects, such as convergence related to the Maastricht criteria or structural convergence. Some of the types of convergence that have recently gained more importance in the European policy debate are listed below, several of which overlap.

Nominal convergence: Fulfils the requirements established by the TEU for accession to the EMU. It focuses on the evolution of inflation rates, nominal interest rates, the variability of exchange rates and fiscal variables, such as public deficits and debts (EPSC, 2015).

Legal convergence: Identified by the TFEU and another precondition of access to the EMU. It requires national legislation to be compatible with the treaties and the Statute of the European System of Central Banks in areas such as the independence of national central banks and compatibility with the prohibition of the monetary financing by governments (ECB, 2017).

Structural convergence: Changes in the structure of the economy or welfare systems of Member States towards some common standard or specific policy input (Vandenbroucke, 2017c).

Cyclical convergence: Where countries are in the same stage of the business cycle, such as an upswing or downswing. It is achieved when countries move in parallel along the economic cycle (European Commission, 2017e).

Real convergence: Convergence in economic and social performances in terms of real variables. It includes different aspects such as convergence in GDP per head, income, productivity and competitiveness, and labour market outcomes (Marelli and Signorelli, 2010).

Upward convergence: Convergence of Member States towards better working and living conditions and/or economic outcomes (European Commission, 2017a).

Convergence to resilient structures: Convergence of Member States to resilient economic and social structures that are better able to absorb and recover from economic events (European Commission, 2017d).

Traditionally, the term convergence has been used predominantly in the macroeconomic context, especially in relation to the EMU and the criteria to access the common currency. However, as noted in Chapter 1, it has also started to be used in reference to the social dimension of the EU in recent years.

Although they are sometimes used mistakenly as synonyms, convergence should not be confused with cohesion, nor should divergence be confused with inequality. Convergence indicates a process towards something, while cohesion is a status. In this regard, Eurofound (2017a) highlights that while cohesion is the capacity of the EU to hold together, cohesion does not necessarily imply convergence. However, some degree of equality (or at least a tendency to converge) between Member States is probably necessary for the cohesion of the EU.

The difference between inequality and divergence follows a similar logic. Inequality indicates a status of difference of rank or dignity and being unlike or different. Divergence, as the opposite of convergence, is a process towards dissimilarity. In the policy discourse, inequality and convergence are often related to different levels of society. While inequality often refers to the individual level (in other words, income inequality among citizens), convergence mainly refers to geographical units (Member States or regions).

The relationship between convergence and inequality is rather unclear. While convergence among Member States could be expected to result in a decrease of inequality among citizens, this is not necessarily true. In fact, mathematically, the level (average) of performance of a Member State could increase while inequality (variance) within this Member State could also increase. This implies that Member States can grow and move closer to each other while inequality, among regions for example, could increase as well.

Measuring convergence in performance

Notwithstanding all the possible different conceptualisations of convergence, the focus of this report – and Eurofound work on monitoring convergence in general – is upward convergence. This means the investigation of convergence of Member States towards better working and living conditions, measured through the monitoring of outcomes and performance on different indicators.

The concept of upward convergence does share some characteristics with real convergence. While real convergence is the process of reducing disparities in economic and social performance alone, upward convergence adds a normative element. It aims to reduce disparities through the overall improvement of performance while moving towards a measurable policy target (such as better working and living conditions). This policy target may be explicit, such as the Europe 2020 target to have 75% of the working age population in employment by 2020. Or it may be implicit, when there is a societal consensus that an increase or decrease in an indicator is 'good' (or 'upward'), as, for example, the reduction of unemployment.

From a methodological point of view, the way to measure convergence relates to the type of convergence under investigation. For instance, measuring cyclical convergence would require certain types of statistical measures and indicators, such as the Hodrick–Prescott filter or VAR analysis (Bayoumi and Eichengreen, 1993; Artis and Zhang, 1997). Measuring convergence in performance, such as real convergence, often uses the standard deviation or coefficient of variation (Hall et al, 1992; Monfort, 2008). So, just as there are different ways of defining convergence, there are also various ways of measuring it.

In order to monitor convergence in performance, it is important to have a clear understanding of what is captured with the various existing statistical measures of convergence. There is no single measure capable of capturing all relevant aspects of the convergence process. It is important, therefore, to understand the specificities and limitations of the existing measures.

According to Heichel et al (2005), when analysing policy, there are four main ways in which researchers conceptualise the measurement of convergence in performance:

- **beta-convergence**, in which those lagging behind catch up with the leaders in relation to a specific outcome or policy objective
- **sigma-convergence**, defined as a decrease in the variation of outcomes or performances
- **gamma-convergence**, which examines changes in country rankings with respect to a particular outcome or policy objective
- **delta-convergence**, which analyses countries' distance from an exemplary model or group of countries

Beta- and sigma-convergence are probably the most common statistical measures of convergence, and they derive from economic growth theory. Sigma-convergence can be implied by beta-convergence under some assumptions (Sala-i-Martin, 1996).

Beta-convergence

Beta-convergence is a catching-up process in which poorer countries grow faster than the rich ones. According to neoclassical growth theory, economies that possess the same structural parameters (technology level, propensity to save, population growth and capital depreciation) experience an 'unconditional' (or absolute) beta-convergence and eventually converge to the same steady-state level of capital per worker and GDP per capita (Solow, 1956).

Apart from the purpose of testing this classical hypothesis of income convergence, the analysis of beta-convergence can be applied to other variables of interest to assess if poorer countries or regions catch up with better-performing ones (see, for instance, Signorelli, 2005 for an analysis of the convergence of employment rates).

Technically, the computation of unconditional beta-convergence involves estimating the following regression:

$$\ln(\Delta y_{i,t}) = \alpha + \beta \ln(y_{i,t-1}) + \varepsilon_{i,t}$$

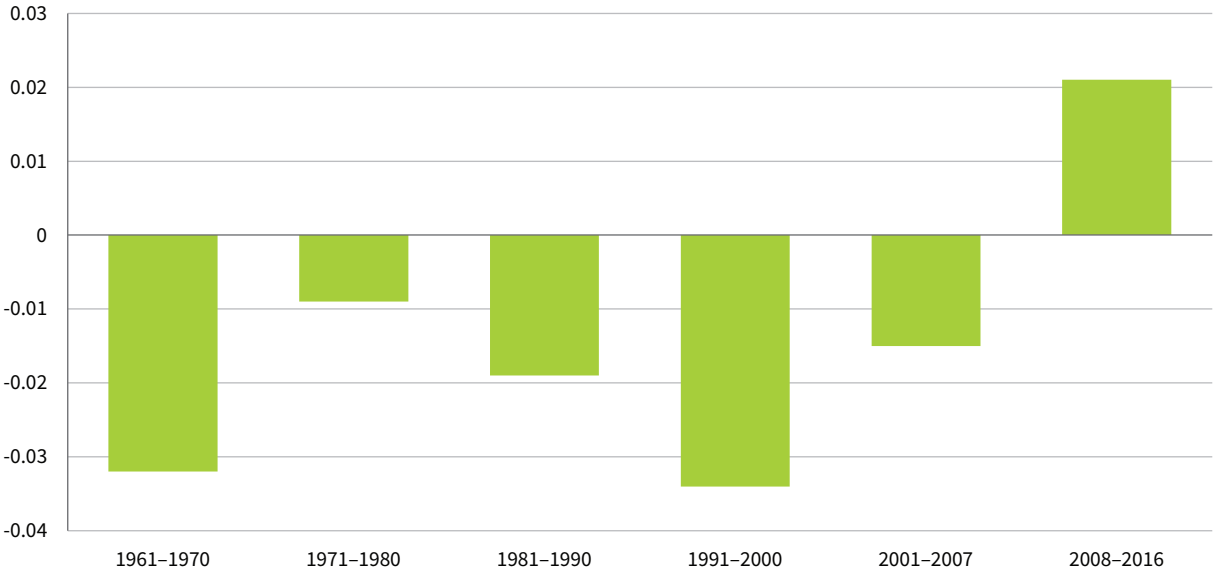
Where $y_{i,t}$ is the level of indicator y in country i at time t, $\Delta y_{i,t}$ is the growth rate of indicator y in country i at time t, α and β are the parameters to be estimated and $\varepsilon_{i,t}$ is the error term.

This equation analyses the relationship between the growth of an indicator over a certain period of time and its initial value. Beta-convergence exists if that relationship is statistically significant and negative, hence if those countries in which the initial level is higher grow more slowly. The magnitude of parameter β gives an indication of the speed of the convergence process.

Figure 1 shows an example of an analysis with unconditional beta-convergence through the application of a simple bivariate cross-country linear regression. In the figure, the average annual change in per capita income is regressed on the initial per capita income level (in purchasing power standard or PPS) for each decade over the period 1960–2016 (ECB, 2017). The period since 2000 is split into the pre-crisis and post-crisis periods (2001–2007 and 2008–2016). The sample covers the EU12 Member States, excluding Luxembourg (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain and

Figure 1: Catch-up of poorer Member States with richer Member States, EU12, where negative values indicate convergence and positive indicate divergence

Beta coefficient of linear regression of per-capita income growth on initial income levels, 1961–2016



Notes: *EU12 Member States, excluding Luxembourg (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain and the United Kingdom).*
Source: *ECB (2017)*

the United Kingdom). This simple test of convergence reveals that divergence (a positive β coefficient) is observed only in the period 2008–2016, that is, during and after the crisis. In each subperiod between 1961 and 2007, a negative β coefficient indicates convergence.

While the unconditional beta-convergence model can reasonably be applied for homogeneous groups of countries, it does not take into account cross-country differences that may affect the convergence process. Conditional convergence takes into account the different initial conditions and predicts that a country will grow faster the further it is from its own steady state, but income per capita does not necessarily equalise across countries in the long run. This is because convergence is conditional on a series of other explanatory variables, namely factor endowments and institutions, which can differ across countries even in the long run. To study the effect of other factors that could influence the convergence process, such as the characteristics of countries, a model of conditional convergence is estimated through the following equation:

$$\ln(\Delta y_{i,t}) = \alpha + \beta \ln(y_{i,t-1}) + \gamma Z_{i,t} + \varepsilon_{i,t}$$

Where $Z_{i,t}$ is a vector of potential explanatory factors.

Conditional convergence allows the convergence process to be investigated by controlling for certain explanatory factors such as the rate of technological progress across economies, changes in the labour force, investment-to-GDP ratio or year of EU accession (Kaitila, 2005; Gluschenko, 2012).

A compromise between the two approaches of unconditional and conditional convergence is the convergence clubs hypothesis. Convergence clubs are regions with similar initial conditions that converge to the same steady-state and growth trajectories (Eckey and Türck, 2007). With this approach, countries with similar levels in a set of covariates, such as educational attainment, employment rate or other measurable factors, are classified in clubs. Then the hypothesis that the 'worst performing' countries converge with one another and the 'best performing' countries converge with one another is tested. The convergence clubs hypothesis assumes that the explanatory factors that create clubs make it nearly impossible for a country in one club to move to another club.

Sigma-convergence

The concept of sigma-convergence refers to a reduction in disparities between statistical observations, in this case in countries or regions, over time. Convergence defined in this way is often identified by a decrease in a function of variability over time, demonstrating that a variable, such as employment rate, is becoming increasingly homogeneous cross-nationally. The reduction of disparities is usually investigated through the changes in standard deviation or the coefficient of variation. In particular, the coefficient of variation is a scale-invariant measure that allows for the comparison of dispersion across time periods. It has been cited as the best quantitative measure of homogeneity as it

allows variability trends among different indicators to be compared (Kenworthy, 1999). In order to investigate if there is convergence, the coefficient of variation of the variable of interest is calculated for each year (indicated by the subscript t) in the time series as the standard deviation divided by the mean:

$$CV_t = \frac{\sigma_t}{\mu_t}$$

Where $\sigma_t = \sqrt{\frac{\sum_{i=1}^{n}(x_{i,t}-\mu_t)^2}{N}}$ and $\mu_t = \frac{1}{N}\sum_{i=1}^{n} x_{i,t}$ are the standard deviation and the average for the population of reference.

If the coefficient of variation decreases over time, it is evidence of sigma-convergence. An increase in the coefficient of variation and in the standard deviation over time suggests that countries are diverging. A primary benefit of using sigma-convergence is that it is fundamentally consistent with the way we understand convergence: it is a measure of how countries, or other units, are becoming similar to each other. As such, it is a strong quantitative measure of whether convergence is occurring or not. However, the main problem with using the coefficient of variation is that a decrease in it may be driven by an increase in the average instead of a decrease in the standard deviation. For this reason, if no comparison among indicators is needed, it is preferable to measure sigma-convergence through a pure measure of variability, such as the standard deviation. In this way, the measure of dispersion of an indicator will not be affected by changes in its average.

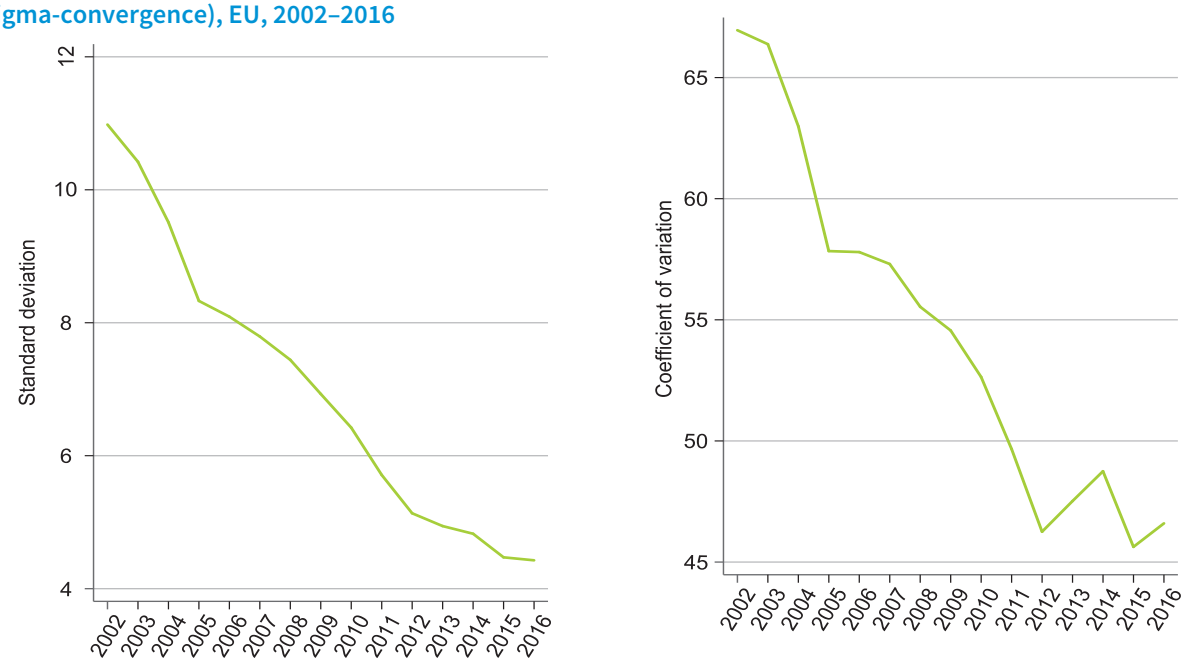
Figure 2 shows an example of sigma-convergence analysis. In this case, the standard deviation and coefficient of variation are applied to the early school-leavers indicator for the period 2002–2016 for all EU countries. Convergence can be observed yearly in the overall reduction in the standard deviation during the period. Similarly, an overall decrease in the coefficient of variation was recorded, although with a very limited increase in 2012–2014.

Overall, while beta-convergence generally implies sigma-convergence, the presence of country-specific economic events can increase dispersion. So beta-convergence is a necessary, but not sufficient, condition for sigma-convergence (for an early acknowledgement of this idea, see Barro and Sala-i-Martin, 1992, pp. 227–228; for a more recent discussion, see Young et al, 2013). In general, while the analysis of beta-convergence is almost exclusively covered in the academic literature, sigma-convergence is used widely in policy literature and is particularly well suited to looking at real convergence variables, such as the employment rate (European Commission, 2014, 2016).

Gamma-convergence

The concept of gamma-convergence aims to capture the movements of countries. It was developed as a variant of beta-convergence, which has been criticised for not capturing sufficient aspects of cross-country dynamics and mobility (Boyle and McCarthy, 1999). For the analysis of gamma-convergence, country rankings for different points in time are compared to assess the mobility of countries. If countries in the first ranks fall behind or catch up over time, convergence occurs.

Figure 2: Reduction of disparities across Member States in respect of the early school-leavers rate (sigma-convergence), EU, 2002–2016



Source: *Eurofound analysis of Eurostat data*

Changes in outcomes are analysed by simple measures of association, like the Kendall index of rank concordance (Boyle and McCarthy, 1999). The Kendall index measures changes over time through the following:

$$KI_t = \frac{Var[\sum_{t=0}^{T} rank(Y)_{it}]}{(T+1)^2 Var\left[rank(Y_{i,0})\right]}$$

The index assumes values between 0 and 1. A low degree of similarity of index rankings indicates that a high number of changes in the position of countries have been observed over time, whereas high index values imply that few or limited changes have been observed. Gamma-convergence adds an additional perspective to the study of convergence and allows the capture of movements that are not captured by other indices. However, according to Heichel et al (2005), country rankings may also change without a significant decrease of cross-country variation or without movement towards an exemplary model. Although the use of gamma-convergence is not common yet, it nonetheless represents a promising tool for policy studies, as the idea of comparing ordinal classifications is also compatible with a qualitative research design. An interesting application of gamma-convergence in policy analysis can be found in Holzinger et al (2009), where the authors investigate the convergence of national environmental policies through an analysis of policy outputs in 24 member countries of the Organisation for Economic Co-operation and Development (OECD).

Delta-convergence

Finally, the term 'delta-convergence' was coined by Heichel et al (2005) to describe the analysis of countries' distance from an exemplary model, such as the best-performing country. Delta-convergence may be measured, for example, through the sum of the distances from the top performers.

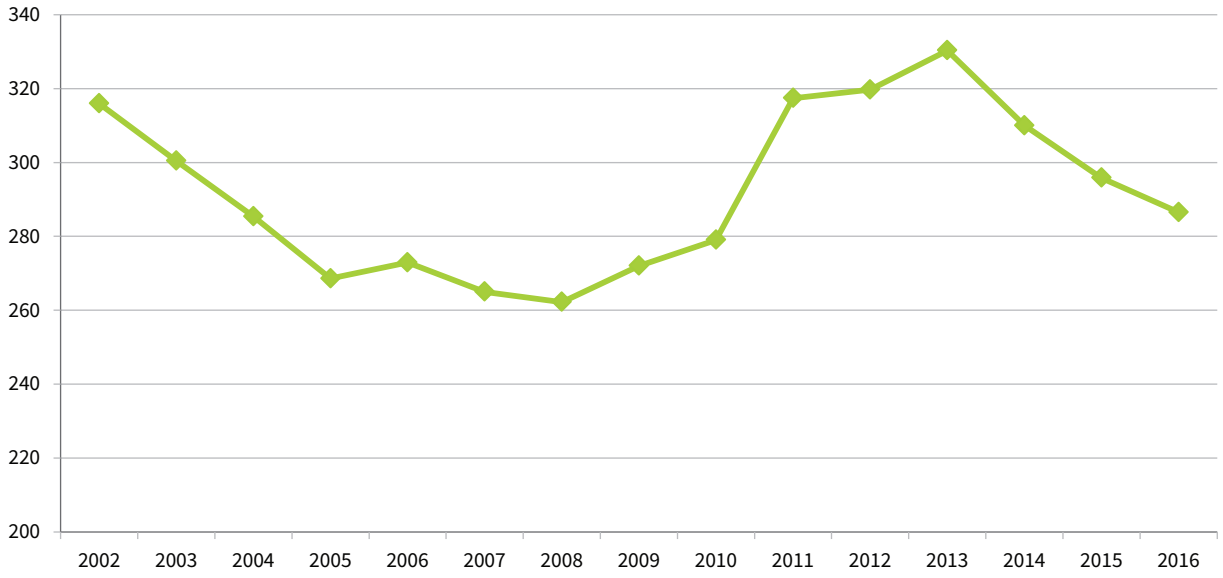
$$\delta_t = \sum_{i=1}^{N} (MAX(x_{i,t}) - x_{i,t})$$

The minimisation of a country's distance from the frontrunner over time implies convergence. Specifically, if the sum of the distances decreases over time, it is evidence of delta-convergence, while an increase in the sum of the distances suggests that countries are diverging. Delta-convergence is a measure of how countries, or other units, are becoming similar to the top performer. While it can be biased by the presence of outliers, it is a good quantitative measure of whether convergence towards a certain policy target is occurring.

Originally, delta-convergence referred to the qualitative study of changes in spending or policies in a small group of countries (Heichel et al, 2005). Such studies served to shed light on the ways in which policies change qualitatively over time. However, they were often limited by their sample sizes, examining a small number of countries rather than providing a regional or larger group overview and comparison. Studies using delta-convergence do not generally employ an explicit measure of distance. Instead they tend to be qualitative studies, not necessarily focused on the issue of convergence as much as understanding the underlying processes and trajectories (Plümper and Schneider, 2009; Noy and Sprague-Jones, 2016).

Figure 3 shows the application of delta-convergence to the employment rate. In this case, the sum of the distances from the best performer (the country with the

Figure 3: Distance of Member States from the best-performing Member State in respect of the employment rate (delta-convergence), EU, 2002–2016



Source: *Eurofound analysis of Eurostat data*

highest employment rate in the EU) is computed for each year for the period 2002–2016. The example shows that convergence in employment rates occurred during 2002–2008 and again during 2013–2016. Conversely, an increase in the sum of the distances from the best performer was recorded from 2008 until 2013.

Measuring upward convergence

It is important to note that EU documents discuss not only real convergence in general but upward convergence in particular. The importance of upward convergence reflects concerns about the impact of downward convergence in a single market system. Some Member States with higher social standards fear that a greater role for the EU in social affairs and an increase in its capacity to enforce convergence could actually mean downward convergence for them (or at least create such a risk). It is also for this reason that the concept of upward convergence, and not convergence alone, is at the core of the current policy debate.

Upward convergence means 'to move closer together upward', and it is the union of two concepts: growth, or improvement in performance and outcomes towards a policy target such as better working and living conditions, and convergence, or the reduction of disparities (European Commission, 2015b). Upward movement alone is not sufficient, as growth does not intrinsically imply convergence. A group of countries may perform better, but there is not upward convergence if disparities among them increase as well. Conversely, convergence alone is not sufficient, as it does not imply upward movement. Countries can converge while their performance worsens, which is a case of downward convergence.

Measuring upward convergence means to measure both concepts: improvement and convergence in performance. For this reason, the statistical measures presented so far are not sufficient to investigate upward convergence, as they need to be complemented by additional measures of improvement and upward mobility among Member States. This can be, for example, a simple change in performance in comparison to the previous year's average EU performance.

As upward social convergence means the improvement of living and working conditions, this implies a normative interpretation of the improvement in an indicator, which may be an increase or decrease, depending on the nature of the indicator and its related policy target. This means that upward convergence results from a rise in some indicators and a decrease in others. In the case of the employment rate, for example, an increase is the policy target, while conversely a reduction is the policy target for early school-leavers.

Therefore, upward convergence identifies those situations in which the levels of an indicator improve (irrespective of direction), while there is a reduction in disparities in the performance of Member States.

However, improvement in the average level of an indicator over time does not necessarily imply that levels are improving for all Member States. An example is the changes in the employment rate between 2016 and 2017: while the EU average increased from 66.6% to 67.6%, the rate in Denmark decreased from 74.9% to 74.2%. This highlights how variant situations at Member State level may be hidden under the European average if only the average level is considered. It is therefore essential to distinguish between a situation where only the EU average improves (upward convergence) and where all Member States improve (strict upward convergence). For this reason, the investigation of upward convergence should take the situation of all Member States into account in order to accurately assess if better living and working conditions have been achieved across the EU or if particular countries are lagging behind.

Defining upward convergence

According to Scopus, the abstract and citation database, of the more than 30,000 scientific articles on economics and social science that discuss convergence, only 13 examine upward convergence. And while several statistical methodologies can be applied to monitor convergence in performance – and several reflect the definition of real convergence provided in the literature – to our knowledge, the term 'upward convergence' has not been formally defined in the literature. In the previous section upward convergence was narratively defined as 'to move closer together upward'; this study seeks to fill the gap in the literature by also providing a formal and mathematical definition of upward convergence.

As highlighted earlier, the definition distinguishes between upward convergence (improvement in the average performance of Member States collectively, with a reduction of disparities over a period of time) and strict upward convergence (improvement of the performance of each Member State, with a reduction of disparities).

Upward convergence defined

Let $j=1..n$ be the observations, let $t=1..k$ be the time, let i be an integer so that $0 \leq i \leq k$, let $X(t,j)$ be a continuous random variable with positive direction towards the desirable target, let $g(X)$ be a monotonically increasing function of dispersion, let $\mu(X(t))$ be the average of X at time t.

There is upward convergence, or upward convergence in the weak sense, between t and i if

$$\begin{cases} g(X_t) < g(X_{t-i}) \\ \mu(X(t)) \geq \mu(X(t-i)) \end{cases}$$

There is strict upward convergence between t and i if

$$\begin{cases} g(X_t) < g(X_{t-i}) \\ X(t,j) \geq X(t-i,j)\ \forall\ j = 1..n \end{cases}$$

Adopting this definition, upward convergence between *t* and *i* is defined as the reduction in the function of dispersion accompanied by an average increase in the performance of the unit of observation. Then, strict upward convergence between *t* and *i* is defined as the reduction in the function of dispersion accompanied by an increase in the performances of all of the units of observation.

The function of dispersion used to measure convergence could be one of the four types of convergence measures described above. Assuming that sigma-convergence (using the coefficient of variation in this case) is adopted as the function of dispersion, it can be said that there is upward convergence, or upward convergence in the weak sense, in employment rates between 2015 and 2016 if:

$$\begin{cases} CV(Employment\ rate_{2016}) < CV(Employment\ rate_{2015}) \\ \mu_{2016}(Employment\ rate) \geq \mu_{2015}(Employment\ rate) \end{cases}$$

And there is strict upward convergence in the rates between 2015 and 2016 if:

$$\begin{cases} CV(Employment\ rate_{2016}) < CV(Employment\ rate_{2015}) \\ X_{2016,j}(Employment\ rate) \geq X_{2015,j}(Employment\ rate)\ \forall\ j = 1..n \end{cases}$$

The concept of upward convergence defined here comes with two properties attached; these are described next. The same properties hold for downward convergence.

First property of upward convergence

Upward convergence in the strict sense between t and i implies upward convergence in the weak sense during the same period.

Demonstration: Assuming that the condition of strict upward convergence is respected, this means that for each *j=1..n*, we have $X(t,j) \geq X(t-i,j)$.

So, summing all the observations:

$$\sum_{j=1}^{n} X(t,j) \geq \sum_{j=1}^{n} X(t-i,j),$$

so that

$$\mu(X(t)) = \frac{1}{n}\sum_{j=1}^{n} X(t,j) \geq \frac{1}{n}\sum_{j=1}^{n} X(t-i,j) = \mu(X(t-i))$$

hence $\mu(X(t)) \geq \mu\big(X(t-i)\big)$.

And the condition of weak upward convergence is verified.

Second property of upward convergence

Upward convergence in the weak sense between time t and i is a necessary, but not sufficient, condition for upward convergence in the strict sense during the same period.

Demonstration: If upward convergence in the strict sense holds between *t* and *i*, for property 1 we know that also upward convergence in the weak sense holds. Hence, the necessary condition is satisfied. However, this condition is not sufficient because it can be that *j* such as $X(t,j) < X(t,j-i)$ but that still

$$\mu(X(t)) = \frac{1}{n}\sum_{j=1}^{n} X(t,j) \geq \frac{1}{n}\sum_{j=1}^{n} X(t-i,j) = \mu(X(t-i)).$$

An example of this can be seen by looking at the early school-leavers indicator between 2002 and 2016. Reducing the rate of early school-leavers is a long-standing objective of the EU, and a rate of below 10% is one of the goals of Europe 2020 (European Commission, 2010). Upward convergence is achieved if there is a reduction in the level of disparities between Member States accompanied by a reduction in the rate.

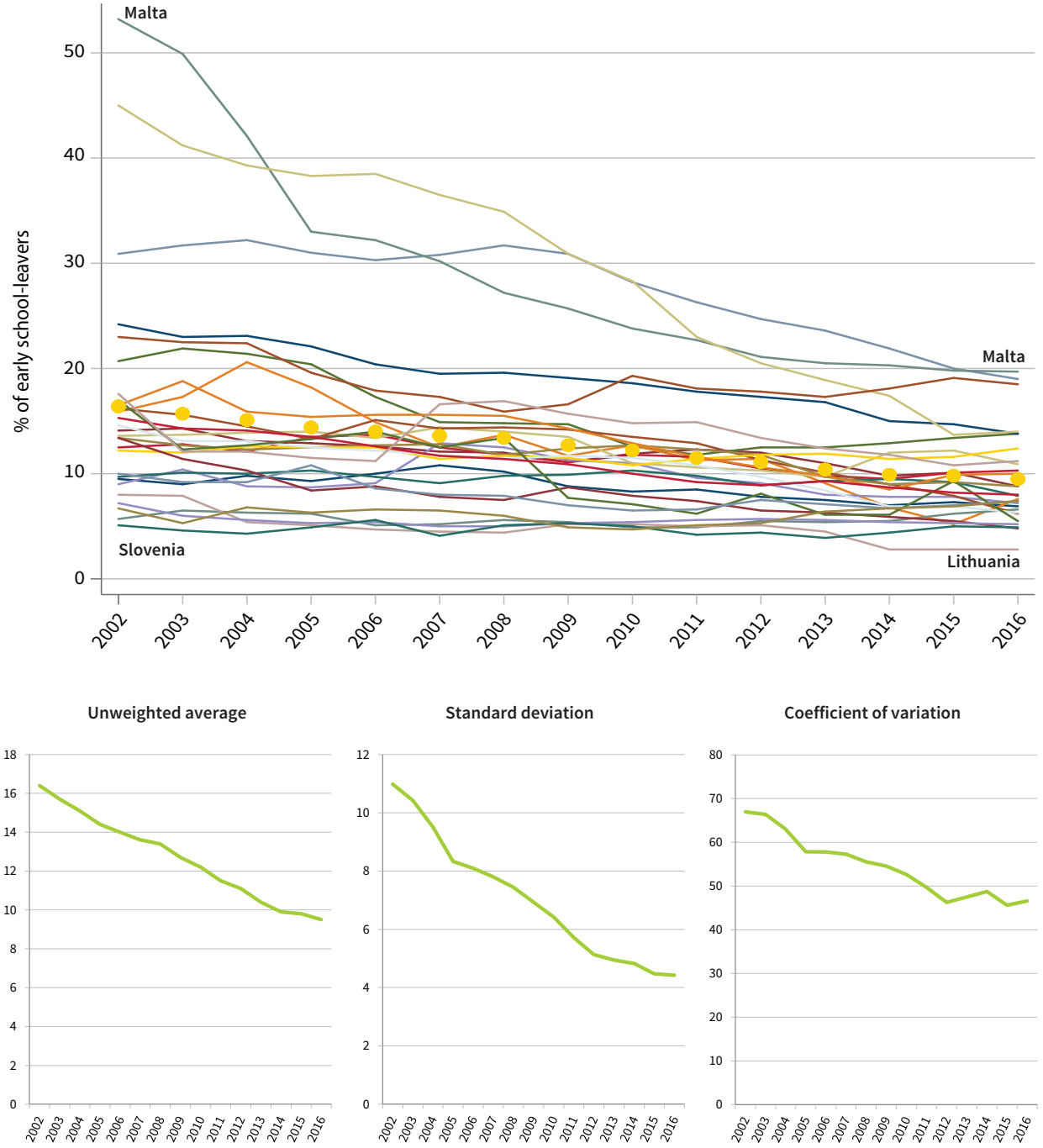
Assuming that sigma-convergence (coefficient of variation) is chosen as the function of dispersion, a general decrease in dispersion can be seen among Member States over 2002–2016 (Figure 4). As the average EU rate decreased from above 17% to 10.7% in the same period, it can be said that upward convergence occurred. However, as this decrease was not observed in the Czech Republic and Slovakia – which recorded an increase in the rate of early school-leavers over the period – the conditions for strict upward convergence are not met.

Defining upward divergence, downward divergence and downward convergence

Examining trends in Member States across time shows that the upward convergence condition as defined in the previous section is not always met. This is the case when the performance of Member States is improving but disparities between them are increasing, or when the EU's performance is declining while Member States become less heterogeneous. To exhaustively map the situation of Member States when upward convergence conditions are not met, three additional cases can be identified: upward divergence, downward divergence and downward convergence.

Upward divergence: This implies an improvement in performance together with an increase in disparities between Member States (in other words, Member States move towards the policy target while becoming more dissimilar). This was the case for employment rates between 2005 and 2016: the average employment rate

Figure 4: Member State trends and standard deviation on unweighted averages on rates of early school-leaving, EU, 2002–2016



Note: *In the upper chart, the lines represent Member States; the yellow dots represent the EU average.*
Source: *Eurofound analysis of Eurostat data*

increased from 68.5% to 70.9% (unweighted averages), while the standard deviation slightly increased from 5.7 to 5.8.

Downward divergence: This implies a decrease in performance together with an increase in disparities between Member States (Member States move further away from the policy target and become more dissimilar). This occurred with the Eurostat indicator of transition rates from temporary to permanent contracts between 2011 and 2015: the rate decreased from 35.8% to 33.5% (unweighted averages), while the standard deviation increased from 12.1 to 13.7.

Downward convergence: This implies a decrease in performance associated with a reduction in disparities between Member States (the performance of Member States becomes more similar, but they move further away from the policy target). An example of this is the trust in the government indicator (from Eurofound's European Quality of Life Survey) between 2007 and 2016, where trust in the government decreased from a score of 4.8 to 4.6, while the standard deviation decreased from 1.0 to 0.9.

These additional conditions can be formally and mathematically defined in the same way as upward convergence. The three definitions once again highlight the difference between upward or downward convergence/divergence in the weak sense and strict upward or downward convergence/divergence. The two properties defined for upward convergence in the weak sense and strict upward convergence also hold for these three new conditions.

Upward divergence defined

Let $j=1..n$ be the observations, let $t=1..k$ be the time, let i be an integer so that $0 \leq i \leq k$, let $X(t,j)$ be a continuous random variable with positive direction towards the desirable target, let $g(X)$ be a monotonically increasing function of dispersion, let $\mu(X(t))$ be the average of X at time t.

There is upward divergence, or upward divergence in the weak sense, between t and i if

$$\begin{cases} g(X_t) \geq g(X_{t-i}) \\ \mu(X(t)) \geq \mu(X(t-i)) \end{cases}$$

There is strict upward divergence between t and i if

$$\begin{cases} g(X_t) \geq g(X_{t-i}) \\ X(t,j) \geq X(t-i,j)\ \forall\, j = 1..n \end{cases}$$

Upward divergence between t and i is defined as the increase in the function of dispersion accompanied by an average improvement in the performance of the unit of observation between year t and year i. Then, strict upward divergence between t and i is defined as the increase in the function of dispersion accompanied by an increase in the performance of all the units of observation between t and i.

Downward divergence defined

Let $j=1..n$ be the observations, let $t=1..k$ be the time, let i be an integer so that $0 \leq i \leq k$, let $X(t,j)$ be a continuous random variable with positive direction towards the desirable target, let $g(X)$ be a monotonically increasing function of dispersion, let $\mu(X(t))$ be the average of X at time t.

There is downward divergence, or downward divergence in the weak sense, between t and i if

$$\begin{cases} g(X_t) \geq g(X_{t-i}) \\ \mu(X(t)) < \mu(X(t-i)) \end{cases}$$

There is strict downward divergence between t and i if

$$\begin{cases} g(X_t) \geq g(X_{t-i}) \\ X(t,j) < X(t-i,j)\ \forall\, j = 1..n \end{cases}$$

Downward divergence between t and i is defined as the increase in the function of dispersion accompanied by an average decrease in the performance of the unit of observation between year t and year i. Then, strict downward divergence between t and i is defined as the increase in the function of dispersion accompanied by a decrease in the performance of all the units of observation between t and i.

Downward convergence defined

Let $j=1..n$ be the observations, let $t=1..k$ be the time, let i be and integer so that $0 \leq i \leq k$, let $X(t,j)$ be a continuous random variable with positive direction towards the desirable target, let $g(X)$ be a monotonically increasing function of dispersion, let $\mu(X(t))$ be the average of X at time t.

There is downward convergence, or downward convergence in the weak sense, between t and i if

$$\begin{cases} g(X_t) < g(X_{t-i}) \\ \mu\big(X(t)\big) < \mu(X(t-i)) \end{cases}$$

There is strict downward convergence between t and i if

$$\begin{cases} g(X_t) < g(X_{t-i}) \\ X(t,j) < X(t-i,j)\ \forall\, j = 1..n \end{cases}$$

Downward convergence between t and i is defined as the reduction in the function of dispersion accompanied by an average decrease in the performance of the unit of observation between year t and year i. Then, strict downward convergence between t and i is defined as the reduction in the function of dispersion accompanied by a decrease in the performance of all the units of observation between t and i.

Ranking the four conditions

When it comes to ranking the four conditions on the basis of their desirability, it can be said that upward convergence and upward divergence are more desirable than downward convergence and downward divergence as the former move towards a policy target while the latter move away. Upward convergence is then more desirable than upward divergence, as a decrease in disparities between Member States is preferable to an increase. Downward divergence is more desirable than downward convergence as, while both reflect a decrease in performance, an increase in the heterogeneity of Member States may imply that some are performing better than the rest and reacting better to the downward trend.

3 Eurofound's strategy to monitor upward convergence

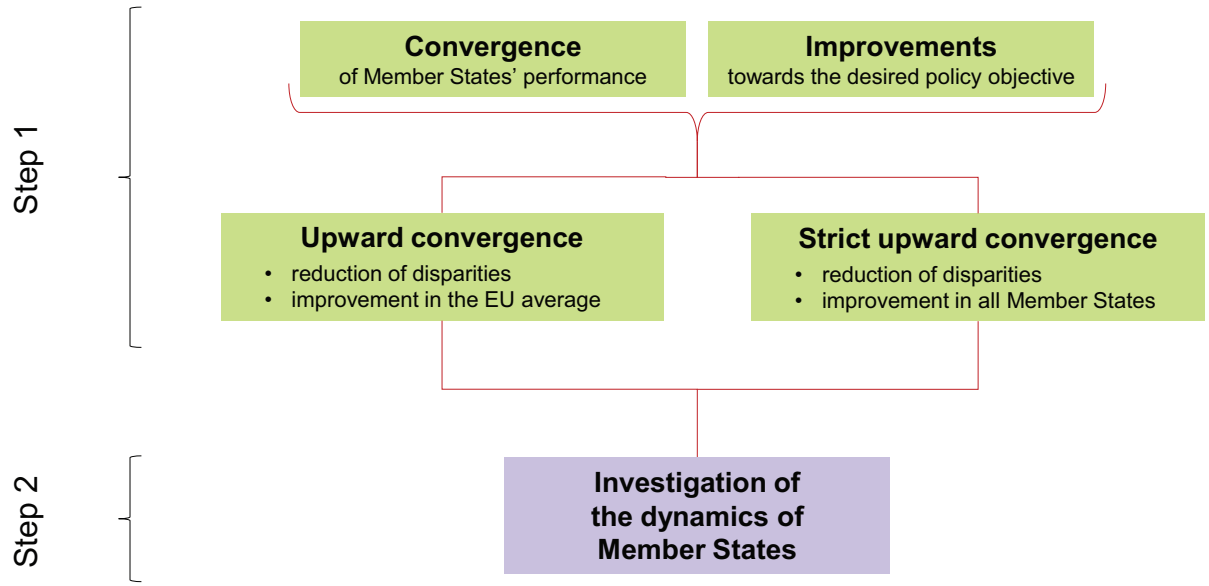
Monitoring upward convergence implies the investigation of two tendencies: the tendency towards a reduction in the level of disparities between Member States, and the tendency to move towards a desired policy objective. On this basis, this study has formally defined upward convergence and identified two types.

- **Upward convergence** is the reduction in disparities between Member States in the indicators associated with the desired policy objective, together with an overall improvement in the EU average of the indicators.
- **Strict upward convergence** is a reduction in disparities between Member States in the indicators associated with the desired policy objective, accompanied by an overall improvement in all Member States.

The analysis of convergence in the indicators selected for this study is performed through a two-step approach (Figure 5), which is systematically applied for each indicator.

In the first step, the pattern of convergence or divergence is assessed at EU level. In the second step, the convergence or divergence dynamics of individual Member States is assessed, and the most relevant cases are identified. This research strategy is implemented in STATA as a methodological toolbox. For a given indicator, the code automatically produces the full range of analyses presented in this report.[2]

Figure 5: Two-step approach to monitoring upward convergence



2 The toolbox is available upon request. It will also be encoded as an R package and available for download in 2019 from the Eurofound website.

Step 1: Verification of upward convergence patterns

The first step of the analysis verifies whether there has been a pattern of upward convergence or strict upward convergence. If these patterns are not present, it establishes which other kinds of convergence or divergence patterns occurred (upward divergence, downward divergence or downward convergence). In order to do this, two quantities are measured: convergence and improvement (Figure 6).

Measuring convergence

Convergence in outcomes and performance can be measured through the four types of convergence examined in Chapter 2: beta-, sigma-, gamma- and delta-convergence. Each of these types measures certain characteristics of the convergence process and has advantages and limitations.

As the concept of upward convergence aims to measure a reduction in disparities among Member States, this study uses sigma-convergence, measured using the standard deviation and/or the coefficient of variation. The population standard deviation, σ_t, is the square root of the sum of squared deviations from the average divided by the number of observations. It has been adopted in this report instead of the sample standard deviation, because the population of reference (all Member States) contains all the values of interest. The population standard deviation is an absolute measurement of pure variability and is expressed in the same units as the data:

$$\sigma_t = \sqrt{\frac{\sum_{j=1}^{n}\left(x_{j,t} - \mu_t\right)^2}{n}}$$

While it is algebraically simpler, being expressed in the same units as the data makes it less robust and not a proper measure for a comparison of variability among different datasets. However, if no comparison is performed, the standard deviation is the easiest indicator of pure variability.

Conversely, the coefficient of variation shows the ratio of the standard deviation to the mean and is a standardised measure of volatility, often expressed as a percentage. The coefficient of variation, CV_t, is very useful for comparing the heterogeneity of two indicators that may have been measured through different scoring mechanisms.

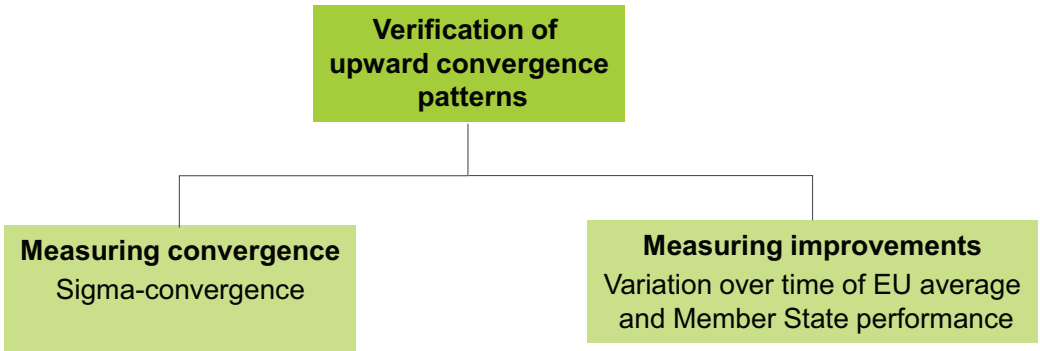
$$CV_t = \frac{\sigma_t}{\mu_t}$$

While the coefficient of variation is a standardised measure of variation, it has some limitations too. Being standardised by the mean of the indicator, it cannot be computed when the average of the observations is 0 as the value will become infinite. For the same reason, it can provide misleading values when the observations are positive and negative, and their average is close to 0. Most importantly, as the coefficient of variation is standardised by the average, a decrease of the coefficient of variation between two points in time does not always reflect a reduction in variability. In fact, this reduction of the value of the coefficient of variation can be driven by an increase in the average. This can be the case when the increase in the average is higher than the reduction in the standard deviation or holding the standard deviation constant.

This study uses both variability indicators. While the standard deviation enables the investigation of the tendency towards heterogeneity in the Member States for a given indicator, the coefficient of variation allows comparisons to be drawn between indicators.

These two indicators of heterogeneity are computed on unweighted averages of Member States' performance. The use of unweighted averages assigns equal weight to all Member States and allows the process of convergence to be monitored among countries. If weighted averages were used, convergence of the EU population (and not Member States) would be measured. In this case, the results would be driven by larger Member States, which account for a higher percentage of the EU population, obscuring the performance of smaller Member States.

Figure 6: Schematic of measuring convergence and improvements



Measuring improvements

The reduction of disparities between Member States is measured through the computation of sigma-convergence. However, the concept of upward convergence also encompasses improvement in the performance of Member States in terms of policy objectives (such as better working and living conditions).

Economic and social improvements are measured through absolute or relative changes in the levels of each selected indicator over a period of time. For example, economic growth – usually defined as an increase in the production of goods and services over a specific period – is usually measured through the relative increase of GDP growth, comparing a country's GDP in one quarter to the previous quarter in relative terms. Social improvements are often measured through absolute change, as in, for example, research on health inequality (Mechanic, 2002; King et al, 2012).

Statistically absolute and relative changes across time in the level of an indicator can be measured in a very simple way. The absolute change refers to the simple difference in the indicator over two periods. The relative change expresses the absolute change as a percentage of the indicator in the earlier period.

Absolute change: $\Delta x_{t,i} = x_t - x_i$

Relative change: $\Delta x_{t,i} = \frac{(x_t - x_i)}{x_i}$

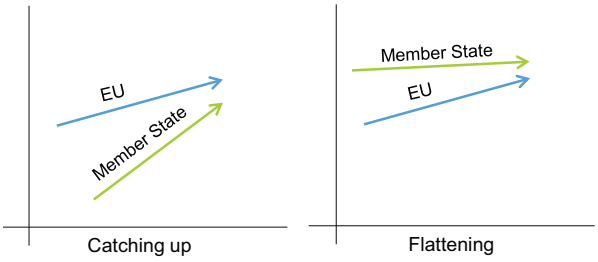
The measure of absolute and relative change applies to all numerical indicators, irrespective of the unit of measurement. For example, if an indicator is measured in terms of percentage (such as the employment rate), the absolute change will refer to the change in the indicator in percentage points, namely the value of the indicator at time *t* minus that at time *i*. The relative change refers to the change in the indicator in terms of percentage, namely the absolute change of percentage of the value of the indicator in time *t*.

Step 2: Investigation of the dynamics of Member States

The analysis of convergence through the methods in Step 1 is relatively simple and will provide a good summary of convergence or divergence trends at EU level. However, the picture will fail to describe the heterogeneity of the situations in the Member States, which are hidden under a single indicator. In order to have a full understanding of upward convergence in the EU, the dynamics of Member States must also be analysed.

Investigating these dynamics is a much more complex exercise than just looking at the change in the levels of indicators across time. In fact, an overall reduction or increase of variability at EU level can conceal very different situations in individual Member States. For example, the overall heterogeneity of Member States can decrease when those whose performance was initially lower than the EU average catch up by advancing towards the policy target faster than the others (Figure 7). However, the overall heterogeneity can also decrease when Member States with better initial performance than the EU average improve less than the rest of the Member States and flatten the EU average. Both cases will bring about an overall reduction of heterogeneity, but while the first situation is a positive example of catch-up, the second indicates the slower growth of a Member State in comparison to the EU average. Similar contradictory examples can be found when the overall variability increases.

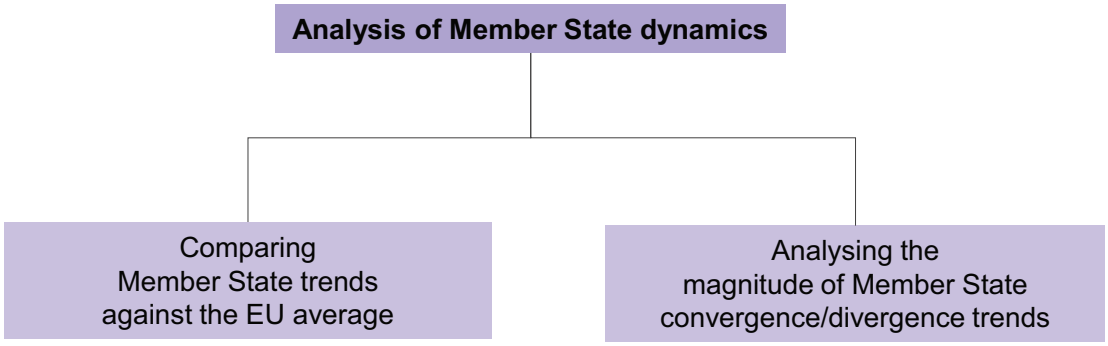
Figure 7: Examples of convergence trends



Understanding the dynamics of Member States is necessary in order to better identify possible drivers of convergence and divergence, as well as structural deficiencies, shocks or sustainable recoveries. As simple graphical analysis does not allow patterns to be captured systematically, this study investigates the convergence and divergence of Member States in two main phases (Figure 8). Firstly, the trend in each Member State is broken down into patterns of convergence or divergence with the EU average. Secondly, an analysis of the magnitude of these patterns is performed in order to identify the most relevant trends.

Combining the results of these two phases will clarify the convergence/divergence patterns of all the Member States in comparison to the EU level and will illustrate the dynamics of each Member State in relation to other Member States and the EU average as a whole.

Figure 8: Main phases of convergence/divergence analysis within Member States



Comparing Member State trends against the EU average

Convergence occurs if the distance between two trends – in this case at Member State level and the EU average – decreases over time; divergence occurs if the distance between the trends increases. As discussed previously, convergence/divergence patterns between two trends can be monitored in several different ways, and these have a variety of technical and policy-related implications.

Divergence might be the result of an economic shock (such as a recession) that causes a Member State's performance to suddenly falter or collapse. Alternatively, it could be the consequence of a slow but inexorable move away from the EU average as a result of structural barriers. While these two situations might technically lead to the same increase in variability, different policy responses are needed in order to prevent them.

In order to understand the dynamics of convergence at Member State level, all the possible convergence/divergence patterns that can occur between Member States and the EU average across two points of time, t and i, must be mapped.

Expressing this mathematically, given an indicator X, with $f(X)_{MS}$ being the trend line of a Member State and $\mu(X)_{EU}$, being the EU average trend line, the possible combinations of convergence/divergence patterns of these two trends between time t and i depend on the following four quantities:

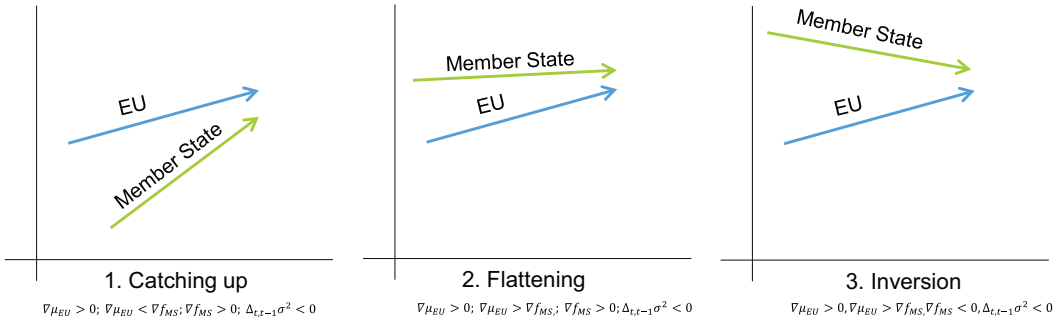
- the gradient of the trend of the Member State: ∇f_{MS}
- the gradient of the EU average: $\nabla \mu_{EU}$
- the initial position of $f_{MS}(t)$ in comparison to $\mu_{(t)}$
- the difference of their squared distance between t and i:

$$\Delta_{t,t-1}\sigma^2 = (f_{MS}(X_t) - \mu(X)_t)^2 - (f_{MS}(X_i) - \mu(X)_{(i)})^2$$

These four quantities map 12 possible convergence/divergence patterns when comparing the Member State trend to the EU average trend. Three additional scenarios of constant upward and downward movement, without convergence/divergence trends may be identified but they are not reported here. From a mathematical perspective, the scenarios are neutral as they are based on the combination of mathematical quantities. However, as soon as a policy target is attached to trends in the indicators, these scenarios become normative, describing quite different situations in relation to upward convergence (some positive and some negative). Furthermore, irrespective of the direction of the indicator, upward convergence always identifies a movement towards the policy target accompanied by a reduction of heterogeneity. However, the direction of the indicator is instrumental in describing a positive or negative situation. For this reason, the same scenario is reflected by a different combination of parameters depending on the direction of the indicator.

The 12 possible convergence/divergence patterns between a Member State and the EU average are shown in Figures 9–12. The assumption is that upward convergence is reached through the maximisation of the indicator when its direction is positive and the minimisation of the indicator when its direction is negative. In the example below, upward convergence is assumed to be reached by the maximisation of indicators.

Figure 9: Patterns of upward convergence



Upward convergence

1. **Catching up**: This captures how upward convergence is typically conceptualised: when the performance of a Member State is initially lower than the EU average but grows more quickly and reduces the gap.
2. **Flattening**: The performance of a Member State is initially higher than the EU average but grows at a slower pace; convergence takes place nevertheless.
3. **Inversion**: The performance of a Member State is initially higher than the EU average but then performance declines, moving towards the EU average, which is rising; the distance from the EU trend is narrowed, nevertheless, so convergence is observed.

Upward divergence

4. **Outperforming**: The performance of a Member State is initially higher than the EU average and grows at a faster rate; as a result, the gap between the two increases.
5. **Slower pace**: The performance of a Member State is initially lower than the EU average and grows at a slower rate, increasing the gap over time.
6. **Diving**: The performance of a Member State is initially lower than the EU average and declines while the EU average increases, widening the gap between them.

Figure 10: Patterns of upward divergence

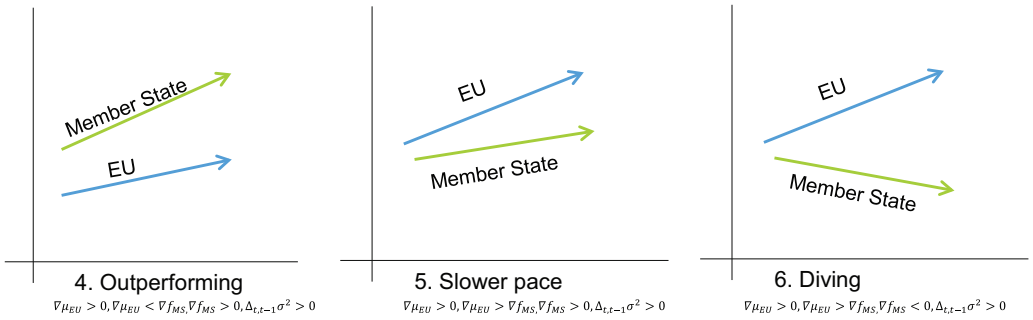
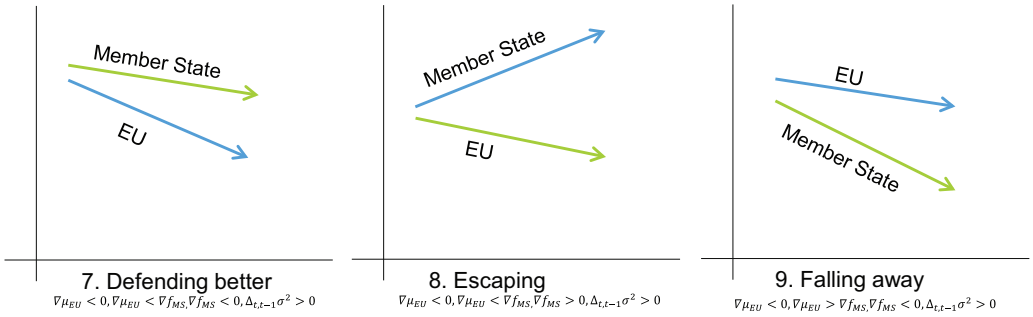


Figure 11: Patterns of downward divergence



Downward divergence

7. **Defending better**: The performances of both a Member State and the EU average are falling, but the Member State is falling at a slower rate, increasing the gap between them.
8. **Escaping**: The performance of a Member State is initially higher than the EU average and that performance grows while the EU average falls, which creates divergence.
9. **Falling away**: The performance of a Member State is initially lower than the EU average and both fall, but the Member State is falling at a faster rate, which increases the gap between them.

Downward convergence

10. **Underperforming**: The performance of a Member State is initially higher than the EU average, both are falling and the Member State is falling at a faster rate, leading to convergence.
11. **Recovering**: The performance of a Member State is initially lower than the EU average, but grows while the EU average falls, reducing the gap.
12. **Reacting better**: The performance of a Member State is initially lower than the EU average, both are falling and the Member State is falling at a slower rate; this again leads to convergence.

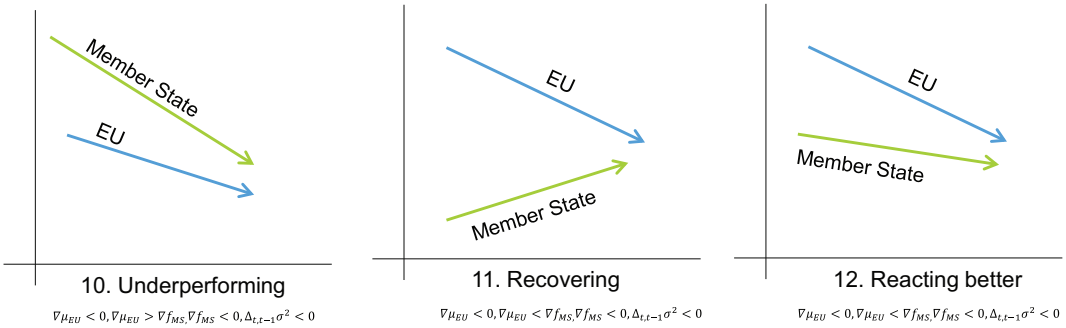
While upward convergence is defined irrespective of the direction of the indicators, it should be noted that the direction plays an essential role in determining the interpretation of the graphs presented above. All refer to a situation where the maximisation of the indicator is required in order to achieve upward convergence. In cases where upward convergence would be achieved through the minimisation of an indicator, the interpretation above changes radically, and the same graph acquires a different meaning. In particular, those situations labelled as upward convergence/divergence now represent downward convergence/divergence.

A full mapping of the possible patterns of convergence/divergence allows specific situations to be selected that may be policy-relevant. This can be the case when, for example, Member States catch up with the EU average, or they suffer a drop in performance due to an economic shock. All of these cases are easily identifiable using the approach presented here.

Analysing the magnitude of convergence/divergence patterns

Comparing individual Member State trends against the EU average alone does not take into account the magnitude of these patterns or differences in the level of reduction (whether marginal or significant) in the distance between a Member State and the EU average.

Figure 12: Patterns of downward convergence



The magnitude of convergence/divergence patterns needs to be analysed in order to identify cases, for example, where a Member State's performance drives convergence patterns at EU level or shows strong divergence when trends overall were positive.

This study examines the magnitude of convergence/divergence patterns in two ways. It first looks at whether a Member State has significantly improved its performance over time. To do this, it takes on board elements of the methodology developed by the European Commission, the Employment Committee (EMCO) and the Social Protection Committee (SPC) for assessing the social performance of Member States in the framework of the European Semester, and assumes that the indicators follow a normal distribution every year.

The second method investigates the absolute change of square differences for each Member State over time. Combining the results from these two methods identifies countries that have recorded considerable variation in their performance and are more likely to drive the overall convergence/divergence patterns observed at EU level.

Analysis of normality assumptions

In 2015, the European Commission, EMCO and the SPC agreed on a methodology for assessing the performance of Member States against a scoreboard of key employment and social indicators. For each indicator, the methodology aims to provide a measure of the relative standing of each Member State within the distribution of the indicator values of the EU. The methodology is applied jointly to yearly levels as well as to one-year changes, enabling the performance of Member States to be assessed as a whole. In this regard, and in the framework of the *Joint Employment Report 2018*, the Commission has decided to apply the methodology to the new Social Scoreboard accompanying the European Pillar of Social Rights.

According to this methodology, an indicator for a given year is assumed to follow a normal distribution, with mean and standard deviation as the one of the indicator. Although the distribution of an indicator is often not normal, this assumption is justified for both statistical and conceptual reasons. In fact, especially in the debate around convergence, it would be desirable if the performance of Member States were a normal distribution, whose variance reduces as a function of time.

In order to detect when a Member State's performance deviates significantly from the average, levels and changes for each year are converted to standard scores (also known as z-scores). This allows the same metric to be applied to all indicators and is achieved by standardising the raw values of both levels and changes according to the following formula:

$$z\text{-}score\ for\ MS_X = \frac{[MS_X\ indicator - average\ (MS\ indicator)]}{standard\ deviation\ (MS\ indicator)}$$

The performance of Member States is then assessed by comparing the resulting z-scores against a set of predefined thresholds, which are set as standard deviation multiples.

The current study builds on this methodological approach to monitor improvements in the performance of Member States over time and to identify cases of convergence or divergence. In order to do that, the performance of each Member State is standardised for each year and then the scores are divided into three groups according to their standard deviation:

- Member States whose score is below -1
- Member States whose score is in the interval -1, +1
- Member States whose score is above +1

The standardised performance of all Member States over time is then monitored, and those Member States that cross the interval -1, +1 are selected for additional investigation. The interval -1, +1 is selected on the basis of the properties of a normal distribution. Given the property of normal distribution (0, 1), 68% of the observations will fall in the interval -1, +1. Those Member States that fall in that interval are considered to have quite a stable performance. Those Member States crossing the -1, +1 bands, on the other hand, are mobile and moving from the group of average performers towards the leaders or the laggards.

Analysis of absolute changes of square differences

The analysis of the selected cases is completed by analysing the changes in the standard deviation over time. This allows Member States whose performance has significantly driven positive or negative convergence trends in the EU to be identified.

In order to investigate the absolute changes in standard deviation and identify the most interesting cases, a three-stage analysis is used.

1. For each year, the total square difference, namely the nominator of the standard deviation, is broken down by Member State.
2. For each Member State, the yearly absolute changes over time are computed.
3. For each Member State, the sum of the absolute values of the changes over the entire period under consideration is computed (the higher the value, the stronger the changes in performance for Member States).

These results, in combination with those already obtained in the previous steps, will allow the strongest patterns of convergence/divergence to be identified. Analysing the absolute changes will highlight the Member States that particularly drove convergence/divergence patterns in the EU (and that were identified in the first step). It will also show if those Member States that remained within the intervals have seen considerable changes in their performance or not, and how mobile the overall performance of Member States has been.

Applying the analytical approach

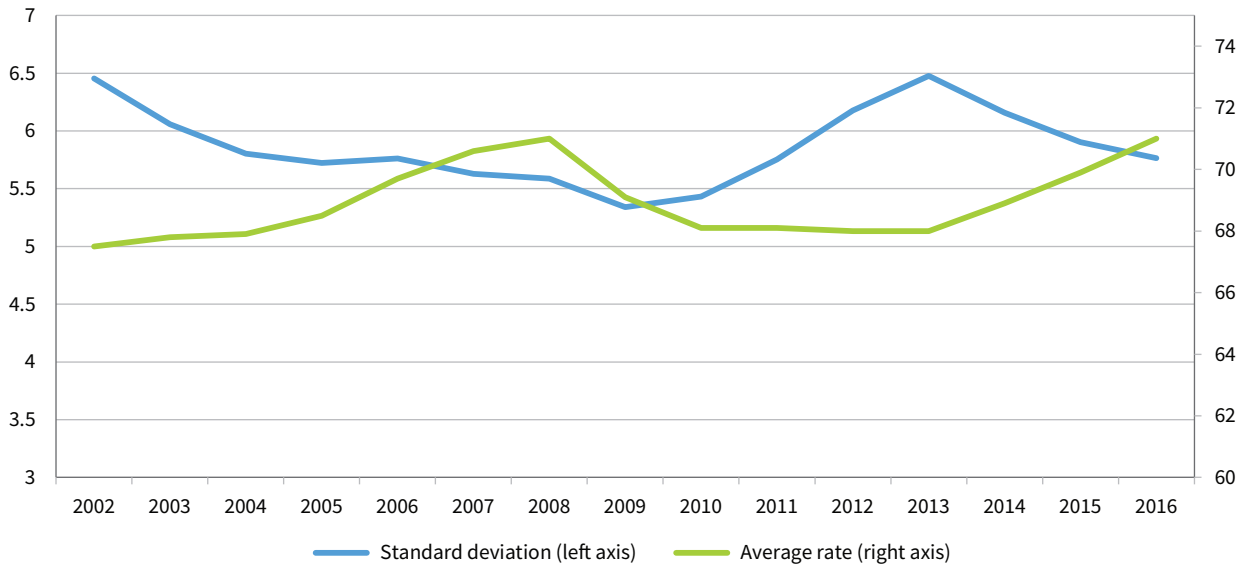
The following is an example of how the analysis of convergence/divergence patterns and their magnitude is performed, using data on the employment rate (of people aged 20–64) for the period 2002–2016. An initial evaluation of the average employment rate and standard deviation at EU level shows that upward convergence took place during 2002–2008 and 2013–2016 (Figure 13). By contrast, downward divergence with decreasing averages and increasing variability occurred during 2009–2013.

Yet these trends in the average and variability of the EU employment rate mask interesting patterns of convergence and divergence at Member State level. It is therefore useful to split out the trends of each Member State and compare them to the EU average in order to identify which of the 12 convergence or divergence patterns examined earlier apply.

The application of the methodological strategy to the employment rate data allows a specific pattern of convergence or divergence to be defined for each Member State for every two consecutive years. Table 1 shows the results, which correspond to 3 of the 12 convergence/divergence patterns: catching up, falling away and diving. The most desirable scenario from a policy perspective is catching up, where the average employment rate increases at both country and EU levels, with the Member State rate starting from a lower position and increasing more rapidly. This scenario can be seen in countries like Bulgaria, Poland and Spain both before and after the 2008 economic crisis.

The falling away and diving scenarios are undesirable as they both indicate divergence. Falling away – when the employment rate declines at EU level and even more quickly at country level – occurred in Ireland between 2008 and 2010. Diving – when the employment rate rises in the EU, but declines in a Member State – is of even greater concern, and this occurred in Romania between 2003 and 2005.

Figure 13: Standard deviation and average of the employment rate, EU, 2002–2016



Note: *The unweighted employment rate average is used.*
Source: *Eurofound analysis of Eurostat data*

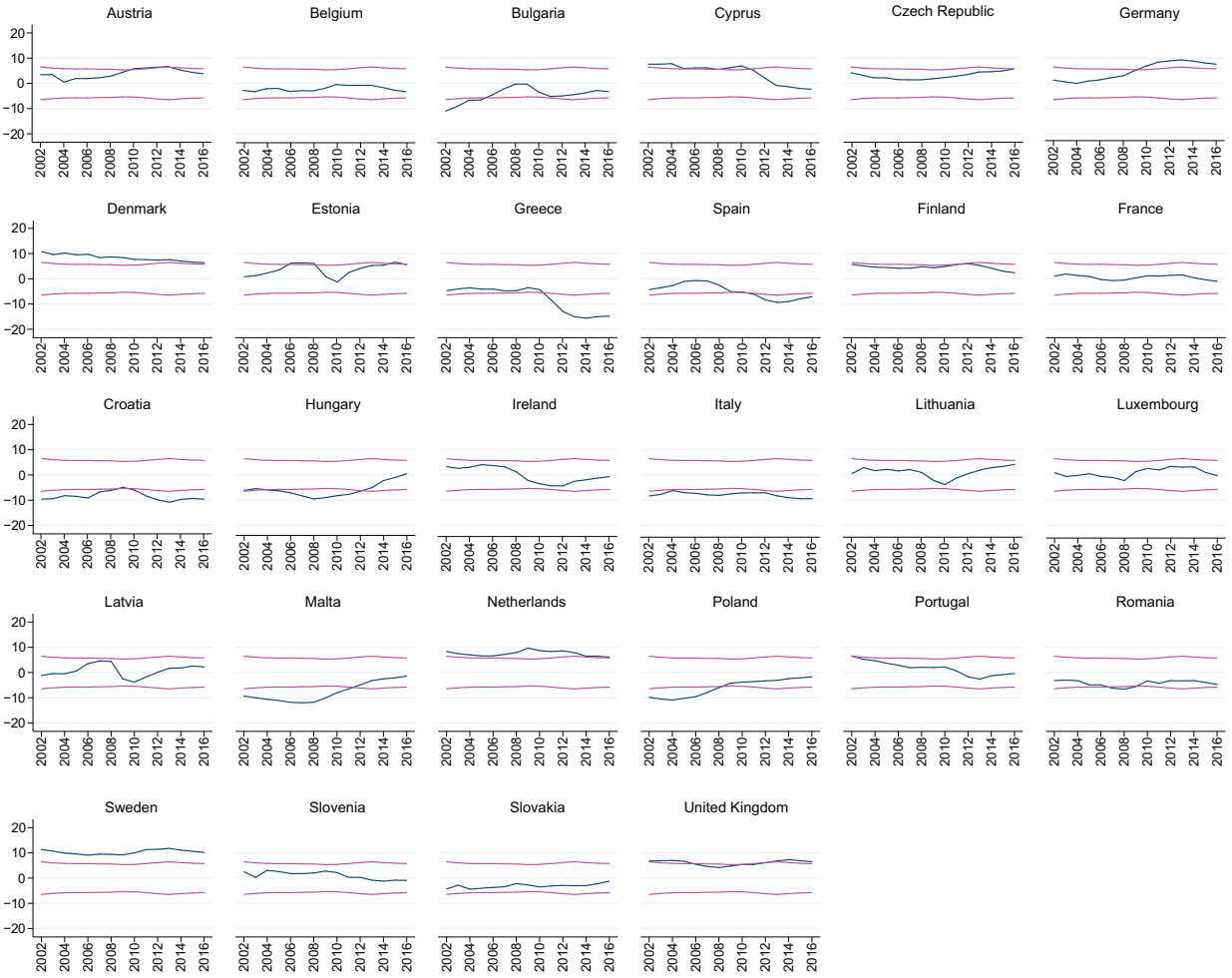
Table 1: Convergence and divergence patterns for the employment rate, 2002–2016

Country	Yearly changes														Instances of convergence and divergence		
	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	Catching up (1)	Falling away (9)	Diving (6)
Austria	4	3	4		4	4	7	8	4	8	4	3	1	1	0	0	0
Belgium	6	2	2	5	2	5	12	11	6			5	6	5	3	0	3
Bulgaria	2	2	2	2	2	2		9	6	11	2	2	2	5	9	1	1
Croatia	2	2	5	5	2	2	12	9	6	9	6	2	2	5	6	2	2
Cyprus		4	3	4	4	3	7	7	3	10	3	5	5	5	0	0	0
Czech Republic	3	3		1	1		7	7	4	8	4	4	4	4	0	0	0
Denmark	3	4	3	4	3	4	10	10	3	10	4	1	1	1	0	0	0
Estonia	4	4	4	4	4	1	10	9	4	8	4	4	4	1	0	1	0
Finland	3	3	1	1		4	10	7	4	8	3	3	3	1	0	0	0
France	4	3	1	1	5	2	12	7	3	8	4	3		5	1	0	0
Germany	3	3	4	4	4	4	8	8	4	8	4	1	1	1	0	0	0
Greece	2	2	5		5	2	12	9	6	9	6	5	2	2	5	2	2
Hungary	2	6	5	5	6	6	12	12	2	11	2	2	2	2	6	0	3
Ireland	3	4	4	1	1	3	9	9	6		2	2	2	2	4	2	1
Italy	2	2	6	5	5	5	12	12			6	5	5		2	0	2
Latvia	2	5	4	4	4	1	10	9	2	11	4	4	4	1	2	1	0
Lithuania	4	3	4	1	4	3	9	9	2	11	4	4	4	4	1	2	0
Luxembourg	3	2	4	5	5	6	11	8	3	8	3	4	3	3	1	0	1
Malta	6	6	5	5	5	2	12	11	2	11	2	2	2	2	6	0	2
Netherlands	3	3	1		4	4	7	10	3	8	3	3		1	0	0	0
Poland	6	6	2	2	2	2	12	12	2	11	2	2	2	2	9	0	2
Portugal	3	3	3	1	3	4	10	7	3	9	6	2	2	2	3	1	1
Romania	2	6	6		6	5	12	11	6	11	6	2	5	5	2	0	5
Slovakia	2	6	2	2	2	2	9	9	2	11	6		2	2	8	2	2
Slovenia	3	4	1	1		4	7	10	3		6	5	2	5	1	0	1
Spain	2	2	2	2	5	6	9	9	6	9	6	2	2	2	7	3	3
Sweden	3	3	1	1	4	1	10	7	4	8	4	1	1	1	0	0	0
United Kingdom	4	4	1	1	1	1	7	7		8	4	4	1	1	0	0	0

Note: *The numbers in the yearly changes columns represent the 12 possible convergence/divergence patterns. See pp. 24–26.*
Source: *Eurofound analysis of Eurostat data*

The second step of the analysis consists of evaluating the magnitude of convergence/divergence patterns. This is done by plotting the deviations from the EU mean for each country over time against two bands computed as +1/-1 of the standard deviation at EU level (Figure 14). If the observations follow a normal distribution, a range covered by one standard deviation above the mean and one standard deviation below it includes about 68% of the observations. Positive deviations indicate that the employment rate in the country was higher than the EU mean.

Figure 14: Deviations from the EU mean, by Member State, 2002–2016



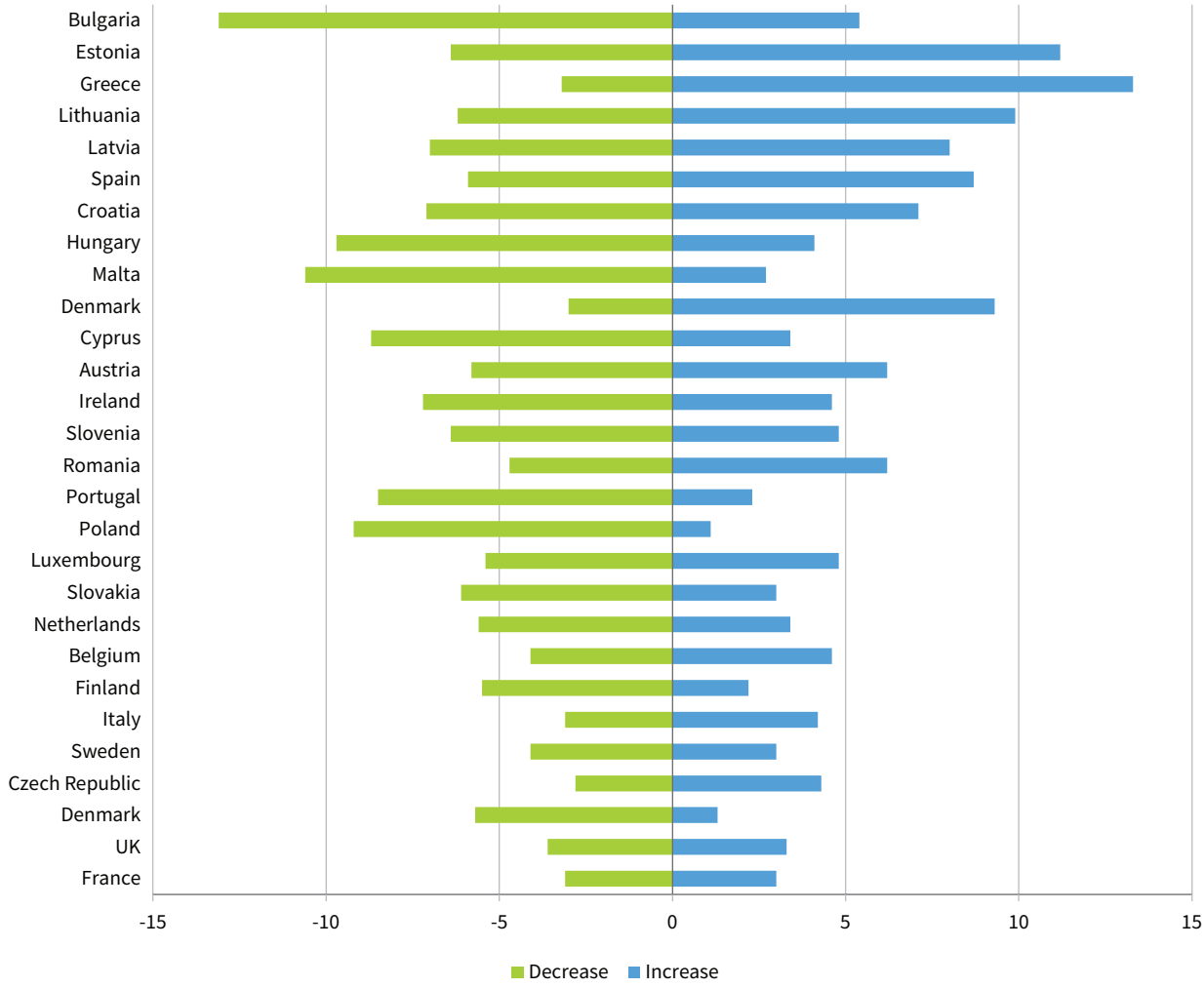
Note: *The upper band corresponds to +1 standard deviation and the lower band corresponds to -1, calculated at EU level.*
Source: *Eurofound analysis of Eurostat data*

Figure 14 shows the countries that have performed more or less in line with the EU average for the entire period (such as France, Luxembourg and Slovenia, albeit with some fluctuations), those that have consistently outperformed or underperformed in terms of employment participation (Sweden and Italy, respectively) and those where the gap with the EU average substantially decreased or increased by crossing the upper or lower bands (such as Bulgaria until the onset of the crisis or Greece during the recession).

These findings are complemented by an analysis of the total absolute distance from the EU mean and its evolution over time for each Member State, summarised in Figure 15. Countries are ranked (from highest to lowest) on the basis of how much they deviated from the EU mean over the entire period, both in positive terms (decrease in the gap) and negative terms (increase in the gap).

The results show that the periods in which the employment gap with the EU increased were compensated by a very similar reduction in countries such as France, Sweden and the United Kingdom. In the Czech Republic and Denmark, developments were more unbalanced, despite the size of the gap being similar. At the other extreme, the chart shows that in Bulgaria, the periods during which the distance from the EU mean was falling were predominant; the opposite holds for Greece. In Estonia and the other Baltic states, periods of reduction and increase were more balanced.

Figure 15: Total decrease and increase in the gap with the EU mean, employment rate, by Member State



Note: *Member States are sorted by absolute total change in the gap with the EU mean.*
Source: *Eurofound analysis of Eurostat data*

Time horizon

The determination of convergence, and of its direction, is very sensitive to the specific time horizon and, in particular, the starting and ending points of the data series of the various indicators analysed. The adoption of different starting or ending points may result in different results and affect whether upward convergence can be said to have occurred or not.

For this reason, the analysis of convergence should take into consideration various time horizons. While the investigation of one or two years' volatility may be important, the question of how trends converge or diverge through a full business cycle and beyond is more critical. For this reason, this study analyses long-term trends wherever possible in order to establish what is temporary and what is lasting. Furthermore, the selection of the time horizon – and especially the starting point of observation – is also crucial in order to conclude if upward convergence was observed in the EU.

Indicators are often drawn from different data sources, and the length of their time series may vary and data availability can be an issue. In fact, while they may have a considerable number of years in common, they often have different starting or ending years. While the lack of a common starting point may create problems in terms of the comparability of results, the analysis of upward convergence over the entire time series is of interest as it allows different periods of upward convergence to be explored. These periods may be common across the set of indicators considered, revealing similar patterns of convergence/divergence.

In order to have comparable results, it is important to identify a length of the time series that is common to all indicators. This common time frame means that a comparative picture of upward convergence can be developed for all the indicators under consideration.

Taking these points into account, this study first investigates upward convergence throughout the entire length of time for each indicator. Then the results are analysed taking an overarching and comparative approach and adopting a common starting point, 2010, the year of the adoption of Europe 2020.

4 Research framework

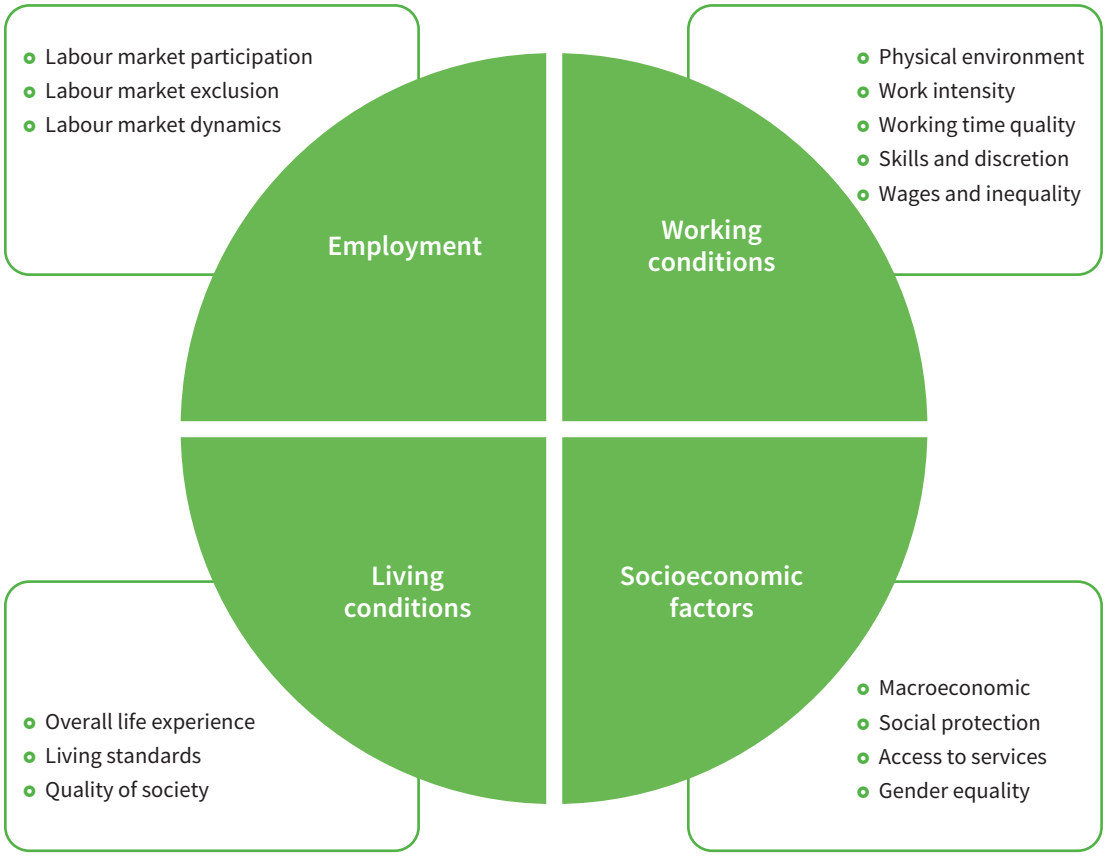
Given Eurofound's expertise on working and living conditions in Europe, this study's investigation of convergence focuses on outcome indicators and Member States' performance in four research areas: employment, working conditions, living conditions and socioeconomic factors. These four areas encompass the social dimensions of the EU that are widely considered the most relevant in the debate around convergence. Some are included in the Social Scoreboard accompanying the European Pillar of Social Rights, while others are complementary to it.

Each research area is structured into different dimensions and investigated through a set of selected indicators that provide a comprehensive measurement of developments in each dimension (Figure 16).

Employment

Convergence in employment is the basis for balanced growth and full participation of citizens in the EU. High employment is paramount for social advancement. While employment and social policy have remained largely national competencies, the EU has put methods of soft governance and policy coordination in place since the end of the 1990s to measure the progress in employment achieved by Member States with respect to commonly agreed objectives and targets. The European Employment Strategy, which dates back to 1997, aims to create more and better jobs throughout the EU. Employment is also central to Europe 2020, which aims to increase the employment rate of people aged 20–64 to 75% by 2020.

Figure 16: Four areas of research into convergence



Note: *Member States are sorted by absolute total change in the gap with the EU mean.*
Source: *Eurofound analysis of Eurostat data*

Several initiatives are being undertaken by European institutions to monitor the progress of Member States in delivering overarching targets and to formulate policy guidance on employment. For example, the *Joint Employment Report* incorporates a set of key indicators on employment and social trends that allow problems and possible divergences across Member States to be identified more easily and analysed.

The results of this scoreboard should be read in conjunction with the analytical findings of other instruments, such as the *Employment Performance Monitor*, a joint Commission–EMCO report that is adopted twice a year by the Council. A similar scoreboard, the Social Protection Performance Monitor, is adopted by the SPC. Furthermore, since 2015, the scoreboard of the Macroeconomic Imbalances Procedure has incorporated employment and social indicators that allow the consequences of macroeconomic imbalances in labour markets and poverty to be better understood.

Within this context, it is also important to mention the European Commission's annual *Employment and social developments in Europe* review. The 2016 annual review devoted an entire chapter to convergence and divergence of socioeconomic outcomes, and employment and social policies.

Working conditions

Convergence in working conditions is particularly important to the pursuit of better-quality jobs. The exploration of changes in working conditions and job quality over time and convergence/divergence across countries in this area is of interest to policymakers as it reflects the impact of specific policies at the job level (against the backdrop of financial and economic factors, or other macroeconomic and institutional developments). Many policy debates are based around the topic of working conditions and the improvement of aspects of job quality. At EU level, particular attention is paid to the extension of working life and increasing the participation of workers in paid employment, with an emphasis on creating an inclusive labour market that incorporates those who are economically inactive. Supporting job quality is likely to contribute to a positive experience of working life and therefore the effectiveness of these policies.

Governments, social partners, companies and workers all have a role to play in improving working conditions in the EU. Yet, the EU itself is also a key player and has contributed to this goal through various measures with regards to health and safety at work and gender equality, as well as its wider coordination of employment policies. Other action in this context includes general political strategies, regulations (for example, legislation, collective agreements, court rulings and soft law) or operational support instruments implemented by governments or social partners (at any administrative level).

Living conditions

Convergence in living conditions is essential for a cohesive EU with balanced living standards. The investigation of convergence in this area is relatively new.

A recent paper published by the European Commission (2017f) reflects on the future of the social dimension of the EU and emphasises the role the EU plays. While it acknowledges that the social dimension does not mean the same to all stakeholders, the paper recognises its importance.

The 2015 Five Presidents' Report acknowledges the need for convergence in social performance and social cohesion, with a 'social protection floor' to protect the vulnerable and a stronger focus on performance in education, pensions, healthcare and social security. The European Pillar of Social Rights further emphasises the need for social protection and inclusion.

The European Commission's 2009 Communication *GDP and beyond: Measuring progress in a changing world* argued that the measurement of progress should not be limited to material resources, in particular GDP (European Commission, 2009). The communication gives some reasons why: material resources are transformed into well-being in different ways for different individuals; resources are often not marketed (and if they are, prices differ between individuals); and many of the determinants of well-being are aspects of people's circumstances (not resources with prices). The European Parliament (2015) has also called for the mainstreaming of social indicators into the EU's macroeconomic surveillance of Member States.

However, in practice, living conditions and quality of life are often overlooked when progress or convergence in the EU is measured, as employment-related issues tend to take centre stage (ILO, 2016; Ridao-Cano and Bodewig, 2018). Even when they are taken into account, the focus is usually on social protection measures such as social benefits (European Commission, 2017f). Eurofound seeks to address this gap by bringing research on living conditions and quality of life into the picture.

Socioeconomic factors

Based on the assumption that economic and social convergence should go hand in hand, investigation of convergence in socioeconomic factors is a necessity in order to understand how these two areas interrelate.

Economic convergence has been a regular theme in the process of European integration. One of the main drivers of EU membership for potential candidate countries is the opportunity to improve their economic conditions and living standards in line with other Member States (Bongardt and Torres, 2016). It is even more important for a monetary union, where economic convergence among the members of the euro zone is fundamental for its sustainability. The convergence trends of the first few years of the single currency – where the euro zone was a symbol of increasing prosperity – stalled with the 2008 economic crisis. Reflections on how to deepen the EMU in order to build a more resilient and sustainable union have been central to the European policy debate since then (Council of the European Union, 2012; European Commission, 2015a).

However, socioeconomic factors are broader than the economic dimension and concern the interaction of social and economic factors. Indicators in this area also include those that measure access to education, access to healthcare and gender equality – issues addressed by the European Pillar of Social Rights. Reducing the rate of early school-leavers and fostering participation in tertiary education are two important targets of Europe 2020. Tackling unmet healthcare needs is an EU priority and is vigorously promoted by the European Commission.

Furthermore, closing the gaps between men and women is central to the European Union agenda. In fact, increasing the participation of women in the labour market is crucial to meeting the Europe 2020 target of an overall female employment rate of at least 75% by 2020. The *Strategy for equality between women and men 2010–2015* puts forward concrete actions to address several issues, such as the economic independence of women and equality in decision-making (European Commission, 2011). Closing the gender employment gap is also addressed in the 2013 Social Investment Package. In August 2015, the Commission's roadmap for the initiative 'A new start to address the challenges of work–life balance faced by working families' aimed to adapt the EU legal and policy framework to the modern labour market by helping parents with children or dependent relatives to better balance their care and professional responsibilities.

Indicators

Each of the four areas of investigation are subdivided into three or more dimensions for the purposes of the analysis (see Figure 16). Within these dimensions, indicators were selected in order to capture the complexity of the social situation of the EU. The indicators are sourced from Eurostat, Eurofound, the World Bank, and European Institute for Gender Equality (EIGE) and cover different time horizons.

The analysis is performed for all Member States for each indicator. Where data is missing, imputation is performed for a maximum of 10% of the observations missing per year. The year of observation is deleted should the amount of missing data exceed 10%. Practically speaking, this means that years before 2002 and after 2016 are not considered for several indicators.

Approach to monitoring convergence

Chapters 5–8 present the results of the analysis of upward convergence in the selected set of indicators. The methodological toolbox and strategy described in the previous chapters are used to investigate each indicator. The approach taken is as follows:

- upward convergence in the EU is investigated through the standard deviation and unweighted EU average
- Member States' dynamics are analysed by comparing each Member State trend against the EU unweighted average
- the magnitude of the patterns of convergence are investigated through the breakdown of the standard deviation and changes in it over the years

This strategy allows trends across the EU to be identified, along with particular Member States that show unusual patterns of convergence or divergence.

5 Convergence in employment

According to literature, there has been significant upward convergence in employment and social outcomes across the Member States over the past several decades (European Commission, 2014, 2015a). This movement began in the mid-1970s and continued up to 1993, with northern and southern Europe converging towards western Europe. From the mid-1990s to the onset of the recession, eastern Europe converged towards western Europe (Gill and Raiser, 2012). Interestingly, the process of convergence occurred mainly at country level; at regional level, it has been weaker. Some Member States have exhibited sustained north–south or east–west divisions or regional divergence, particularly those that more recently joined the EU (Monfort, 2008; Bongardt et al, 2013).

The 2008 financial and economic crisis exposed vulnerabilities in some regions of the EU and had a significant negative impact on convergence in some key labour market indicators, such as the employment rate (European Commission, 2014, 2016). The trends in the unemployment rate dispersion before and after the onset of the crisis were also very similar to those of the employment rate. Nevertheless, the gradual economic recovery since then has meant that this divergence has started to stabilise or, in some cases, reverse.

Overall, EU labour market conditions significantly improved in 2016 and the first half of 2017, with substantial progress being made towards the employment rate target set by Europe 2020. In 2016, the EU employment rate stood at 71.1%, and this rose to 72.3% by the third quarter of 2017. However, behind this average, large differences between countries can be found.

Data and indicators

Three dimensions of employment are assessed: labour market participation, labour market exclusion and labour market dynamics. Increasing participation in the labour market, preventing labour market exclusion and fighting unemployment, improving the labour market situation of young people, and reducing adverse labour market dynamics are at the heart of EU policy in this area. All the indicators comprising this area are drawn from Eurostat surveys – see Table 2 for a summary.

Dimension 1: Labour market participation

This dimension includes two key indicators to monitor developments in labour market participation: the employment rate (2002–2016) and the activity rate (2002–2016). Both are included in the Social Scoreboard that accompanies the European Pillar of Social Rights.

The employment rate measures the proportion of the working age population that is in employment. It is both a structural indicator that sheds light on the structure of labour markets (as measured through the balance of labour supply and demand) and a short-term indicator that follows the business cycle, although with a lag. In line with the Europe 2020 target, the employment rate of people aged 20–64 is considered.

The activity rate is the percentage of the economically active population aged 15–64 in the total population of the same age group. The economically active population, typically known as the labour force, comprises both employed and unemployed people. The labour force also includes people who are not at work but have a job or business from which they are temporarily absent, for example, because of illness, holidays, industrial disputes, education or training.

Investigating developments in working time adds complementary information to the trends in the employment rate. For this reason, a third indicator, average weekly hours worked (2005–2017), is included. This is the average number of actual weekly hours of work in the main job of employed people (both employees and self-employed).

Dimension 2: Labour market exclusion

This dimension includes three indicators measuring exclusion from the labour market: the unemployment rate, the long-term unemployment rate and the NEET rate, all for the period 2002–2016. All are included in the Social Scoreboard.

The unemployment rate is computed as the number of unemployed people as a percentage of the labour force. Together with the employment rate, it is widely recognised as a key indicator of labour market performance. An unemployed person is defined as someone who is aged 15–74, is without work during the reference week, is available to start work within the next two weeks (or has already found a job to start within the next three months) and has actively sought employment at some time in the last four weeks.

Because long spells of unemployment expose individuals to impoverishment and can lead to a deterioration of skills and detachment from the labour market, an additional indicator capturing long-term unemployment is included. This refers to people (aged 15–74) who have been unemployed for 12 months or more, as a percentage of total unemployment.

Finally, the indicator for NEETs corresponds to the percentage of the population aged 15–24 that are not employed or involved in further education or training.

The numerator of the indicator refers to people who are neither employed nor receiving any education or training in the four weeks preceding the survey. The denominator is the total population aged 15–24, excluding the respondents who did not answer the question on participation in regular education and training.

Dimension 3: Labour market dynamics

This dimension explicitly focuses on aspects related to labour market dynamics, namely: labour transitions from temporary to permanent contracts, involuntary part-time employment, and involuntary temporary work.

The indicator on labour transitions from temporary to permanent contracts measures the percentage of people aged 16–64 who had a temporary contract and moved to a permanent contract within two consecutive years. It is included in the Social Scoreboard, and is an important measure of improved labour market conditions in terms of contractual arrangements.

Investigating whether people enter into non-standard employment arrangements involuntarily is relevant both to the proper functioning of labour markets and to the wider consequences that this may have on job quality (in areas such as training opportunities, job insecurity, participation in employer-funded training, career progression or job autonomy).

The indicator on involuntary part-time employment captures the extent to which people work part-time because they are unable to find a full-time job. It is a partial measure of labour underutilisation due to a mismatch between the volume of work desired by workers and the actual volume of work available. Involuntary temporary employment refers to the percentage of employees (aged 20–64) who were seeking a permanent job, but could not find it and therefore work on a temporary basis.

Main findings

All three indicators of labour market exclusion – unemployment, long-term unemployment and NEET rates – showed similar patterns of upward convergence both before and after the economic and financial crisis, but they exhibited downward divergence in 2008–2009 and in 2013.

While the employment rate showed a similar trajectory to that of the indicators for labour market exclusion – with the economic crisis clearly breaking the pattern of upward convergence – this was not the case for the other two indicators of labour market participation. Indeed, clear upward convergence was recorded for the activity rate over the period 2002–2016, and especially after 2008, when the variability among Member States decreased considerably. For average weekly hours

Table 2: Employment indicators

Dimension	Indicator	Source	Description	Period
Labour market participation	Employment rate	Eurostat	Percentage of the population aged 20–64 in employment	2002–2016
	Activity rate	Eurostat	Percentage of the population aged 15–64 who are economically active	2002–2016
	Average weekly hours worked	Eurostat	Average number of actual weekly hours of work in the main job of employed people (both employees and self-employed)	2005–2017
Labour market exclusion	Unemployment rate	Eurostat	Number of unemployed people as a percentage of labour force aged 15–74	2002–2016
	Long-term unemployment rate	Eurostat	The number of people (aged 15–74) who have been unemployed for 12 months or more, as a percentage of total unemployment	2002–2016
	NEET rate	Eurostat	Young people not in employment, education or training (NEET) measured as percentage of population aged 15–24	2002–2016
Labour market dynamics	Transition rates from temporary to permanent contracts	Eurostat	Transition rates from temporary to permanent contracts measured as percentage (three-year average)	2011–2016
	Involuntary part-time employment	Eurostat	Percentage of involuntary part-time employees as part of total part-time employment aged 20–64	2005–2016
	Involuntary temporary employment	Eurostat	Percentage of involuntary temporary employees as part of total temporary employment aged 20–64	2002–2016

worked, a steady pattern of downward divergence was evident between 2005 and 2017, without any major changes in the trend during the crisis.

With regards to labour market dynamics, all three indicators showed a clear pattern of downward divergence over the entire periods of observation: 2011–2016 for labour market transitions from temporary to permanent contracts; 2005–2016 for involuntary part-time employment; and 2002–2016 for involuntary temporary work.

The next section presents the results in more detail.

Dimension 1: Labour market participation

Employment rate

A process of upward convergence in the employment rate across Member States can be identified between 2002 and 2016. However, downward divergence was recorded from 2009 until 2013 against the backdrop of the economic crisis. Indeed, while the employment rate increased from 67.5% to 71.0% on average (unweighted average, EU) between 2002 and 2016, it decreased during the recessionary period while dispersion among countries was increasing. While similar patterns in the average employment rate were observed inside and outside the euro zone, this was not the case for the variability among Member States. This declined considerably outside the euro zone from 2002 until 2010, while it increased inside the euro zone from 2005 until 2013. Over the whole period, the employment rate increased by more than 10 percentage points in Bulgaria, Hungary, Malta and Poland. Bulgaria, in particular, recorded a remarkable improvement from 2002 to 2008, reducing the gap with the EU average from 11 percentage points to 0 percentage points. During the recession, divergence at EU level was driven mainly by two currents: a fall in the employment rate in Croatia, Greece, Spain and, to a lesser extent, Ireland; and an increase at a faster rate than the EU average in Austria, Germany and Sweden. Since 2013, the employment rate has increased in most Member States.

Activity rate

Upward convergence among Member States in the activity rate was also observed over 2002–2016, and more noticeably than for the employment rate. The process was much more pronounced from 2008 onwards when the dispersion among countries started to decline at a faster pace. The average activity rate increased at a more constant pace from 68.6% to 72.8% (unweighted average, EU). While the trend in the average activity rate was similar both inside and outside the euro zone, the reduction in dispersion was more pronounced among countries outside it. Overall, the process was not one of strict upward convergence over 2002–2016 only because one Member State (Finland) recorded a decrease in the activity rate from 77.2% to 75.9%. Indeed, Finland contributed to a reduction of dispersion, with a more or less steady decline in activity rate, despite always performing better than the EU average. Denmark followed a similar pattern, with decreasing labour market participation, in particular between 2010 and 2015, although in the last year observed, there was a noticeable inversion in the trend. Hungary and Malta recorded the highest increase (around 10 percentage points), and their catch-up with the EU average was much faster from 2008–2009 onwards.

Average weekly hours worked

While the employment rate increased between 2005 and 2016 (aside from the period of the economic crisis), the average number of actual weekly hours of work steadily decreased (from 38.5 to 37.1). Because the variability between the countries also decreased moderately in the observed period, downward convergence took place. However, it is unclear how to interpret this result from a normative perspective, as a reduction in working hours does not necessarily indicate a deterioration in labour market performance, especially when associated with increasing employment rates. All Member States recorded a decrease in the average number of actual weekly hours of work (notably Austria, the Czech Republic and Latvia), with the only exception being the Netherlands (with a small increase of 0.2 hours). The decline in average weekly hours worked was slightly more pronounced in the euro zone (although in terms of levels, it has always been higher outside of the euro zone), while the variability among countries outside the euro zone increased from 2013 onwards. Overall, most countries followed a comparable pattern in terms of declining average weekly hours worked. However, some interesting cases can be identified including Austria (which recorded a much more pronounced decline than the EU average) and the Netherlands (which was always well below the EU average).

Dimension 2: Labour market exclusion

Unemployment rate

In terms of unemployment rate, both the average rate and its variability among Member States were at very similar levels in 2002 and 2016. However, three different subperiods can be clearly identified: upward convergence from 2002 to 2008, downward divergence from 2009 to 2013, and upward convergence again from 2013 onwards. Indeed, although the unemployment rate in the EU in 2002 was the same as in 2016 (8.7%, unweighted average), a steady decline was recorded until 2008, followed by an increase until 2013 and another drop since then. The variability among countries followed a very similar trajectory (although divergence among countries outside of the euro zone started in 2009 rather than 2008). The greatest increases in unemployment rates between 2002 and 2016 were recorded in Cyprus, Greece and Spain, while Bulgaria, Poland and Slovakia registered the biggest decreases.

Bulgaria, Croatia, Poland and Slovakia were among the countries that moved steadily towards the EU average from 2004 until the onset of the economic crisis in 2008. The crisis hit countries like Greece and Spain hard, as well as Croatia, Ireland, Latvia and Portugal, leading to a considerable increase in the unemployment rate and greater distance from the EU average. As the economy began to recover from the crisis, several of these countries underwent a sustained period of catching up, which contributed to restoring upward convergence.

Long-term unemployment rate

In relation to long-term unemployment, a pattern of downward convergence can be identified over the period 2002–2016, with an increase in the rate from 41.5% to 43.8% (unweighted average, EU) and a decrease in variability. However, this development is not clear-cut, and several subperiods of upward convergence can be identified (2002–2003, 2008–2009 and 2014–2016). Interestingly, an overall pattern of upward convergence during the observed period can be seen outside of the euro zone. Estonia, Lithuania and Poland saw significant reductions in their long-term unemployment rates between 2002 and 2016, while Cyprus, Greece, Ireland and Portugal experienced the opposite. Among non-euro zone countries, Poland and Romania closed the gap with the EU average to zero until the onset of the crisis and then followed a similar pattern.

NEET rate

From 2002 to 2016, both the average NEET rate and its variability among Member States declined, resulting in upward convergence. Three main subperiods can be identified, with upward convergence taking place until 2008 and from 2013 onwards, and downward divergence occurring in-between (2009–2013). Developments were similar inside and outside the euro zone, with the most interesting difference being that Member States inside the euro zone started to diverge in 2006, two years earlier than countries outside it. The NEET rate decreased most significantly in Bulgaria, Malta and Slovakia, and increased most significantly in Cyprus, which was well below the EU average in 2002. Until the onset of the economic crisis, countries like Bulgaria, Croatia, Romania and Slovakia were catching up with the EU average. The divergence recorded during the crisis was due to a deterioration of the situation in some Mediterranean and eastern European countries, alongside an improvement in others such as Germany and Sweden. Sustained catching up was then recorded in many of the Member States that were most affected by the crisis. However, this was the result of a steady decline until 2008, a subsequent increase up to 2013, and another drop since then. In terms of variability, the standard deviation followed a very similar pattern to that of the average.

Dimension 3: Labour market dynamics

Transitions from temporary to permanent contracts

Labour transitions from temporary to permanent contracts decreased during 2011–2015, while its variability increased, particularly during 2012–2014. These developments suggest that a process of downward divergence took place. The increase in dispersion was mainly due to developments in the euro zone. The majority of countries recorded a drop in the transition rate (the highest in Malta), but the rate increased considerably in Denmark, Estonia and Latvia. While Malta had a transition rate even higher than the EU average in 2011 (47.9%), this then dropped to 14.9%. In contrast, Estonia and Latvia performed particularly well among the Baltic states.

Involuntary part-time employment

A process of downward divergence can also be observed for involuntary part-time employment from 2005 to 2016. The only exception is in the years before the economic crisis, when a short period of upward convergence occurred. Outside of the euro zone, dispersion decreased over the entire period, suggesting a process of downward convergence.

Rates of involuntary part-time work increased most in Cyprus, Greece, Ireland, Italy and Spain, while they decreased considerably in Bulgaria and Lithuania. Bulgaria had the highest rate of involuntary part-time work in 2005 (73.8%), but caught up with the EU average very quickly by reducing the gap from 46.4 percentage points to 26.7 in only three years.

Involuntary temporary employment

Downward divergence in involuntary temporary employment occurred from 2002 to 2016. The greatest increase both in the average rate of involuntary temporary work and in its variability among Member States was recorded outside the euro zone during the initial subperiod of 2002–2006. The rate decreased most in Latvia and Lithuania, and increased considerably in Croatia, Cyprus, Italy and Poland. In particular, Poland greatly diverged from the EU average after its accession to the EU, recording a rapid increase in the rate of involuntary temporary work from 12% in 2004 to 20.6% in 2006. Portugal also diverged from the EU average over 2005–2006, with the rate of involuntary temporary employment increasing from 13.7% to 16.1%.

6 Convergence in working conditions

Convergence in working conditions has not been a subject of long-standing research. The analysis of working conditions over time in the EU is a relatively new development, often based on data from Eurofound's European Working Conditions Survey (EWCS), which was first conducted in 1990. The broad concept of working conditions covers the working environment and aspects of employees' terms and conditions of employment – in particular, career and employment security, health and well-being in the workplace, development of skills and competencies, and work–life balance. Working conditions in research are investigated through the analysis of employment conditions and characteristics of the job. More recently, the specific concept of job quality (that is, the objective features of a concrete job) has been researched, either by looking into various dimensions individually or using synthetic and composite indicators to explore trends, developments and transitions.

In its report *Convergence and divergence of working conditions in Europe: 1990–2005*, Eurofound examined whether patterns of relative convergence or divergence over time were evident in the quality of working life across four dimensions: career and employment security, skills development, reconciliation of working and non-working life, and health and well-being (Eurofound, 2009). The report also explored whether similar developments were visible between Member States during the period. This framework of four dimensions for analysing working conditions was developed in subsequent studies.

Following the 2016 EWCS, the framework was expanded to include seven independent dimensions to better represent the multidimensional nature of job quality: earnings, career prospects, working time quality, physical environment, social environment, and skills and discretion (Eurofound, 2017c). Each of these has been found to have a positive or negative influence on the health and well-being of workers.

Data and indicators

The seven dimensions of job quality provide the starting point for the analysis of convergence in working conditions in this study. Due to data availability, however, only four are analysed: physical environment, work intensity, working time quality, and skills and discretion. A further indicator sourced from Eurostat adds an additional dimension that measures wages and inequality (Table 3).

Dimension 1: Physical environment

The absence of physical hazards that pose a risk to health and well-being is an acknowledged feature of job quality. Eliminating or minimising these risks is the aim of occupational health and safety policy in Member States. These risks include posture-related (ergonomic) risks, ambient risks (such as vibrations, noise and extreme temperatures), and biological and chemical risks. This dimension is measured through the Physical Environment Index, which consist of 13 indicators drawn from EWCS related to specific physical hazards. The index ranges from 0 to 100, and the higher the value, the higher the risk to occupational health. The index has been computed in a comparable way since 2005.

Dimension 2: Work intensity

While work intensity can be presented as a way to maintain and develop workers' interest in their day-to-day activities, high levels of work intensity can have a negative impact on health, well-being and effectiveness at work. Moreover, work intensity is not necessarily linked to better company performance. It can lead to poor planning, poor task preparation, delays and lower-quality work.

Work intensity is measured here through the Work Intensity Index. The index consists of 13 indicators drawn from the EWCS, measuring quantitative demands, pace determinants and interdependency and emotional demands. It ranges from 0 to 100, where higher values imply higher intensity. The index has been computed in a comparable way since 2005.

Dimension 3: Working time quality

Working time – its duration and organisation – is important for job quality in two ways. On the one hand, working time plays a role in the health and well-being of workers. For example, the extent to which workers are exposed to workplace risks increases with the duration of work, while the availability of sufficient periods of rest is crucial for proper recovery. On the other hand, a good balance between working time and non-working time throughout life is essential for workers to be able to work and to continue working.

Working time quality is measured here through the Working Time Quality Index, which is composed of 19 indicators drawn from the EWCS. These indicators measure duration, atypical working time and working time arrangements. Scores vary from 0 to 100, where higher values imply higher working time quality. While a fourth dimension (flexibility) was included in the 2015 version of the index, that dimension has not been included in this analysis as no data are available for the

Table 3: Working conditions indicators

Dimension	Indicator	Source	Description	Period
Physical environment	Physical Environment Index	EWCS	Measures posture-related, ambient and biological and chemical risks on a scale of 0–100, and is computed through indicators drawn from the EWCS	2005–2015
Work intensity	Work Intensity Index	EWCS	Measures quantitative demands, pace determinants and emotional demands on the job on a scale of 0–100, and is computed through indicators drawn from the EWCS	2005–2015
Working time quality	Working Time Quality Index	EWCS	Measures duration, atypical working time and working time arrangements, on a scale of 0–100, and is computed through indicators drawn from the EWCS	2005–2015
Skills and discretion	Skills and Discretion Index	EWCS	Measures cognitive skills required by the job, decision latitude and training, on a scale of 1–100, and is computed through indicators drawn from the EWCS	2005–2015
Wages and inequality	Compensation per hour	Eurostat	National accounts data on the compensation of employees for the total economy – including wages, salaries and employers' social contributions – divided by the total number of hours worked by all employees	2005–2017
	Income inequality	Eurostat	Income quintile share ratio (S80/S20): 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)	2005–2016

previous waves. The Working Time Quality Index has been computed in a comparable way since 2005.

Dimension 4: Skills and discretion

The skills and discretion dimension captures the extent to which workers develop and grow through their experience of work. The concept takes in the skills required in a job, as well as the autonomy given to workers to apply those skills. The level of discretion (a worker's ability to make decisions about their job) is an important component of Karasek's Demand–Control model (Karasek, 1979). A low level of decision latitude has been associated with an increased risk of cardiovascular disease, musculoskeletal disorders and mental health issues, for both men and women.

This dimension is measured through the Skills and Discretion Index. It ranges from 0 to 100, where the higher the value, the more workers apply and develop their skills on the job as well as their autonomy and ability to influence work organisation. Comprising 14 indicators drawn from the EWCS, the index measures the skills content of the job (cognitive dimension), decision latitude, worker participation in the organisation, and training.

Dimension 5: Wages and inequality

The dimension of wages and inequality is measured through two indicators, both of which are included in the Social Scoreboard. The first is compensation per hour, which is the average pay employees received by hours worked, expressed in euro. It is calculated by dividing national accounts data on the compensation of employees for the total economy – which include wages, salaries and employers' social contributions – by the total number of hours worked by all employees (domestic concept). The indicator is based on European national accounts.

The second indicator is income inequality, which is measured using the income quintile share ratio (the S80/S20 ratio). 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).

Main findings

The results of the analysis reveal that there was no clear-cut movement towards upward convergence in working conditions. Indeed, upward convergence was only observed in two of the subdimensions: physical environment and working time quality. There were overall improvements in work intensity, skills and discretion, and compensation per hour, but countries diverged in those indicators. Downward convergence was apparent in income inequality, with increasing levels but less dispersion across countries.

Compensation per hour is the only indicator that met the conditions of strict convergence/divergence, with all countries showing improvements during the observed period. However, as the countries diverged over time, strict upward divergence was recorded. All the other indicator trends – whether they were converging or diverging – only met the weak condition.

Trends changed between time periods for some of the indicators. For work intensity, the direction of divergence turned negative after 2010, and there was upward convergence in income inequality until 2010, but then countries started to diverge with overall deteriorations. Upward convergence turned into upward divergence after 2010 in terms of physical environment and halted as regards working time quality. For work intensity, divergence was coupled with overall improvements until 2010, but turned negative after this point. Skills and discretion and compensation per hour experienced positive but diverging trends throughout the period observed.

Variability was lower in the euro zone than in the non-euro zone for most indicators. The gap remained relatively stable for several indicators over the whole period observed (compensation per hour, work intensity and income inequality) with some fluctuations. For others, however, the gap decreased (skills and discretion) or the trend was even reversed (physical environment and working time quality).

Dimension 1: Physical environment

Upward convergence among Member States was observed in the Physical Environment Index from 2005 to 2015. A linear, though very moderate, improvement occurred over the period, and dispersion among Member States decreased especially between 2005 and 2010. Upward convergence was evident both inside and outside the euro zone, but the average improvement did not take place in all countries. There were improvements in most Member States, with the highest increases in Croatia, Greece, Hungary and Portugal. In France, Spain and the United Kingdom, the index decreased. Catch-up convergence was seen particularly in Bulgaria, which reached the EU average in 2015, and Croatia and Greece, which drew very close to the average in 2015. Hungary and Portugal scored well below the EU average in 2005, but surpassed the average in 2015. Denmark and the United Kingdom started from levels well above the EU average in 2005, but converged towards the average in 2015. France was in line with the EU average but diverged to a lower level up to 2015. Similarly, Spain had near-average levels in 2005, but fell behind in 2015.

Dimension 2: Work intensity

The Work Intensity Index showed a pattern of upward divergence from 2005 to 2015. An increase in the variability of work intensity among Member States was recorded only in the euro zone in this period. Among the countries where it decreased most were the Czech Republic, Finland, Germany and Slovenia, while it increased considerably in Croatia, Cyprus, Ireland, Romania and Spain. The Czech Republic had a level higher than the EU average in 2005, but this continuously decreased and fell below the average in 2015. The UK was in line with the EU average in 2005 but diverged in the following years and showed a particularly large increase in 2015. Romania moved towards the EU average in 2010, but then experienced a steep increase.

Dimension 3: Working time quality

In terms of the Working Time Quality Index, upward convergence among Member States was observed from 2005 to 2015. A process of declining dispersion among countries was constant from 2005 onwards. The average Working Time Quality Index score increased at a slower pace. Convergence was largely driven by the non-euro zone area, while there was only a negligible decrease in variability within the euro zone. Overall, the process of upward convergence from 2005 to 2015 was not strict because the index decreased in some of the older Member States (such as France, the Netherlands and Sweden), having started from a very high level. Some countries that started above the EU average in 2005 fell to below the average in 2015 (Ireland, Malta and the United Kingdom). Overall, convergence was mainly driven by the catch-up of some eastern European countries: levels in Bulgaria, Poland and Romania came close to the EU average (83 points), while Latvia (+6.5 points since 2005) and Hungary (+4.1 points since 2005) surpassed it.

Dimension 4: Skills and discretion

Upward divergence was observed in the Skills and Discretion Index, with increasing averages but rising dispersion among the Member States. The moderate process of divergence was mostly driven by the euro zone countries, whereas countries outside this zone experienced a moderate decrease in variability. However, average levels rose in both areas after 2005. The highest overall levels in 2015 were reported in Denmark, Finland, Luxembourg and Malta, with the lowest levels measured in Cyprus, Greece and Latvia. Increases were seen in most Member States from 2005, particularly in Estonia, Spain and the UK. Germany, Lithuania and Spain caught up with the EU average, while positive but divergent developments were recorded for countries that moved away from the average level over the period (Estonia, Luxembourg, Malta, Slovenia and the UK). Downward divergence between individual countries and the EU was observed in Greece, Hungary, Latvia and Portugal.

Dimension 5: Wages and inequality

Compensation per hour

In terms of the average compensation of employees per hour, upward divergence among Member States was observed from 2005 to 2017. A process of growing dispersion among countries was constant from 2005 onwards. However, the average hourly compensation paid to employees increased until 2017 (though at a slower pace during the last two years of observation). Developments were comparable inside and outside the

euro zone, with increasing averages in both. Overall, the process of upward divergence from 2005 to 2017 can be classed as strict because hourly compensation did not decrease in any of the Member States (although it remained unchanged in Greece). The largest increases were recorded in Belgium, Denmark and Luxembourg, although most countries had comparable developments. Upward divergence was mainly driven by Austria, Belgium, Denmark, Finland and Luxembourg, which increased their gaps with the EU average, and Croatia, Cyprus, Greece, Hungary and Poland, which diverged from the average due to very moderate or no increases in pay per hour.

Income inequality

Downward convergence occurred in income equality from 2005 to 2016. While upward convergence was initially recorded during 2005–2012, this was replaced by a strong downwardly divergent trend in 2012–2015; upward convergence then returned in 2015–2016. Income inequality decreased from 2005 to 2007, remained constant until 2012, then increased until 2015 and decreased in the final year of observation. Dispersion decreased during 2005–2011, increased steeply during 2012–2015 and decreased moderately in 2016. Upward convergence therefore took place in 2005–2012, followed by a robust period of downward divergence in 2012–2015 and a return to upward convergence in 2015–2016. These developments were mostly driven by countries outside the euro zone. In 2016, income inequality was highest in Bulgaria, Lithuania and Romania, and lowest in the Czech Republic, Finland, Slovakia and Slovenia. Bulgaria had a comparable level to the EU average in 2005, but diverged significantly from it during the observed period, as did Spain and, to a lesser extent, Greece and Italy. Croatia, Latvia, Poland, Portugal and the UK were among the countries that saw a reduction in inequality and convergence with the EU average over the observed period. Other countries – such as Austria, Cyprus, Denmark, Germany, Luxembourg and Sweden – converged with the EU average through increasing income inequality.

7 Convergence in living conditions

There is no clear-cut definition of quality of life (Veenhoven, 2000). Efforts to map quality of life have been made by Eurostat (2017) at EU level, with its measurement framework of quality of life, and by the OECD, through its biannual *How's life?* report (OECD, 2015). The Social Scoreboard to monitor progress on the European Pillar of Social Rights is a further contribution, as is the work of the SPC's indicator subgroup on social indicators.

The current study builds on, and complements, these approaches. It differs mainly in the fact that it is not limited to using indicators from official statistics alone, as the objective is to measure convergence rather than progress in living conditions and quality of life as such, and to cover other broad dimensions.

Eurofound's framework to measure convergence in living conditions and quality of life combines various approaches. It is grounded in Amartya Sen's (1985) 'capability approach', which is based on input factors that allow people to live the life they choose. This perspective is combined with output factors, in particular life satisfaction, or by approaching the subject from the perspective of subjective well-being (Veenhoven, 2000; Stiglitz et al, 2009). Eurofound's framework also gives a prominent role to the dimension of quality of society (Abbott and Wallace, 2012).

Data and indicators

Dimension 1: Overall life experience

The first dimension analysed is an individual's overall experience of life, following its inclusion by Eurostat's task force on quality of life and by Stiglitz et al (2009). It is measured using two indicators. The first is life satisfaction, which captures the overall experience of life more completely than other indicators such as happiness (Eurofound, 2012a). The indicator is based on average country scores in response to the question from the European Quality of Life Survey (EQLS): 'All things considered, how satisfied would you say you are with your life these days?' It is measured on a scale of 1 to 10, where 1 means very dissatisfied and 10 means very satisfied.

The second indicator is life expectancy at birth, a specific measure of health status, drawn from Eurostat data. While other indicators were considered, it was felt that some of the more subjective elements were already captured by life satisfaction. Furthermore, subjective measures of health status are often subject to reporting biases (for a discussion, see Eurofound, 2017b).

Dimension 2: Living standards

The main indicator of living standards is Eurostat's 'At risk of poverty and social exclusion' (AROPE) indicator. It is the proportion of people who are either at risk of poverty after social transfers (income poverty), severely materially deprived or living in households with very low levels of work intensity. This indicator is included in the Social Scoreboard.

Two further indicators serve to emphasise important aspects of living standards. Firstly, from a policy perspective, work is generally seen as a route out of poverty. However, work sometimes fails to prevent poverty, so in-work poverty is included as an additional indicator. In-work poverty is measured by the share of employed persons of 18 years or over with an income below the risk-of-poverty threshold, set at 60% of the national median equalised disposable income (after social transfers), using European Union Statistics on Income and Living Conditions (EU-SILC) data.

The second indicator is material deprivation, which highlights the negative impact on living conditions of being unable to afford basic items. It acknowledges the deficiencies of an income poverty measure calculated relative to median national income, which can imply that if the situation in a country deteriorates, the measure can improve. Furthermore, people who are not monetarily poor may still face financial strain if, for instance, the cost of living in a specific city is high, if they have household debts (see, for example, Eurofound, 2013), or if childcare costs are high due to a lack of public childcare facilities. The material deprivation index uses data from the EQLS to capture people's ability to afford basic items. It is based on a harmonised approach among Member States, counting the number of items (out of six) that people report not being able to afford (such as keeping their home adequately warm or paying for a week's annual holiday away from home).

Dimension 3: Quality of society

The third dimension is quality of society, which encompasses two subdimensions. The first relates to governments and institutions. The second concerns more 'interpersonal' aspects of the quality of society.

With regard to government and institutions, the first indicator is trust in government, sourced from the EQLS and measured as the average country scores in answer to the question 'Please tell me how much you personally trust each of the following institutions' after which 'the government' is specified. Answers are on a scale of 1 to 10, where 1 means no trust at all in the government, and 10 means complete trust.

The second indicator is quality of government, measured by the World Bank's Government Effectiveness Index, with a possible minimum score of -2.5 and maximum of 2.5. It is based on variables from various sources, concerning issues such as the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Three indicators are used to measure the more interpersonal aspects of quality of society. The first is social exclusion measured by the EQLS Social Exclusion Index. It is based on the extent to which respondents agree with four statements:

- I feel left out of society.
- Life has become so complicated today that I almost can't find my way.
- I don't feel that the value of what I do is recognised by others.
- Some people look down on me because of my job situation or income.

Possible answers for each statement range from 1 (strongly disagree) to 5 (strongly agree).

Another important aspect of quality of society is whether people can rely on others to provide care. This is captured using an informal care indicator, sourced from the EQLS, which measures the proportion of people who report spending an average of at least 55 hours a week caring for and/or educating their children and/or grandchildren. Care for people with disabilities or elderly people was excluded due to data limitations.

The 2012 EQLS referred just to caring for children or grandchildren and not educating them. However, it was considered that comparison with 2016 was reasonable in terms of measuring convergence between Member States (arguably, there is less scope for measuring whether there was an increase or a decrease, as the addition of education may have caused an increase).

This indicator is probably the least straightforward in terms of the desired direction. The need for informal childcare is likely to differ depending on the availability of formal care arrangements. From this perspective, a decrease from a policy objective may be desirable. However, formal care is already included in the investigation of convergence in socioeconomic dimensions (Chapter 8).

The third indicator is civic engagement, measured by involvement in unpaid voluntary work. It is captured by the EQLS question, 'Look at the list of organisations and tell us, how often did you do unpaid voluntary work through the following organisations in the last 12 months?' Response categories include, for example, community and social services; educational, cultural, sports or professional associations; and social movements. People who report being involved in at least one of these types of volunteer work, to any extent, are considered to be involved in volunteering.

Main findings

Overall, most indicators showed clear convergence: life satisfaction, life expectancy, material deprivation index, AROPE, trust in government, quality of government, informal care and social exclusion. Clear divergence, however, was apparent in some (volunteering and in-work poverty), in contrast to other indicators within the same dimensions (quality of society and living standards, respectively).

There are three indicators where upward convergence was recorded: life expectancy, AROPE and social exclusion. More often, though, convergence had a downward trend, for example trust in government and material deprivation, or the EU average remained stable, as in life satisfaction and quality of government.

In most instances, convergence and divergence were not strict because countries either improved or deteriorated along the relevant indicator in comparison to the first year of the analysis. The life expectancy indicator was the exception, as it showed strict upward convergence through improvements in all Member States from the first to the last year (although from year to year, there were some decreases).

In most cases when the trend differed between time periods, the latest trend was one of convergence. An important exception is life satisfaction, where the opposite was true: divergence has followed convergence. Taking the latest available period into consideration (2011–2016 for many of the indicators and 2014–2015 to 2015–2016 for some with yearly data available), the trend towards convergence was even more pronounced. Social exclusion then also converged, while life expectancy and trust in government showed even stronger convergence trends. Furthermore, the convergence trends were often more positive (with an improving EU average) for indicators such as trust in government and social exclusion. However, this is not true for life satisfaction, which has remained relatively stable, and convergence changed into divergence around 2011.

For most indicators, variability was lower in the euro zone than outside it. High variability outside of the euro zone was often the result of countries like Denmark and Sweden having particularly high scores, and Bulgaria and Romania having particularly low scores. The gap in variability within the euro zone and outside it remained relatively stable for several indicators (life expectancy, in-work poverty, trust in government and informal care) and decreased for others (life satisfaction, deprivation, AROPE and social exclusion). The only indicator it increased for was volunteering. For trust in government

Table 4: Indicators on living conditions

Dimension	Indicator	Source	Description	Period
Overall life experience	Life satisfaction	EQLS	Responses to the question 'All things considered, how satisfied would you say you are with your life these days?' range from 1 (very dissatisfied) to 10 (very satisfied)	2007–2016
	Life expectancy at birth	Eurostat	Mean number of years that a newborn child can expect to live if subjected throughout their life to the current mortality conditions	2002–2015
Living standards	AROPE	Eurostat	Proportion of people who are either at risk of poverty after social transfers (i.e. income poverty), severely materially deprived or living in households with very low levels of work intensity	2005–2016
	In-work poverty	Eurostat	Share of employed persons of 18 years or over with an income below the risk-of-poverty threshold, set at 60% of the national median equivalised disposable income (after social transfers)	2010–2016
	Material deprivation	EQLS	Material deprivation index, based on the affordability of six basic items: 1. keeping the home adequately warm; 2. paying for a week's annual holiday away from home (not staying with relatives); 3. replacing worn-out furniture; 4. a meal with meat, chicken, fish every second day if desired; 5. buying new, rather than second-hand; clothes, and 6. having friends or family for a drink or meal at least once a month	2007–2016
Quality of society	Trust in government	EQLS	The average country scores in answer to the following question: 'Please tell me how much you personally trust each of the following institutions' after which 'the government' is specified. Responses range from 1 (do not trust at all) to 10 (trust completely)	2007–2016
	Quality of government	World Bank	Measured by the Government Effectiveness Index, with a possible minimum score of -2.5 and maximum of 2.5	1996–2016
	Social exclusion	EQLS	Social Exclusion Index, based on the extent to which respondents agree with four statements: 'I feel left out of society'; 'Life has become so complicated today that I almost can't find my way'; 'I don't feel that the value of what I do is recognised by others'; and 'Some people look down on me because of my job situation or income'. Responses to each statement range from 1 (strongly disagree) to 5 (strongly agree)	2007–2016
	Informal care	EQLS	Percentage of people providing informal care to children or grandchildren	2007–2016
	Civic engagement	EQLS	Percentage of people who volunteered for any of the following in the 12 months prior to the survey: a) community and social services (e.g. organisations helping the elderly, young people, disabled or other people in need); b) educational, cultural, sports or professional associations; c) social movements (for example environmental, human rights) or charities (for example fundraising, campaigning); d) political parties, trade unions; and e) other voluntary organisations	2011–2016

and informal care, variability was similar both within the euro zone and outside it.

Dimension 1: Overall life experience

Life satisfaction

Life satisfaction remained relatively stable from 2007 to 2016. Countries' scores converged during 2007–2011 in particular, both inside and outside the euro zone, but more so outside. While there was an overall increase in heterogeneity in 2011–2016, convergence continued – albeit at a slower pace – in Member States outside the euro zone.

In the period under consideration, clear patterns can be seen. Member States such as Belgium and Sweden (which started with higher levels than the EU average) recorded negative trends and tended to align to the EU

average. Greece, which started at a lower level than the EU average, saw a decrease in life satisfaction and diverged further. On the other hand, Member States such as Austria diverged upwards from above the EU average, while others such as Hungary and Portugal converged upwards from below the EU average.

Life expectancy at birth

Upward convergence in life expectancy at birth was recorded in the period assessed (2002–2015). This was caused by the convergence that took place from 2007 to 2015, following a period largely marked by divergence (2002–2007). This pattern was similar in both euro zone and non-euro zone countries, but variability was greater outside the euro zone, with a stable gap between the two areas. Upward convergence was strict, as life expectancy at birth increased from 2007 to 2015 in all Member States. Despite the overall improvement, life expectancy increased at different rates in different Member States, implying an increase or a reduction in the distance from the EU average. Bulgaria, Germany and Greece, for example, recorded an increase in life expectancy lower than the EU average, whereas Estonia and Slovenia recorded a marked increase in life expectancy.

Dimension 2: Living standards

AROPE

Upward convergence was recorded in the AROPE indicator from 2005 to 2016 in the EU. This effect was driven mainly by strong upward convergence from 2005 to 2008. Variability between countries was consistently higher outside of the euro zone than inside. Both areas experienced a decrease in variability from 2005 to 2016, although the decrease was stronger outside of the euro zone, and the gap between the two areas in terms of variability subsequently narrowed.

Overall, convergence was not strict, with several Member States moving in opposite directions. Three main periods can be identified. Firstly, upward convergence was recorded from 2005 to 2008 when the EU average and standard deviation decreased. Then, with the economic recession, the EU average and standard deviation increased until 2012, and downward divergence occurred. Finally, after 2013 upward convergence trends were restored. As the average and standard deviation recorded in 2016 were lower than those in 2005, upward convergence in the weak sense was recorded during this period. This upward convergence trend was driven by the performance of Bulgaria, Poland and the Baltic states, which recorded considerable decreases in AROPE and convergence towards the EU average. Conversely, southern Mediterranean countries such as Italy, Greece and Spain recorded increases in AROPE and a diverging trend.

In-work poverty

In-work poverty has diverged downwardly somewhat from 2005 to 2016, with an increase in the Member State average, resulting in a move away from the policy objective. The EU average increased more or less constantly over the period considered, while the standard deviation decreased from 2005 to 2011 and then increased from 2011 onward. For this reason, two main periods can be identified: upward convergence from 2005 to 2007 and downward divergence from then onward. In the overall period, the variability between countries was consistently higher in countries outside the euro zone. In both areas, variability showed a fluctuating pattern, with little change overall, leaving the gap between the two constant. In-work poverty increased markedly in Germany and Hungary, while it decreased in Latvia, Poland, Portugal and Slovakia.

Material deprivation

Downward convergence was recorded for the material deprivation indicator from 2007 to 2016, with the share of individuals experiencing material deprivation in the EU increasing. This convergence was greater outside the euro zone. Variability in the EU average and standard deviation increased especially from 2007 to 2011 as a result of the economic crisis. Then they decreased from 2011 to 2016. Overall, a downward convergence trend was recorded. Material deprivation increased most noticeably in France, Greece, Italy and Spain, which showed patterns of divergence. Conversely, the Baltic states, Bulgaria, Poland and Slovakia recorded a decrease in material deprivation and marked patterns of convergence.

Dimension 3: Quality of society

Trust in government

Trust in government converged downwards from 2007 to 2016. This was caused by divergence from 2007 to 2011, as Member States converged between 2011 and 2016. From 2007 to 2011, there was sharp divergence in the euro zone, but not outside it, and from 2011, there was convergence in both areas. Variation was largest outside of the euro zone until 2011, when the opposite became true.

Some Member States showed clear signs of convergence or divergence. Negative developments are apparent in those countries where the indicator converged from above the EU average towards it (such as Denmark), dropped below the average (France and Spain) or started below the average and diverged further away from it (Greece and Slovenia). Positive developments occurred in those countries that diverged from above the EU average to even further above it (Malta) or converged from below the EU average towards it (the Czech Republic, Hungary and Latvia).

Quality of government

Quality of government was about the same in 1996 and 2016, but analysing the standard deviation reveals that Member States converged towards each other during this period, reducing their disparities. Convergence was almost continuous, except during short periods such as 2005–2007. Euro zone and non-euro zone countries showed similar convergence patterns, but variability was continuously higher in the non-euro zone.

At Member State level, some countries showed clear signs of convergence or divergence. Negative developments were seen in those countries that have generally converged downward from above the EU average towards it (Belgium and Luxembourg) and those that started below the EU average and diverged further away from it (Greece and Hungary). Positive developments were seen in those countries that converged upwards from below the EU average (Croatia, the Czech Republic, Latvia, Lithuania and Slovakia).

Social exclusion

Social exclusion converged upwards from 2007 to 2016, with the EU average in the Social Exclusion Index decreasing from 2.19 in 2007 to 2.12 in 2016 (and the standard deviation decreased as well). However, there are two distinct subperiods. In the first period, from 2007 to 2011, downward divergence was recorded. Then from 2011 to 2016, a robust upward convergence occurred. Countries outside of the euro zone experienced greater variability than those inside it, although the gap decreased, particularly from 2007 to 2011.

Once again, there are clear signs of convergence and divergence at Member State level. Negative developments were seen in those countries that converged upwards from below the EU average towards it (Luxembourg and Spain) and in those that started above the EU average and diverged further away from it (Belgium and Italy). Positive developments occurred in countries that diverged from above the EU average towards it (Lithuania) and those that converged from below or around the EU average to a level far below the average (Austria and Finland).

Informal care

The informal care indicator converged between 2011 and 2016, with an increase from 14% to 16% in the EU overall. This occurred both within the euro zone and outside it, and variability in both areas converged towards each other.

Civic engagement

Volunteering diverged downwards from 2011 to 2016, with a decrease in the EU average and a sharp increase in the standard deviation. There was divergence in both the euro zone and outside it, with stronger divergence in the latter. Variability was higher outside the euro zone, and the gap between the two areas increased. While the limited period of time included in the study does not permit an elaborate analysis, some countries showed clear signs of convergence or divergence. Negative developments were seen in those countries that converged downwards from above the EU average towards it (Austria and Ireland), or even to below the average (the Czech Republic), as well as those that started below the EU average and diverged further away from it (Portugal, Romania and Slovakia). Positive developments were seen in those countries that converged upwards from below the EU average (Latvia), sometimes even surpassing the average (Cyprus, Italy and Slovenia), as well as those that started above the EU average and diverged further upward (Denmark, Germany and Sweden).

8 Convergence in socioeconomic factors

While economic convergence (usually measured as convergence in GDP per capita) has attracted significant academic attention (Borsi and Metiu, 2013; ECB, 2017), studies on institutional and social convergence within the EU from a wider perspective are relatively scarce. Among them, López-Tamayo et al (2014) investigate socioeconomic convergence in the EU by analysing seven possible dimensions, ranging from technological capacity to quality of life; they conclude that convergence is happening only for country subgroups. This chapter aims to fill the gap in the literature, taking into consideration 12 indicators from 4 dimensions: macroeconomic, social protection, access to services and gender equality.

Data and indicators

Dimension 1: Macroeconomic

Macroeconomic convergence is measured through one indicator: real GDP per capita. This is a measurement of the total economic output of a country divided by the number of people and adjusted for inflation. It is used to compare the standard of living between countries and over time. In order to compare this value across countries, real GDP per capita is adjusted by purchasing power parity (PPP).

Convergence in GDP is a well-established field of study. However, given the importance of the economic dimension to convergence in the EU, this indicator cannot be neglected. Several studies use real GDP per capita in PPP to investigate economic convergence, such as CEPS (2018), which explores the evolution of variability among Member States using the coefficient of variation of GDP per capita in PPP. The ECB (2015) takes a beta-convergence perspective and investigates convergence in real GDP per capita in the euro zone.

Dimension 2: Social protection

Convergence in social protection is investigated through three indicators: expenditure on social protection, the impact of social transfers on poverty reduction, and the aggregate replacement ratio for pensions. All three are included in the Social Scoreboard.

Expenditure on social protection is measured through the total government expenditure on social protection measures as a share of GDP. This includes social benefits, or transfers in cash or in kind, to households and individuals with the aim of relieving them of the burden of a defined set of risks or needs. It also includes administration costs and other miscellaneous expenditure by social protection schemes (payment of property income, for instance).

It is difficult to assign a normative interpretation to it, firstly because expenditure does not take into account effectiveness and, secondly, because an increase in social expenditure means that there is a trade-off with other, more growth-enhancing, spending (such as education). In light of these limitations, it is important to monitor whether Member States are converging to a certain threshold or not.

The impact of social transfers on poverty reduction indicator measures the reduction in percentage of the risk-of-poverty rate due to social transfers. It is calculated by comparing at-risk-of-poverty rates before social transfers with those after transfers; pensions are not considered as social transfers in these calculations. The indicator is based on the EU-SILC.

The aggregate replacement ratio for pensions is defined as the ratio of the median individual gross pensions of the 65–74 age category relative to the median individual gross earnings of the 50–59 age category, excluding other social benefits. This indicator is also based on the EU-SILC.

Dimension 3: Access to services

The dimension of access to services is measured through four indicators: early school-leavers rate, tertiary education attainment rate, self-reported unmet needs for medical care, and children aged less than three years in formal childcare. All these indicators are included in the Social Scoreboard.

The early school-leavers indicator is defined as the rate of people aged 18–24 fulfilling the following two conditions:

- the highest level of education or training attained is International Standard Classification of Education (ISCED) 0, 1 or 2
- no education or training has been received in the four weeks preceding the survey on the total population aged 18–24

These data come from the European Union Labour Force Survey (EU-LFS).

The tertiary educational attainment indicator is defined as the percentage of the population aged 30–34 who have successfully completed tertiary studies (in a university or a higher technical institution, for example). This educational attainment refers to ISCED 2011

levels 5–8 for data from 2014 onwards and to ISCED 1997 levels 5–6 for data up to 2013. The indicator is based on the EU-LFS.

The self-reported unmet needs for medical care is based on a person's own assessment of whether they needed examination or treatment for a specific type of healthcare, but did not have or seek it because of the following three reasons: financial reasons, waiting list and too far to travel. 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 are collected from the EU-SILC and refer to such needs during the previous 12 months. It is expressed as a percentage within the population aged 16 years old and over living in private households. This indicator is one of the Social Scoreboard indicators.

The children aged less than three years in formal childcare indicator shows the percentage of children (under three years old) cared for by formal arrangements other than by family. The indicator is based on the EU-SILC.

Dimension 4: Gender equality

The gender equality dimension measures the difference between men and women, or the gender gap, in four indicators: employment, parliamentary representation, early school-leavers and AROPE.

The gender gap in employment indicator measures the difference between the employment rates of men and women aged 20–64. The employment rate is calculated by dividing the number of people aged 20–64 in employment by the total population of the same age group. The indicator is based on the EU-LFS and is included in the Social Scoreboard.

The gender gap in parliamentary representation indicator is computed as the difference between the share of men and women who are members of parliament in Member States. The data are taken from the Gender Statistics Database of EIGE, which records the number of women and men in key decision-making positions across a number of different areas, including politics (at local, regional, national and EU levels).

The gender gap in early school-leavers indicator measures the difference between the early school-leavers rate of men and women aged 18–24.

The gender gap in AROPE indicator measures the difference between the AROPE rate of men and women.

A summary of these indicators is given in Table 5.

Table 5: Socioeconomic indicators

Dimension	Indicator	Source	Description	Period
Macroeconomic	Real GDP per capita	Eurostat	Real GDP per capita in PPS	1995–2016
Social protection	Expenditure on social protection	Eurostat	Total government expenditure on social protection measured as percentage of GDP	1999–2016
	Impact of social transfers on poverty reduction	Eurostat	Impact of social transfers (excluding pensions) on poverty reduction as percentage of AROPE	2005–2016
	Aggregate replacement ratio for pensions	Eurostat	Aggregate replacement ratio for pensions (excluding other social benefits)	2005–2016
Access to services	Early school-leavers rate	Eurostat	Rate of early school-leavers as share of population aged 18–24	2002–2016
	Tertiary educational attainment rate	Eurostat	Tertiary education attainment as percentage of population aged 30–34	2000–2016
	Self-reported unmet need for medical care	Eurostat	Percentage of the population aged 16 and over in private households reporting they did not have treatment for a specific type of healthcare need because of financial reasons, a waiting list or an excessive distance to travel	2010–2016
	Children aged less than three years in formal childcare	Eurostat	Percentage of children (under three years old) cared for by formal arrangements other than by the family	2010–2015
Gender equality	Gender gap in employment	Eurostat	Gender gap in employment as difference between share of men and women	2002–2016
	Gender gap in parliament representation	EIGE	Gender gap in parliament representation as difference between share of men and women	2006–2015
	Gender gap in early school-leavers	Eurostat	Gender gap in early school-leavers as difference between share of men and women	2002–2016
	Gender gap in AROPE	Eurostat	Gender gap in AROPE as difference between share of men and women	2002–2016

Main findings

The results of the analysis show strong upward convergence in most of the indicators for the period considered. Real GDP per capita has increased steadily since 1995 at European level. For this variable, a strong convergence trend is evident when the relative increase of Member States is measured. However, divergence is recorded when the absolute variability is investigated.

Indicators measuring access to services, such as education, healthcare and childcare, show consistent upward movement. In particular, the early school-leavers rate and the rate of tertiary educational attainment show very stable upward convergence trends, and no effect of the crisis was recorded. For the rate of tertiary educational attainment, strict upward convergence was met, with all the countries improving in the period of observation. Upward convergence was also recorded for the rate of children aged less than three years old in formal care. Upward divergence was found for self-reported unmet medical needs; a decrease in the number of people whose medical needs went unmet was accompanied by an increase in the heterogeneity of Member States.

Finally, upward convergence is apparent for all the gender equality variables. In particular, there were strong upward convergence trends in the gender gap in employment, as well as in early school-leavers and in parliamentary representation.

Dimension 1: Macroeconomic

Real GDP per capita

Real GDP per capita in PPP increased steadily across the EU in the period 1995–2016. Variability among countries (measured in terms of the standard deviation) also increased, albeit with some fluctuations. However, the result of the convergence/divergence analysis depends on what measure of convergence is used. If beta-convergence is used, as in ECB (2017), a trend of upward convergence is found. However, the result changes if sigma-convergence is used as the measure of variability. In this case, considering both developments together, a pattern of strong upward divergence can be observed.

The development of GDP per capita can be divided into three main phases: a steep rise in 1995–2007, a sharp decline in 2008–2009 (against the backdrop of the economic crisis) and a continuous recovery since then. A very similar pattern can be seen for the standard deviation, which had its highest level in 2015 but dropped in 2016, the last year of observation.

Taken together, both developments indicate that upward divergence took place during the observed period. There were subperiods of downward convergence, although these were against the backdrop of the general economic downturn in 2009. Diverging trends were much more pronounced in the euro zone than outside it, although the average development shows identical paths in both areas.

Dimension 2: Social protection

Expenditure on social protection

The share of government expenditure on social protection was quite stable between 1999 and 2008, but increased in 2009 (probably because of the economic and financial crisis). The increase of 2.1 percentage points reflected a 4.3% increase in overall social protection expenditure (in current prices) combined with a fall in GDP (-5.7 percentage points). The rate stayed stable after that point, varying between 17.2% (2010) and 16.8% (2015). The variability between countries shows a slightly different pattern: the standard deviation increased between 1999 and 2003, decreased from 2004 to 2010 and sharply increased after that until 2015, when it reached a similar level to 2003. Therefore, a diverging trend as regards government expenditure on social protection relative to GDP occurred over the last few years.

Impact of social transfers on poverty reduction

Although the trend in the impact of social transfers on poverty reduction was quite stable during 2005–2016, it showed an overall decrease from 37.8% to 34.9%. In the same period, the variability of Member States decreased. Assuming that a higher impact of social transfers on poverty reduction is the implicit policy target, this implies that during the observed period, the trend was one of downward convergence. Member States both inside and outside the euro zone show the same trend of downward convergence, while the variability outside the euro zone is higher than within. In terms of the performance of Member States, the impact of social transfers increased considerably since the onset of the crisis in Finland, Ireland and the United Kingdom, and upward divergence was recorded. Spain, on the other hand, saw convergence to the EU average, with a considerable improvement in its performance. Hungary and Sweden converged to the EU average with an overall decrease of their levels.

Aggregate replacement ratio for pensions

The aggregate replacement ratio for pensions shows an average increase from 47.1% to 54.9% in the EU. However, the variability remained almost unchanged, indicating that while the replacement ratio increased overall, neither clear convergence nor divergence took place across Member States. Developments were different inside and outside the euro zone, with the latter showing a decrease in standard deviation over the observed period and the former showing an increase in variability from 2009 onwards. Looking at individual country trajectories, it becomes evident that the interpretation of convergence or divergence is ambiguous and not markedly positive or negative. In

particular, it is interesting to note that Cyprus caught up with the EU average in the observed period (a case of upward convergence). Similarly, Spain was well below the average in 1999, but surpassed the EU level in 2012. However, both countries were hit particularly hard by the economic crisis, which is why convergence in those cases was not necessarily a good thing. In countries such as Austria, Denmark, Germany and Sweden, in 2014, the rate was more or less at the same level as in 1999 or even decreased – all these are examples of countries that did comparably well in the years of the crisis.

Dimension 3: Access to services

Early school-leavers rate

Overall, upward convergence was recorded from 2002 to 2016 at EU level for the early school-leavers rate indicator. Almost all Member States improved, by up to 33.5 percentage points in the case of Malta. However, convergence was not strict because three Member States showed an increase: the Czech Republic, Hungary and Slovakia by 0.9, 0.2 and 0.7 percentage points respectively. The proportion of early school-leavers decreased steadily from a Member State average of 16.4% in 2002 to 9.5% in 2016. In 2016, it was highest in Malta (19.7%) and lowest in Finland (2.8%). Variability in the proportion of early school-leavers across Member States also decreased continuously. While variability in the euro zone was greater than in the countries outside it, upward convergence within the euro zone was particularly dramatic.

Tertiary educational attainment

Tertiary educational attainment grew steadily and considerably between 2000 (22.8%) and 2016 (41.3%). The variability between the countries shows a different pattern, with the standard deviation increasing between 2001 and 2006, but declining after this point. These findings make tertiary educational attainment a clear example of strict upward convergence, with improvements at both EU and Member State levels.

Developments are comparable between the euro zone and the non-euro zone Member States. In both, averages grew steeply in the observed period and the standard deviation decreased after 2006. A look at the country trajectories from 2000 to 2016 compared to the EU average shows some interesting cases: Austria had quite a flat development – diverging from the EU average – until 2013, but quickly caught up with the overall EU performance in the years that followed. Bulgaria started from the average level in 2000, but had a flatter trajectory that diverged from the EU average in the observed period, which was also the case for Germany. Belgium and Finland converged towards the EU average from above, having higher average levels in 2000 but growing at a slower pace. In contrast, the Czech Republic, Latvia and Portugal were all below the average in 2000, but recorded a steeper increase than the EU did overall. Poland had a below-average level in 2000, but was above the EU level in 2016. In Ireland, Luxembourg and Sweden, the tertiary educational attainment rate was above the EU average in 2000 and grew faster than the average in the observed period.

Self-reported unmet medical needs

Different periods in the patterns of convergence of self-reported unmet medical needs were identified. The EU average increased from 3.5% in 2010 to 3.9% in 2013 and 2014, before decreasing again to 3.1% in 2016. In 2016, the rate was highest in Estonia (15.3%) and lowest in Austria and the Netherlands (0.2%). Variability across Member States showed a volatile pattern, but returned to slightly above its 2010 level in 2016. For this reason, upward divergence was identified. Differences in the trends between the euro zone and the non-euro zone show patterns that are measure-sensitive. However, both the standard deviation and the coefficient of variation indicate that variability in the euro zone increased. The measure also shows that variability was greater outside of the euro zone than inside it from 2010 to 2013.

Children aged less than three years in formal childcare

The EU average proportion of children below age three in formal care increased from 24.3% in 2010 to 28.0% in 2015. In 2015, it was highest in Denmark (77.3%) and lowest in Slovakia (1.1%). Variability across Member States decreased from 2010 to 2012 and increased again in 2015, surpassing 2010 levels. For this reason, upward divergence was identified. Between 2010 and 2015, variability in the euro zone was consistently below that of countries outside it. Considering these findings, it can be said that there was upward convergence in the EU during this period.

Dimension 4: Gender equality

Gender employment gap

The gender employment gap in the EU decreased from 16.4 to 10.7 percentage points between 2002 and 2016 (with more men being employed than women). The variability among Member States followed a similar pattern, with the exception of a very moderate increase in 2008–2009. Considering both developments together, a pattern of upward convergence can be seen. However, this was in a weak sense because the gender employment gap increased in some Member States during the period observed. A comparison between the euro zone and the non-euro zone reveals that in the latter, the diversity among Member States in terms of women's employment participation increased from 2006, and the average gender employment gap started to decrease only after 2008. Therefore, there was some upward divergence in the area outside of the euro zone in the second half of the period.

Gender gap in parliamentary representation

The indicator for gender gap in parliamentary representation shows that the gap between women and men in national parliaments decreased from 55.3% to 45.8% between 2006 and 2017 (with more men serving in national parliaments than women). Likewise, dispersion among Member States decreased over the entire period and so a process of upward convergence among countries took place, although not in the strict sense. However, subperiods in which variability in the EU increased can also be identified, notably from 2007 to 2011 and from 2013 to 2016. These fluctuations were largely determined by developments in the euro zone. Indeed, a much stronger process of upward convergence can be identified among countries outside of the euro zone, where the standard deviation decreased in a much more linear fashion.

Gender gap in early school-leavers

The average gender gap in early school-leavers in the EU decreased from -4.3 to -3.2 percentage points between 2002 and 2016 (with more male early school-leavers than female). The only exception is during 2004–2007, when the gap increased marginally. At the same time, dispersion among Member States also decreased, suggesting that a process of upward convergence took place. However, because not all Member States recorded a decrease in the gender gap in early school-leavers, this was upward convergence in the weak sense. These developments were mainly driven by changes in the euro zone. The average gap in countries outside of the euro zone remained at around -1.8 percentage points during the observed period, with only small fluctuations. Similarly, the decrease in dispersion was the largest in the euro zone, while it actually increased during the crisis in countries outside it.

Gender gap in AROPE

The gender gap in AROPE decreased from 2.7% in 2005 to 1.9% in 2016, while the standard deviation increased. For this reason, a trend of upward divergence was identified. The indicator increased up to 2008, reaching 3%, then it decreased during the crisis and then started to increase again from 2013 on. Given the nature of the crisis, in that it affected more male-dominated economic sectors, this trend seems to indicate that the improvement in the gender gap in AROPE is driven more by a worsening of the circumstances of men than by an improvement in those of women. The overall variability across Member States has increased steadily since 2010. The reduction in the indicator was stronger in the euro zone, where it decreased from 3% to 2%, than in non-euro zone countries, where it decreased from 2% to 1.7%. However, variability follows the same pattern in the two areas, so that upward divergence is apparent in both.

9 Conclusions and next steps

The founding fathers of the European project expected that social convergence would arise spontaneously through economic convergence. The 2008 economic crisis has shown the limitations of this assumption. The asymmetric impact of the crisis on Member States has caused them to diverge in several social dimensions, such as employment and poverty (Vandenbroucke, 2017a). In this regard, the 2008 crisis was the catalyst that placed the concept of convergence at the centre of European policy discourse. It caused a slowdown of a long-standing and widespread process of convergence of real standards of living among the Member States. It also severely challenged the stability of the euro, casting doubts upon the adequacy of the existing governance and highlighting the need for reform (Eurofound, 2017a).

Patterns of economic and social divergence across the EU are a growing concern, and evidence is required to assess whether or not these patterns signal a general deterioration of living and working conditions. In order to address these concerns, Eurofound has designed a four-year research activity entitled 'Monitoring convergence in the EU'. Its aim is to contribute to the debate on convergence by providing facts and figures to support policymakers in their understanding of upward convergence towards better working and living conditions. This study lays the groundwork for Eurofound's research on convergence, clarifying the meaning of convergence, creating a methodological toolbox to measure it, and presenting the results of an initial analysis of convergence in the social dimension of the EU.

Convergence: A slippery term

While the debate around convergence was once strictly linked to macroeconomic policy and to the Maastricht criteria, the focus has changed in recent years. In the aftermath of the economic crisis, and with the publication of the Four Presidents' Report in 2012, the policy debate started to consider the importance of social convergence in areas such as employment, working conditions and living conditions for the future and the sustainability of the EU and the EMU. This culminated in 2017 with the express recognition by the European Commission that the economic and social dimensions of the EU should have an equal footing in policymaking and that economic and social convergence must go hand in hand (European Commission, 2017e; Moscovici, 2017).

In the framework of the discussion around the European Pillar of Social Rights, the concept of upward convergence entered prominently into the policy debate. As a formal definition of upward convergence has not existed in the literature to date, this report fills the gap by defining upward convergence as an improvement in the performance of Member States in terms of employment, working and living conditions, moving closer to a policy target, alongside a decrease in the disparities among them. Upward convergence is identified as strict when all Member States move closer together towards the policy target.

Measurement challenges

Measuring convergence – and upward convergence in particular – is not straightforward. While several methods are presented in the literature, each has its pros and cons, and there is no single measure capable of capturing all the relevant aspects of the convergence process. As this study aimed to investigate the reduction of disparities among Member States, sigma-convergence was adopted as the measure of convergence, where the reduction in disparities was examined through changes in the standard deviation or the coefficient of variation. Furthermore, a sound methodological strategy was developed to allow the investigation of both upward convergence in the EU and the dynamics of convergence in Member States. While the former was investigated through changes over time in the standard deviation and levels of indicators, the latter was investigated through the comparison of Member State trends against the EU average, as well as through the analysis of the magnitude of their patterns.

This methodological approach was subsequently applied and tested on a set of indicators belonging to four research areas: employment, working conditions, living conditions and socioeconomic factors. These four areas have been selected by Eurofound to monitor convergence in the social dimension of the EU.

Results overview

It is important to stress that the results from the analysis of each indicator are very sensitive to the time horizon under consideration. In particular, the results are not directly comparable if indicators have data series of different lengths or different starting and ending points. In this study, all the indicators were investigated for the entire length of their time series. While this does not make the results automatically comparable, it allows the various developments across time to be investigated, along with the possible effects of the crisis. Furthermore, in order to provide a comparative picture of the upward convergence trends in the EU, results from the period 2010–2015 are discussed separately here.

Table 6: Summary of convergence trends in employment indicators

Dimension/indicator	Period	Type of convergence	
		Whole period	Post-2010
Labour market participation			
Employment rate	2002–2016	Upward convergence	Upward divergence
Activity rate	2002–2016	Upward convergence	Upward convergence
Average weekly hours worked	2005–2016	Downward convergence	Downward convergence
Labour market exclusion			
Unemployment rate	2002–2016	Upward convergence	Upward divergence
Long-term unemployment rate	2002–2016	Downward convergence	Downward divergence
NEET rate	2002–2016	Upward convergence	Upward convergence
Labour market dynamics			
Transition rates from temporary to permanent contracts	2011–2016	Downward divergence	Downward divergence
Involuntary part-time employment	2005–2016	Downward divergence	Downward divergence
Involuntary temporary employment	2002–2016	Downward divergence	Downward divergence

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour market participation															
Employment rate	UC	UC	UC	UC	UC	UC	UC	DC	DD	DD	DD	DD	UC	UC	UC
Activity rate	UC	UC	UC	UD	UD	UD	UD	UC	UC	UD	UC	UC	UC	UC	UD
Average weekly hours worked				DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC
Labour market exclusion															
Unemployment rate	UC	UC	UC	UC	UC	UC	UC	DD	DD	DD	DD	DD	UC	UC	UC
Long-term unemployment rate	UC	DC	DD	UC	UC	UC	UC	UC	DC	DD	DD	DD	DD	UC	UC
NEET rate	UC	UC	UC	UC	UC	UC	UC	DD	DD	DD	DD	DD	UC	UC	UC
Labour market dynamics															
Transition rates from temporary to permanent contracts										DC	DD	DD	DD	DC	
Involuntary part-time employment				UC	UC	UC	DC	DD	DD	DD	DD	DD	DD	UD	UD
Involuntary temporary employment	DD	DD	DD	DD	DD	UD	UD	UD	DC	DD	DC	DC	DD	DD	DD

Effect of the economic crisis and the recovery

The analysis of all the time series shows that the 2008 economic crisis had a very significant impact on the convergence patterns of several indicators, especially those in the areas of employment and living conditions. Despite this, upward convergence trends were restored in most of the indicators affected by the economic crisis once recovery efforts were put in place.

Employment

The economic crisis severely affected employment. In fact, with the exception of the activity rate, which exhibits a stable upward convergence pattern, all the remaining indicators clearly show the impact of the crisis. For employment, unemployment and NEET rates, the upward convergence trend was broken in 2008, changing to downward and diverging trends, reflecting the asymmetry of the reaction to the crisis. The impact on long-term unemployment started to be felt one year later, in 2009, and transformed a consolidated upward convergence into downward convergence. For these indicators, downward divergence trends halted in 2013 (in 2014 for long-term unemployment), when upward convergence was restored. Conversely, downward trends remained constant for average weekly hours worked, transition rates from temporary to permanent work, and involuntary temporary work, while the long-consolidated trend of downward divergence in the share of involuntary part-time work changed into upward divergence.

Table 7: Summary of convergence trends in working conditions indicators

Dimension/indicator	Period	Type of convergence	
		Whole period	Post-2010
Physical environment			
Physical Environment Index	2005–2015	Upward convergence	Upward divergence
Work intensity			
Work Intensity Index	2005–2015	Upward divergence	Downward divergence
Working time quality			
Working Time Quality Index	2005–2015	Upward convergence	Convergence
Skills and discretion			
Skills and Discretion Index	2005–2015	Upward divergence	Upward divergence
Wages and inequality			
Compensation per hour	2005–2017	Strict upward divergence	Upward divergence
Income inequality	2005–2016	Downward convergence	Downward divergence

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Physical environment												
Physical Environment Index	UC	UC	UC	UC	UC	UC	UD	UD	UD	UD	UD	
Work intensity												
Work Intensity Index	UD	UD	UD	UD	UD	UD	DD	DD	DD	DD	DD	
Working time quality												
Working Time Quality Index	UC	UC	UC	UC	UC	UC	C	C	C	C	C	
Skills and discretion												
Skills and Discretion Index	UD	UD	UD	UD	UD	UD	UD	UD	UD	UD	UD	
Wages and inequality												
Compensation per hour	UD	UD	UD	UD	UD	UD	UD	UD	UD	UD	UD	UD
Income inequality	UC	UC	UC	UC	UC	UC	UC	DD	DD	DD	DD	UC

Working conditions

The area of working conditions shows a more stable pattern than employment but nevertheless reflects the impact of the crisis. The work intensity indicator changed from a pattern of upward divergence in 2010 to one of downward divergence, indicating a worsening of conditions. On the other hand, stable upward convergence was evident in working time, while upward divergence was recorded for skills and discretion and later for physical environment too. Upward divergence was also apparent in compensation per hour over the entire period. Income inequality moved from upward convergence to downward divergence in 2010, signalling that an increase in overall inequality may have been a result of the economic crisis; a downward convergence trend was recorded for the overall period.

Living conditions

The economic crisis had a significant impact on living conditions. The life satisfaction indicator, reflecting increasing disparities, changed from upward convergence to downward divergence in 2011. Over the entire period, a downward convergence trend is evident for trust in government, but since 2011 an upward convergence trend seems to have been established. A similar trend is evident in social exclusion. There was overall downward convergence in material deprivation, although some positive developments can be seen after 2011. Conversely, in-work poverty exhibits a trend of downward divergence. Finally, over the entire period, upward convergence is recorded in AROPE and life expectancy shows strong upward convergence, albeit with some reduction in the final year.

Table 8: Summary of convergence trends in living conditions indicators

Dimension/indicator	Period	Type of convergence	
		Whole period	Post-2010
Overall life experience			
Life satisfaction	2007–2016	Convergence	Downward divergence
Life expectancy	2002–2015	Upward convergence	Upward convergence
Living standards			
AROPE	2005–2016	Upward convergence	Upward convergence
In-work poverty	2005–2016	Downward divergence	Downward divergence
Material deprivation	2007–2016	Downward convergence	Upward convergence
Quality of society			
Trust in government	2007–2016	Downward convergence	Upward convergence
Quality of government	1996–2016	Downward convergence	Downward convergence
Social exclusion	2007–2016	Upward convergence	Upward convergence
Informal care	2011–2016	Downward convergence	Downward convergence
Civic engagement	2011–2016	Downward divergence	Downward divergence

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Overall life experience															
Life satisfaction						UC	UC	UC	UC	UC	DD	DD	DD	DD	DD
Life expectancy	UD	UD	UD	UD	UD	UD	UC	UC	UC	UC	UC	UD	UD	DC	
Living standards															
AROPE				UC	UC	UC	UC	DD	DD	DD	DD	UC	UC	UC	UC
In-work poverty				UC	UC	UC	DD	DD	DD	DD	DD	DD	DD	DD	DD
Material deprivation						DD	DD	DD	DD	DD	UC	UC	UC	UC	UC
Quality of society															
Trust in government						DD	DD	DD	DD	DD	UC	UC	UC	UC	UC
Quality of government	DC	DC	DC	DC	DC	DC	UC	UC	UC	UC	UC	UC	DC	DC	DC
Social exclusion						DD	DD	DD	DD	DD	UC	UC	UC	UC	UC
Informal care											DC	DC	DC	DC	DC
Civic engagement											DD	DD	DD	DD	DD

Socioeconomic factors

The effect of the crisis is also clear in some of the socioeconomic indicators. While real GDP per capita had shown a trend of upward divergence since 1995, at the beginning of the crisis in 2008, it changed to downward convergence for a limited time. This returned to upward divergence from 2010 onwards. Downward convergence is apparent for the impact of social transfers on poverty reduction. The aggregate replacement ratio for pensions moved from upward convergence to upward divergence in 2012. The most positive trends can be seen in the education indicators, such as the rate of early school-leavers and tertiary educational attainment, as well as gender gap indicators. Here a constant upward convergence trend is recorded for the period overall.

Comparative picture since Europe 2020

While is important to have an overall picture of developments over time for each indicator, it is equally important to have an overall picture comparing their trends. As this requires identifying a common time series for all indicators, the period 2010–2015 has been chosen, 2010 being the year of the launch of the Europe 2020 strategy.

Table 9: Summary of convergence trends in socioeconomic indicators

Dimension/indicator	Period	Type of convergence	
		Whole period	Post-2010
Macroeconomic			
Real GDP per capita	1995–2017	Strict upward divergence	Upward divergence
Social protection			
Expenditure on social protection	1999–2015	Upward divergence	Downward divergence
Impact of social transfers on poverty reduction	2010–2015	Downward convergence	Downward convergence
Aggregate replacement ratio for pensions	2005–2016	Upward divergence	Upward divergence
Access to services			
Early school-leavers rate	2002–2016	Upward convergence	Upward convergence
Tertiary educational attainment rate	2000–2016	Strict upward convergence	Upward convergence
Self-reported unmet need for medical care	2010–2016	Upward divergence	Upward divergence
Children aged less than three years in formal childcare	2010–2016	Upward divergence	Upward divergence
Gender equality			
Gender gap in employment	2002–2016	Upward convergence	Upward convergence
Gender gap in parliamentary representation	2006–2015	Upward convergence	Upward convergence
Gender gap in early school-leavers	2001–2016	Upward convergence	Upward convergence
Gender gap in AROPE	2002–2016	Upward divergence	Upward divergence

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Macroeconomic															
Real GDP per capita	UD	UD	UD	UD	UD	UD	DC	DC	UD	UD	UD	UD	UD	UD	UC
Social protection															
Expenditure on social protection	DD	DD	DC	DC	DC	DC	UC	UC	DD	DD	DD	DD	DD	DD	
Impact of social transfers on poverty reduction									DC	DC	DC	DC	DD	DD	DC
Aggregate replacement ratio for pensions				UC	UC	UC	UC	UC	UC	UC	UD	UD	UD	UD	
Access to services															
Early school-leavers rate	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC
Tertiary educational attainment rate	UD	UD	UD	UD	UD	UC	UC	UC	UC	UC	UC	UC	UC	UC	UC
Self-reported unmet need for medical care									DD	DC	DC	DC	DC	UD	UD
Children aged less than three years in formal childcare									UC	UC	UC	UD	UD	UD	
Gender equality															
Gender gap in employment	UC	UC	UC	UC	UC	UC	UC	UD	UC	UC	UC	UC	UC	UC	UC
Gender gap in parliamentary representation					UD	UD	UD	UD	UD	UC	UC	UC	UC	UC	
Gender gap in early school-leavers	DC	DC	DC	DC	DC	DC	UC	UC	UC	UC	UC	UC	UC	UC	DD
Gender gap in AROPE				DD	DD	DD	DD	UC	UC	UD	UC	UD	DC	DD	DC

Overall, 23 indicators out of the 37 investigated moved in a positive direction. From 2010, upward convergence trends were present in 14 indicators, with improving performance of Member States alongside a narrowing of the disparities between them. In particular, upward convergence was present in the education indicators, such as the early school-leavers rate and tertiary educational attainment, as well as in all the gender equality indicators, such as employment, parliamentary representation, education and poverty. Furthermore, upward convergence was also recorded in indicators related to employment and working conditions, such as the NEET rate, the activity rate, working time quality and physical environment. In the area of living

conditions, upward convergence was found in trust in government and life expectancy, as well as material deprivation.

An additional nine indicators moved in an upward direction, even though this was not accompanied by a reduction in the heterogeneity of Member States. From 2010, upward divergence was recorded in socioeconomic indicators such as GDP per capita, the aggregate replacement ratio per pension, unmet medical needs and the share of children aged less than three years in formal care. Most importantly, upward divergence was found in the employment rate (where a marked increase was recorded) and the unemployment rate (where a large decrease was identified), although disparities among Member States increased in this period for both indicators. Finally, upward divergence was also recorded for the compensation per hour indicator.

Downward divergence was recorded in 10 indicators. With the exclusion of the long-term unemployment rate, these were mainly linked to the more qualitative aspects of employment (such as involuntary part-time employment, involuntary temporary employment and transition rates from temporary to permanent contracts) and to poverty and more general living conditions (such as life satisfaction, civic engagement, AROPE and in-work poverty). Downward divergence was also recorded in the expenditure on social protection, although this indicator is difficult to interpret normatively, and the income inequality indicator.

Finally, downward convergence was recorded in only four indicators from 2010: the impact of social protection on poverty reduction, average weekly hours worked, quality of government and informal care (albeit this last indicator is very difficult to interpret normatively).

Convergence and the business cycle

This study highlights the importance of looking at the results of convergence analysis in reference to the business cycle of economic expansion and contraction. For one group of indicators, upward convergence trends were steady and robust even during the crisis; fluctuations in the EU average and the variability across Member States over the business cycle were very limited. This set of indicators includes: the activity rate, education-related indicators (early school-leavers and tertiary educational attainment rates), gender gaps in education and in employment, and the job-quality indicators. Conversely, for other indicators, upward convergence was greatly affected by the business cycle. For these, it is possible to see a cyclical evolution in both averages and variability, suggesting that in good times there is upward convergence (with improvement in the EU average and reduced disparities) while in bad times there is downward divergence (with falls in the EU average and growing disparities). This pattern was identified for employment rate, all labour market exclusion indicators, in-work poverty and material deprivation. These are the indicators for which the resilience of Member States should be strengthened in order to prevent future asymmetric shocks.

Next steps

This study provides a theoretical foundation for Eurofound's work on upward convergence, and the set of selected indicators will be continuously investigated by Eurofound throughout the course of this activity. This report is the first in a series that will be published over the coming years as part of Eurofound's work programme. It will be followed by thematic reports presenting the results of investigations into each research area examined in this report. These will be organised along three main strands.

1. Patterns of convergence or divergence within a broader set of indicators will be investigated over time, in order to identify important trends and patterns within the EU and at regional level.
2. The drivers of convergence and divergence trends across Member States will be investigated through multivariate statistical models, which will include the analysis of factors at institutional, macro and micro levels.
3. European initiatives and policy options to foster economic and social convergence at EU level will be discussed for each research area.

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