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Inequality in Europe

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Authors:

Rocco L. Bubbico (ECON), Leon Freytag (CEPS)

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Table of Contents

Executive Summary.....	1
Introduction	2
1. Has inequality increased in the EU?.....	4
2. What is the relationship between inequality and growth?	7
2.1 A new empirical consensus.....	7
2.2 Inequality and growth in developed countries.....	9
3. Automation and Inequality	11
3.1 Technological unemployment.....	12
3.2 The decline of the labour share: capital-biased technical change.....	14
3.3 The platform economy: talent-biased technical change	16
3.4 The wage distribution: skill-biased technical change	16
4. Inequality of opportunity and some of its dimensions.....	19
4.1 Geography.....	20
4.2 Education	22
4.3 Health.....	24
5. Inequality, politics and policies.....	26
5.1 Income inequality and redistribution policies	26
5.2. The impact of the crisis on inequality trends.....	28
5.3 The rise of populism: is income inequality a driver?	33
6. Conclusions: what can be done?.....	35
Annex – Fiscal policy measures and impact on income distribution: an overview	37
References	39

Executive Summary

- Tackling inequality in its multidimensional nature and reconciling it with growth and competitiveness strategies is a non-partisan choice, and a way to achieve higher and more sustainable economic development.
- Concerns on inequality are high among scholars, policy makers and general public, but income inequality in Europe over the last decade has not increased. On the one hand, this reflects the progressivity of tax systems and the effectiveness of EU's welfare systems. On the other hand, this is the result of conflicting trends, with diversified national growth trajectories and large variations in performance of welfare systems. Moreover, overall poverty has increased, those in the poorest income decile have lost share of total disposable income and still significant inequality of opportunity is observed in Europe.
- There are several on-going factors that need to be considered as drivers of increasing market inequalities in Europe and in other advanced economies. In this paper we look in particular at automation and job polarization. By using automation technology data, we do not find an impact of robotics on wage and employment. Nevertheless, rapid advances in artificial intelligence might change this picture, as more professions and job typologies will be at risk.
- Inequality of opportunity in Europe is still very high. In this note we look at geography, health and education, showing large differentials in basic services, well-being drivers and more generally economic opportunities across Europe and within Member States.
- The strategy to contrast inequality must not be confined to fiscal measures, as it requires a larger and more complex policy mix. The literature and the evidence reported in this note call for action to enhance competitiveness, upgrade skills and reinforcing equality of opportunities.

Introduction

Income inequality has declined worldwide, yet it has become a crucial topic on policy agendas. Global inequality of incomes has declined significantly since 2000, but inequality is increasing within most countries, especially developed ones (Milanovic 2016; World Bank 2016). As a consequence, rising prosperity for lower and middle households has become a fundamental challenge for developed economies, given also the combined effect of the severity of the economic crisis, with stagnating wages and living standard for a prolonged period (Nolan 2016). Over the last years, inclusive growth has become a buzz word for governments and multilateral organisations, including IMF (Lagarde 2017), OECD (2016), World Economic Forum (2017) the European Commission¹ and the Chinese Government². At the same time, among scholars, the long-lasting debate on the relations between inequality and growth has been somehow eclipsed by the scrutiny on the distributional effects of political and fiscal choices of the last two decades, highlighting the underrated, adverse effects of neoliberal policies on both distribution of benefits of growth and long-term economic development. These analyses have reconsidered the distributive impact of popular policy trends before and during the crisis, in particular fiscal consolidation strategies (see Ostry et al. 2016; Ball et al. 2013), capital account liberalisation (Furceri and Loungani 2015) and growth-enhancing structural policies in low-income countries (Fabrizio et al. 2017). Contrasting the classic idea of a natural trickle-down from rich to poor households as a consequence of economic growth, these contributions have highlighted the negative spill-overs of policies that did not consider the vicious circle between distributional effects, inequality and lower growth. More importantly, the recent contributions have triggered a shift in policy recommendations for growth-enhancing policy measures, highlighting the role of inclusiveness to build more competitive and resilient economies (Ostry et al. 2016; Lagarde 2017).

Concerns on inequality have been fuelled more by narrative than by evidence, reinforcing populist positions amid fiscal pressures on welfare policies. The rise of inequality as a topic of interest has been particularly significant in high-income countries and emerging market economies, where it has been connected with social stagnation and distress, before being linked more often to political populism (Inglehart and Norris 2016; Wolf 2017). Beyond economists and development scholars, this interest has also involved the general public, in particular during and in the aftermath of political events such the EU referendum in the UK and the US presidential elections. However, as recently shown, the perception of inequality in many contexts is way above its actual levels (Niehues 2014). Perhaps it is not incidental that the new wave of interest has emerged in times of stress for the European welfare

¹ See the inclusive growth target identified within the Europe 2020 strategy.

² As reported by Darvas and Wolf (2016), the 12th Five Year Plan has the objective to pursue economic growth sharing benefits among all people.

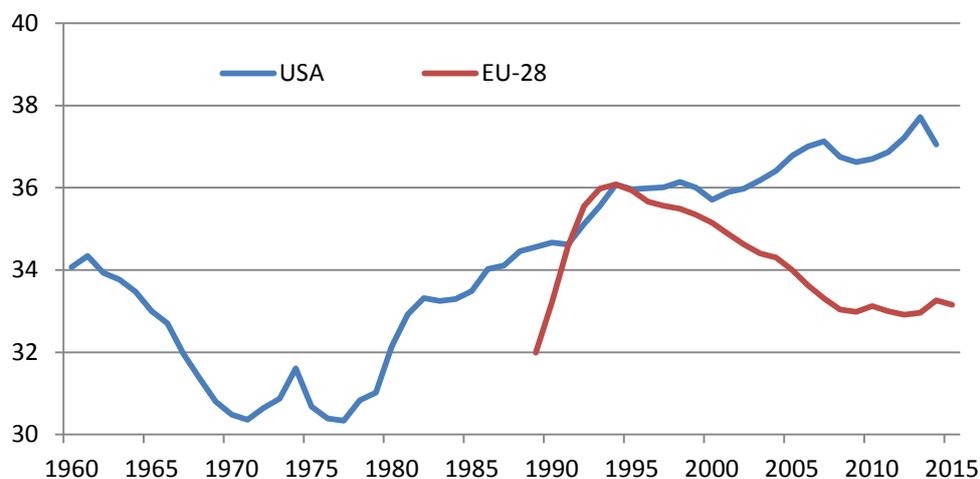
systems, given ageing, migration and the fiscal consequences of the crisis. It is clear that beyond political consequences and its mere impact on growth, high inequality can imply the exclusion of large parts of population from the process of generating and enjoying economic growth. Clearly, beyond efficiency concerns, this is not sustainable from all possible policy angles. As argued in this note, tackling inequality in its multidimensional nature and reconciling it with growth and competitiveness strategies is a non-partisan choice, and a way to achieve higher and more sustainable economic development.

This paper has the objective to review the rich debate on inequality and to draw some lessons for the EIB. The paper is organised as follows: in section 1 we analyse inequality trends in the EU over the last decade, and in section 2 we review the long-debated relation between income inequality and growth. In section 3 we analyse some additional channels in this relation that can be triggered by increasing automation. By using automation data we also analyse job polarization in Europe. In section 4 we focus on some dimensions of inequality of opportunities. In section 5 we assess the impact of the crisis on income inequality in Europe and we review more generally the relations between policies, politics and inequality. Finally, we identify some policy areas to improve equality in Europe, where the EIB can also have a significant impact.

1. Has inequality increased in the EU?

European integration and national welfare systems act together as a convergence machine. Net inequality has actually decreased in Europe in the long run (Darvas 2016). As shown by Darvas and Wolff (2016) the Gini index of market income inequality (income before taxes and transfers) has been increasing since the early 1990s from around 0.45 to above 0.50, with little variation since 2000. Interestingly, the market income Gini has been larger in Europe than in the US since the early 1990s. However, as shown in figure 1, in Europe, the tax and welfare systems have been tweaked in effective ways, increasing their redistribution capacity over time, reducing net inequality and achieving an increasing gap with market income Gini. Instead, in the US, the trend of net Gini has broadly followed the one of market Gini, showing a limited impact of welfare and fiscal measures in contrasting diverging market dynamics. In the long run, the decline of inequality in Europe has been due to convergence of average incomes across the Member States, with a significant increase of disposable income in poorer countries vis-à-vis more developed European countries. In fact, the bulk of total EU inequality is essentially due to the intra-country and intra-regional component, rather than cross-country (Rodriguez-Pose and Tselios 2009)

Figure 1 – Net Gini coefficient (after taxes and transfers) 1960-2015



Source: Darvas (2016).

The crisis put the convergence process at a halt, but this is mainly the outcome of cross-country dynamics. The weak economic performance of the EU over the last decade had a clear impact on economic conditions of individuals, affecting their employment conditions, income levels and social protection benefits. Moreover, the asymmetric growth trajectories of European economies during the crisis have also spurred the idea that the European ‘convergence machine’ had stopped (Vandenbroucke et al. 2015). In fact, while the least developed countries in Europe have kept on converging, the decline of disposable

income in southern EU countries relative to the rest of the EU has put this process at a halt. The result of these somewhat contrasting trends is that overall inequality has not increased significantly (Darvas 2016). As shown in table 1, market inequality in the EU, measured by the market Gini coefficient (Gini before taxes and social transfers) has increased only marginally from 2007 to 2015. Instead, the net Gini coefficient is basically the same as 2007. This is consistent with the tendency observed in poverty indicators. The at-risk-of-poverty rate before social transfers has increased, but marginally, as well as the rate after social transfers and the rate for those working. The severe material deprivation rate, instead, decreased, after peaking at 9.8% in 2012.

Table 1 – Inequality and poverty indicators, EU-27

	2007	2015	Difference
Market Gini	≈50	≈51*	+1.0
Net Gini	≈33	≈33.5*	+0.5
At risk of poverty rate before social transfers**	25.8%	26.1%	+0.3
At risk of poverty rate	16.6%	17.3%	+0.7
In work at risk of poverty rate	8.3%	9.5%	+1.2
Severe material deprivation rate	9.2%	8.0%	-1.2

Notes: *2014 data; **pensions non included in social transfers. Source: Darvas and Wolff (2016), Eurostat database

Global inequality decreased (on the back of the booming of China’s and India’s economies), but incomes did not increase on an equal footing. Relative (but not absolute) global inequality declined steadily over the last 35 years, with the Gini index declining from 0.74 in 1975 to 0.63 in 2010 (Niño-Zarazúa et al. 2016). This fall was driven primarily by declining inequality between countries, arising from the extraordinary economic progress observed in China and India. This improvement was registered despite an increasing trend of inequality within these countries. With a focus on inequality at a global scale, Milanovic (2016) shows that the global poorest did not observe a large increase of their real income between 1988 and 2011³. Overall, the members of the ‘global’ middle class⁴, mainly living in China and other rapidly developing economies, doubled their real income. Instead, middle-class of developed countries⁵ faced a stagnation of their real incomes. This reflects increased inequality within developed countries, since the top percentile, composed mainly by developed country’s higher income earners, witnessed a much higher growth of real income than the middle class.

In Europe, over the last decade, those in the lowest income deciles have lost some share of total income. Looking at the distribution of income Europe in the period 2005-2015, the picture has changed only slightly. The lower deciles of the income distribution are the ones that have lost the largest share of total equivalised disposable income. Instead, the mid-

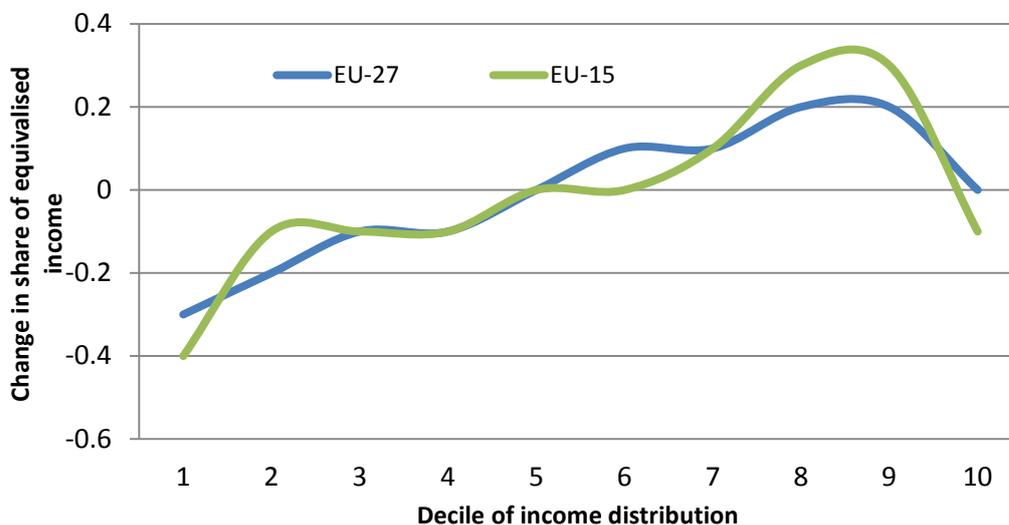
³ Milanovic (2015) analyses changes in real incomes per capita per percentile of income distribution in the world.

⁴ in particular between the 45th and 65th percentile of the global income distribution

⁵ those between the 80th and 95th percentiles of the global income distribution

range of the total income distribution has seen no change in their share of total income, while the 8th and 9th deciles are the ones witnessing the highest increase. Finally, the highest income decile has seen a limited reduction of its share of total income.

Figure 2 – Change in share of equivalised income in Europe by income decile 2005-2015



Data source: Eurostat database.

Although net inequality has not increased, there are several on-going factors that need to be considered as drivers of increasing market inequalities in Europe and in other advanced economies⁶. One has to do with aggregate demand and the labour market. With low labour-force participation rates, persistently high unemployment, fading of social protection and stagnating productivity all lead to lower incomes over the entire life-cycle of individuals, with poor households being more affected. This is combined with fiscal and welfare systems under increased pressure. Another issue is linked to the increasing skill-bias in income, with low (in some countries negligible) salary increases for low-skilled and part-time workers and large income increases for high-skill occupations. An additional driver is the near-zero interest rate environment, with low returns on capital income⁷. Demographic pressure and rapid ageing play a key role, both for the sustainability of welfare systems and for the evolving composition of households (lower average number of members, higher housing costs, lower intra-family welfare), making them potentially more prone to poverty. Milanovic (2016), building on previous contributions, identifies several other factors that are likely to push market inequality up in the US and in other developed countries: (i) capital income is highly concentrated (Gini of 90 in developed countries) and is combined with high labour income of the same individuals; (ii) homogamy has also a role as more educated and richer people tend to marry each other; (iii) better access to political decisions for high-income earners.

⁶ See McKinsey Institute (2016)

⁷ Low returns on capital affect private demand and saving rates and in the long run also capital allocation and life choices (e.g. higher savings for retirement, lower spending during retirement or postponed retirement), with a non-negligible potential impact on income distribution.

2. What is the relationship between inequality and growth?

2.1 A new empirical consensus

The relation between growth and inequality is not straightforward. Income inequality has an impact on growth through a multitude of channels that might bring the effect either on positive or negative ground depending on market conditions and on the existence and progressivity of re-distributive measures. On the one hand, inequality impacts positively economic activity and output as far as income differentials provide incentives and reward personal effort, risk-taking and innovation⁸. It also promotes a more rapid accumulation of savings, promoting growth. On the other hand, income inequality can actually harm growth, inter alia, by: (i) reducing aggregate demand (Carvalho and Rezai 2014); (ii) fuelling financial instability (Rajan 2011; Acemoglu 2011); (iii) hampering investment (Bardhan 2005; Dabla-Norris et al. 2015) and middle class risk-taking (Boushey 2011); (iv) impeding the swift upgrade of skills and education, reducing productivity (Stiglitz 2012); (v) hampering socio-economic mobility (Krueger 2012; Corak 2013).

Over the recent years many studies found a negative and significant impact of inequality indices on countries' growth rates, but this relationship has been long debated. In the 1950's and 1960's, economists such as Nicholas Kaldor and Simon Kuznets argued that there is a trade-off between reducing inequality and promoting growth. Kuznets (1955) showed that market forces first increase and then decrease market inequality as the economy develops. This view was challenged during the 1990s, when many studies argued that more income inequality leads to less growth. Some authors have first considered the presence of highly distortionary taxation within very unequal societies as the main channel for explaining this causal relationship, through the effect that voters would have on higher taxation⁹.

A new wave of panel studies has emerged in the 2000's arguing that some inequality generates growth. In some cases the new results suggested that in the short and medium term, an increase in a country's level of income inequality has a significant positive relationship with subsequent economic growth (Forbes 2000; Barro 2000), while in other cases the negativity of this relationship has been confirmed for specific contexts, as in imperfect capital markets (Aghion et al 1999). According to Niño-Zarazúa et al (2016), Asian

⁸ This traditional view of wage differential as incentive for lower-income workers has been challenged by Cohn et al (2014), highlighting how wage differentials are equally bad for employees' morale and productivity.

⁹ See Alesina and Rodrik (1994), Bertola (1993), Persson and Tabellini (1994)

countries would not have achieved the same level of growth by preventing rise in inequality¹⁰.

In parallel, many studies have taken a more political and sociological perspective. In developed countries, high income inequality has been considered as one of the main drivers of wealth concentration, economic stagnation, stalling social mobility, erosion of trust, solidarity and social cohesion, alienation from traditional politics with rising of populism, and ultimately lower quality of health services¹¹. It has been empirically proven that inequality does not only deters investments and growth through an inefficient allocation of capital and resources, but it also enhances the risk of social and political instability (Alesina and Perotti 1996), increases crime rates (Kelly 2000; Soares and Naritomi 2010), corruption (Jong-Sung and Khagram 2005), violent conflicts among groups (Østby 2008) and weakens the efficacy of growth in the reduction of poverty (Ravallion 2001).

A more unequal society weakens the economy as it increases financial vulnerabilities. A few studies focusing on the US have looked at the links between consumption, leveraging and financial crisis, arguing that income inequality has contributed to the fall of saving rates and to overleveraging as households tried to maintain their consumption beyond their means, aided by availability of credit (Rajan 2011; Treeck 2014)¹². This helped to fuel a credit bubble leading to the financial crisis. Reich (2010) observes that increased inequality has reduced aggregate demand as wealthier households have lower marginal propensity to consume. Ranciere and Kumhof (2011) build on these contributions showing that rising inequality in a climate of rising consumption can push poorer households to increase their leverage, thereby making a crisis more likely.

The relation between inequality and growth is not static: it evolves over time and with level of development. Milanovic (2016) has introduced the concept of Kuznets' 'waves', with cycles of increase and decrease of inequality with development. Milanovic identifies a second Kuznets curve in the US, with inequality still rising. This process is driven by technological change, disruption of organised labour and globalisation (like the first Kuznets curve), with decline of middle class and lower taxes on capital. This can be followed by pro-inequality trends built on a combination of inequality stabilisers like political change, pro-unskilled labour technological innovations, dissipation of rents acquired during the technological change, and greater attempts to equalise ownership of assets (ibid.).

¹⁰ It is difficult to imagine how in practice such growth, and the associated poverty reduction, could have occurred without an increase in absolute inequality. What should be more effectively under scrutiny, thus, is not the increase of absolute inequality, but of relative inequality within countries.

¹¹ It has been shown that inequality is not necessarily related with decline in trust, while discontent rises with inequality but only marginally, as acceptance to it increases and the income gap is not immediately recognisable. Instead, higher inequality is correlated with lower civic participation and lower voting turnout among the poor (Nolan 2016).

¹² This is also in line with the earlier findings of Krueger and Perri (2006): income inequality is not accompanied by consumption inequality, suggesting that households accumulate debt to sustain their consumption levels.

Recent contributions show that redistributive policies do not harm growth. Ostry et al. (2014) find no evidence of a clear trade-off between growth and equality, showing that redistributive policies have no adverse effects on growth. Dabla-Norris et al. (2015) show the absence of trickle-down from increases in income of richer individuals. In particular, growth is more robust if income share of lower quintiles increases, compared to an increase of the top quintile¹³. The poor and the middle class matter the most for growth via a number of interrelated economic, social, and political channels¹⁴.

However, different methodologies crucially underpin contrasting results, which might be time- and country- specific In general, it has been highlighted (De Dominicis et al. 2006; Grigoli et al 2016) that studies on the relations between inequality and growth overlook, with a few exceptions (see Barro 2000) the heterogeneity of countries. Overall, the literature focusing on cross-country approaches has found inconclusive or heterogeneous results, with contributions often facing severe methodological issues. Instead, country-specific studies or those focusing on inequality of opportunities show more clearly a negative effect of inequality on growth (De Dominicis et al. 2006).

2.2 Inequality and growth in developed countries

In recent years, there has been a shift from the analysis on global inequality to inequality within developed countries. Recent analyses, notably from the World Bank (2016), show that while levels of inequality at a global scale have gone down, the average person lives now in a more unequal country than in the late 1980s. National trajectories, though, are much differentiated, even across countries that experienced similar macroeconomic developments or registering similarly high development levels (Nolan 2016). For instance, in Japan and Italy growth of incomes has stagnated but inequality has increased only marginally. In Greece and Spain, inequality has not increased during booming years but it has increased with the crisis.

This view looks at inequality as the price developed countries have to pay for growth in poor countries through trade and globalisation channels¹⁵. This view considers market income as the key for increasing inequalities, due to effects of globalisation and technology on dispersion of earnings, returns for skilled occupations and returns on capital (Krueger

¹³ In particular, taking in consideration 159 countries and the period between 1980 and 2012, the authors show that when the income share of the top 20 percent increases, then GDP growth declines over the medium term (0.08 percentage point lower in the following five years). In contrast, an increase in the income share of the poor (first quintile) and lower-middle class (second and third quintile) is associated with higher GDP growth. The effect of an increase of disposable income for the poor is larger (0.38 percentage points over the following five years) than for the middle class (0.32 and 0.27 percentage points if the increase is observed for the second and third quintile respectively).

¹⁴ However, these results have been contested (see Kraay 2015) mainly because of methodological drawbacks in cross-country analysis.

¹⁵ Among others, see Obstfeld (2016) and Antras et al. (2017).

2012). The main idea is that technological change has been skill-biased, favouring those with the skills needed to get the most of it, increasing the wage gap (see Chapter 4).

This mainly technology-caused process went in parallel with the erosion of organised labour and shrinking welfare safety nets in countries with fiscal issues. This is particularly important from a social perspective, since Unions have been found to affect wage structure in particular for the lower-middle class, supporting the vertical mobility to the middle class (Card 2001). Increasing inequality is also seen as the result of declining labour market regulation and minimum wage compression. On the top of this, the changes observed in age and household structures also play a role in rapidly aging countries. Finally, reduced distributive capacity and effort by governments under severe budget constraints can also contribute to this phenomenon (Nolan 2016).

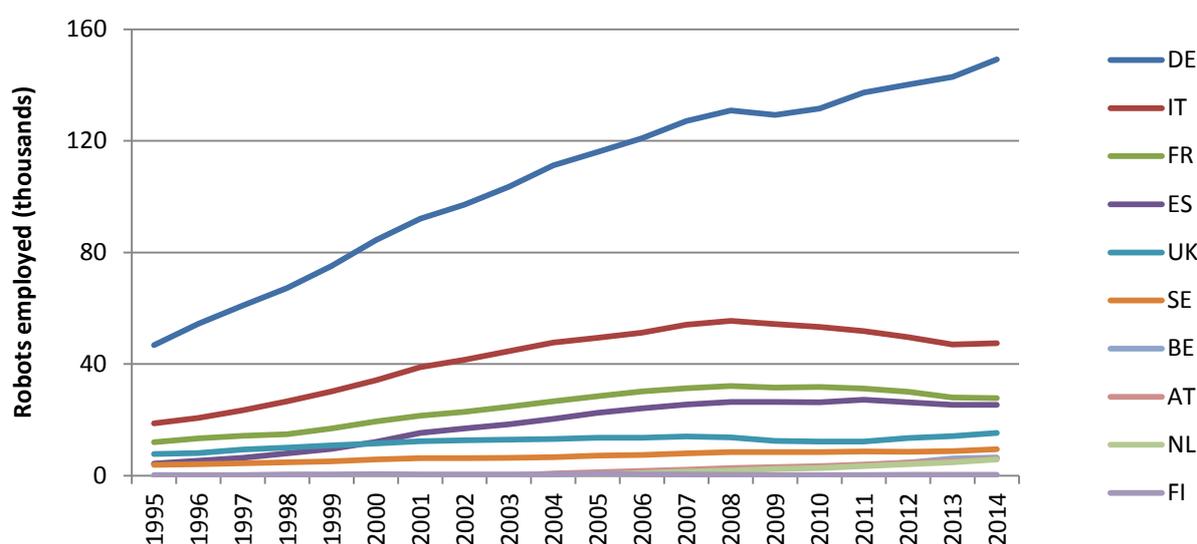
Besides income inequality, wealth inequality has been observed on the rise. Piketty (2014) shows that the increase of income inequality (led by skill-bias, technology and globalisation), combined with returns of capital above growth rate generated a remarkable increase of global wealth inequality. An important point made by Piketty is that wealth is already highly concentrated and concentration tends to increase due to reinvestment, with a rise of overall wealth inequality (already larger than income inequality as top earners are not necessarily the wealthiest).

3. Automation and Inequality

Progress in automation and adoption of ground-breaking artificial intelligence technologies have sparked the idea that skills are losing the race with technology. An increasing number of scholars is warning that automation may be the new biggest driver of inequality. The concern is that modern technological possibilities compete in particular with the jobs of low- and medium-skilled workers, and thus threaten to replace these jobs or at least to put downward pressure on their relative wages (Sachs and Kotlikoff 2012; Hémous and Olsen 2014; WEF 2016).

Automation might impact income distribution through different channels. Four main mechanisms between automation and inequality are outlined in this section, each with a direct impact on the labour market. The first one is technological unemployment, referring to the threat that more machines increasingly replace human work. The second mechanism relates to a fall in the labour share, which is the result when automation increases the relative compensation of the input factor capital as opposed to labour. Third, the platform economy can facilitate monopoly power and rule out competition. Fourth, and finally, automation can impact different workers differently. By making high-skilled workers more productive but substituting for low-skilled workers, automation may add to inequality in the wage (and employment) distribution.

Figure 3: Total number of industrial robots in use in different EU countries, 1995-2014



Source: Author's elaboration on IFR (2016).

To support this chapter with empirical evidence, we used robot data – a main type of automation technology - by the International Federation of Robotics (IFR). The global

market for Industrial robots is growing at a remarkable speed, 16% per year between 2010 and 2015 (IFR 2016, p. 11). By 2025, 4-6 million robots are expected to be in use (Sirkin et al et al 2015). Europe is the region with the highest robot density (92 robots installed per 10,000 employees), with Germany and Italy being the largest users (Figure 3). The financial crisis in 2008 limited growth in some countries, although there has been strong market growth in all countries over the past two decades. The total stock of robots in Europe was 411,062 in 2014. Industrial robots are primarily employed in manufacturing – foremost in the automotive industry (75 robots per 1,000 employees on average), followed by the electronics, metal and chemicals industries.

3.1 Technological unemployment

The unexpected advent of certain new technologies could drastically change our economies - but they might also not seriously compete with human workers. The key questions are how many, and which jobs will be lost as a result of automation. Technological unemployment refers to increasing unemployment rates, because more and more machines replace human work¹⁶. This often hits those already at the lower end of the income distribution. When these workers lose their main source of income, inevitably income inequality and social tensions rise¹⁷.

Is this wave of technology more disruptive for labour than previous ones? Historically, the anxiety associated to technological unemployment is as old as the industrial age.¹⁸ However, over a period of 200 years the view that automation has overall a positive impact on employment has dominated in mainstream economics. More recently, more and more researchers claim that the latest wave of technology is different, though (Brynjolfsson and McAfee 2011; Ford 2015). A frequently cited study by Frey and Osborne (2017) predicts that 47% of US jobs are at high risk of replacement over the next two decades. The estimated risks of job replacement range from telemarketers (99%) to recreational therapists (0.28%).¹⁹ The study yielded similarly high results for countries in Europe, e.g. 42% in Germany (Bonin et al. 2015) and 35% in the UK (Knowles-Cutler et al. 2014). To put these numbers in perspective, these predictions are at the top end of job replacement estimations. A recent OECD study, by contrast, predicts that only 9% of jobs in OECD countries will become automatable, on average, in the near future (Arntz et al. 2016). As opposed to the occupation-based approach by Frey and Osborne, the paper uses a task-

¹⁶ This definition was coined by Keynes, whose often cited prediction was that we would see rising unemployment “due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour” (Keynes 1933).

¹⁷ See Cysne (2009),

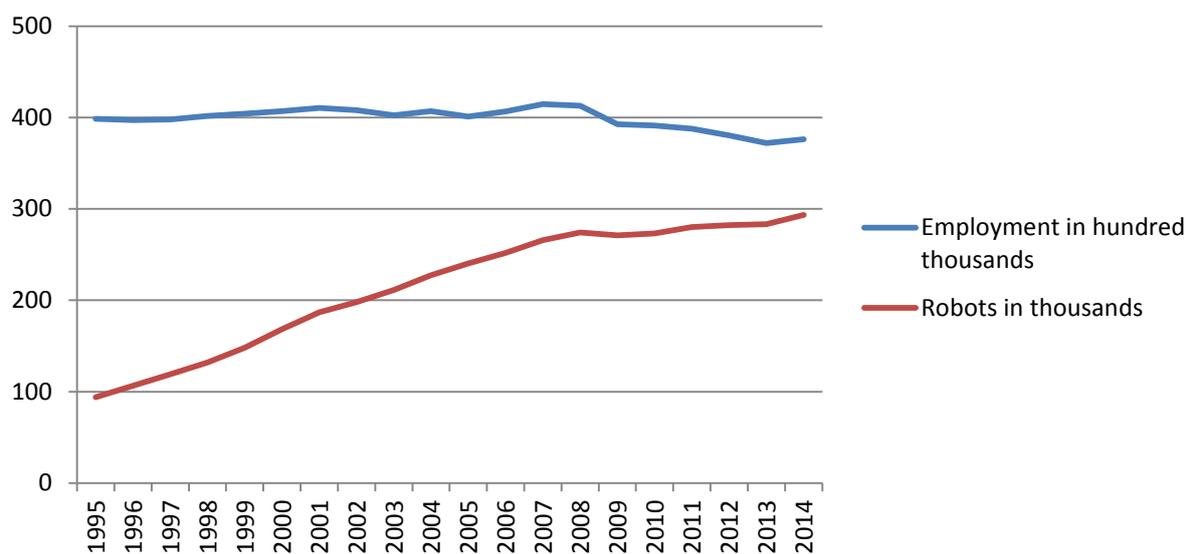
¹⁸ Between 1811 and 1817, a group of skilled textile workers under the leadership of General Ned Ludd “systematically smashed the kinds of machinery they saw as unfair to their craft and their trade” (Jones 2013). Ever since, Luddism symbolizes a global anti-technological philosophy associated with people fearing that machines will make their jobs superfluous.

¹⁹ The high risk category begins at 70%.

based approach.²⁰ The biggest problem with these predictions in general is that we simply do not know which technological innovations will occur, their potential magnitude²¹ and when.

There is mixed empirical evidence on current developments. Acemoglu and Restrepo (2017) have very recently published an empirical analysis on the labour market effects of industrial robots in the US. They find that an extra robot per 1,000 workers reduces the employment to population ratio by 0.18-0.34 percentage points. In the case of Europe, though, we used the IFR data and found a slight positive effect of robots on employment.²² Figure 4 shows that there is no negative relationship between robots and employment in Europe: while the number of robots has roughly tripled over the last two decades, employment has been slightly on the rise until 2007, before declining due to the financial crisis, with a picking up of total employment over the last couple of years.

Figure 4: Total number of robots and employees, selected countries and economic sectors, 1995-2014



Source: Author's elaboration on IFR (2016).

Note: Sectors are Manufacturing, Agriculture, Construction, Education, Electricity and gas, Mining and quarrying.

Consequently, it is not likely that the majority of jobs will be replaced in the near future, but there is evidence suggesting that automation will be a great challenge for employment. Technological advances can also create jobs 'through demand for new technologies and through higher competitiveness' (Arntz et al. 2016, p. 4). A typical

²⁰ In particular, it takes account of the fact that "workers within the same occupation often perform different tasks"⁴ and that a large share of workers perform a certain amount of non-routine interactive tasks which are difficult to automate (Arntz et al. 2016, p.25).

²¹ Brain emulations, for instance, could produce human brain copies that could perform almost any human job (see Hanson 2016).

²² The effect of $\ln(\text{robots})$ on $\ln(\text{employment in } 1'000\text{s})$ was $+0.014$ - and significant ($p < 0.05$). Time and country-industry effects are included in the estimations, and value added as a control variable.

argument is that millions of contemporary occupations would have been unimaginable a century ago, e.g. in IT and the service industries. But also in ‘old industries’ new jobs can emerge as a result of new technologies. New technologies often change workplaces without eliminating them, because workers then specialize in those tasks that are difficult or impossible to automate (Bonin et al. 2015, p. 23; Bessen 2015).²³

In this context, education and retraining for people in shrinking occupations is most important. A changing world of work seems inevitable, but a jobless future is not. Institutions, the possibility of human-machine collaboration and future inventions will be crucial determinants for the impact of automation on employment.

3.2 The decline of the labour share: capital-biased technical change

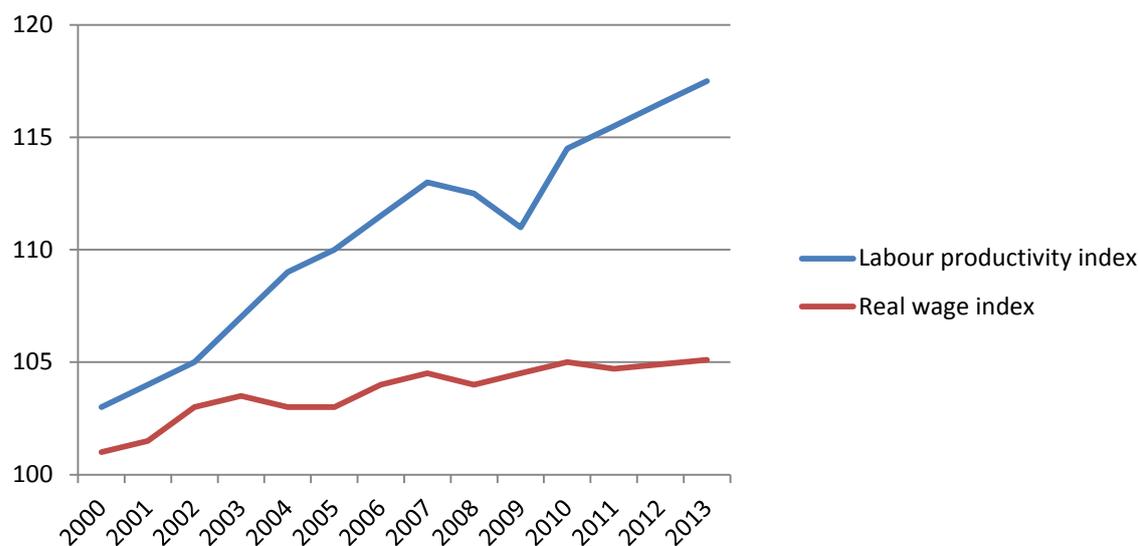
A fall in the labour income share is the result when automation increases the relative compensation of the input factor capital as opposed to labour. As capital income tends to be more unevenly distributed than labour income, inequality increases.²⁴ In economic theory, the stability of the labour share of national income has been a stylized fact and a fundamental feature at least since the early 20th century.²⁵ Recently, however, empirical evidence has strongly suggested that this assumption does not hold anymore. A decline in the labour share has been observed, beginning in the 1980s and taking place in the majority of countries and industries. Karabarbounis and Neiman (2014) calculate a decline in the global labour share of about 5% since the 1980s.²⁶ In 26 of 30 OECD countries the labour share significantly has declined – and the median labour share across the OECD countries fell from 66.1% to 61.7% between 1990 and 2009 (ILO-OECD 2015).

²³ For example, while the number of automated teller machines (ATMs) quadrupled from 1995 to 2010, bank teller employment actually increased slightly over the same period in the US economy – because employees switched tasks. Tellers were increasingly involved in “relationship banking” (forging relationships with customers), and also the number of bank branches rose due to efficiency gains (Bessen 2015).

²⁴ Data proves this relationship (Piketty 2014). Furthermore, a declining labour share is associated with negative effects on household consumption, private sector investment, government consumption and net exports (ILO-OECD 2015).

²⁵ E.g. Kaldor’s model of economic growth (Kaldor 1957) and Cobb-Douglas production function..

²⁶ Of the 59 countries studied by Karabarbounis and Neiman (2014), 42 exhibit a downward trend in the labour share since the 1980s. The IMF has also recently reported and analysed this trend (IMF 2017).

Figure 5: The relationship between labour productivity and average wages

Source: ILO-OECD (2015).

Note: The figure shows the development of an index for labour productivity and an index for real wages in 9 advanced G20 economies between 1999 and 2013 (1999 = 100).

The typical reason for a falling labour share is stronger growth in labour productivity than in average labour compensation.²⁷ In fact, since the industrial revolution, average wages have generally increased alongside labour productivity. But more recently, wages did not fully keep up with the productivity gains anymore (Brynjolfsson and McAfee 2014, p. 128; Sachs and Kotlikoff 2012), as shown in Figure 5.

Technology has been identified as an important factor for the diminishing labour share. In their cogent study about the global labour share decline, Karabarounis and Neiman (2014) conclude that about half of it can be explained by a decline in the relative price of investment.²⁸ These price changes are again due to technological innovations. Our empirical analysis, however, did show any effect of robots on the labour share in different industries and countries.²⁹ Other factors contributing to the labour share decline are (i) globalization, due to the entry of cheap-labour countries into the world economy and the possibility of offshoring, (ii) shift of focus to the shareholder value and away from workers and (iii) labour market institutions, e.g. when the bargaining power of workers abates (see OECD, 2015, pp. 9-10).

²⁷ Labour productivity measures the value of the output produced by workers per hour. Average labour compensation includes wages and benefits and basically means average wages (Ford 2015, p. 35). Other reasons for changes in the labour share can have to do with deflators for example (OECD 2015, p. 7).

²⁸ The price of investment goods relative to the price of consumption goods.

²⁹ The effect of $\ln(\text{robots})$ on the labour share was 0.003, with a robust standard error of 0.002 (not significant). The same dataset was applied as in the case of employment above.

3.3 The platform economy: talent-biased technical change

The internet, often thought of as an empowering invention that is globally equalizing opportunities, actually tends to produce highly unequal outcomes in terms of income distribution. Internet-based innovations make it possible to leverage people's talent via digitalization at almost zero cost to generate large income. This phenomenon, called "talent-biased technical change", poses an aggravated risk of obtaining an isolated elite at the top of the income distribution.

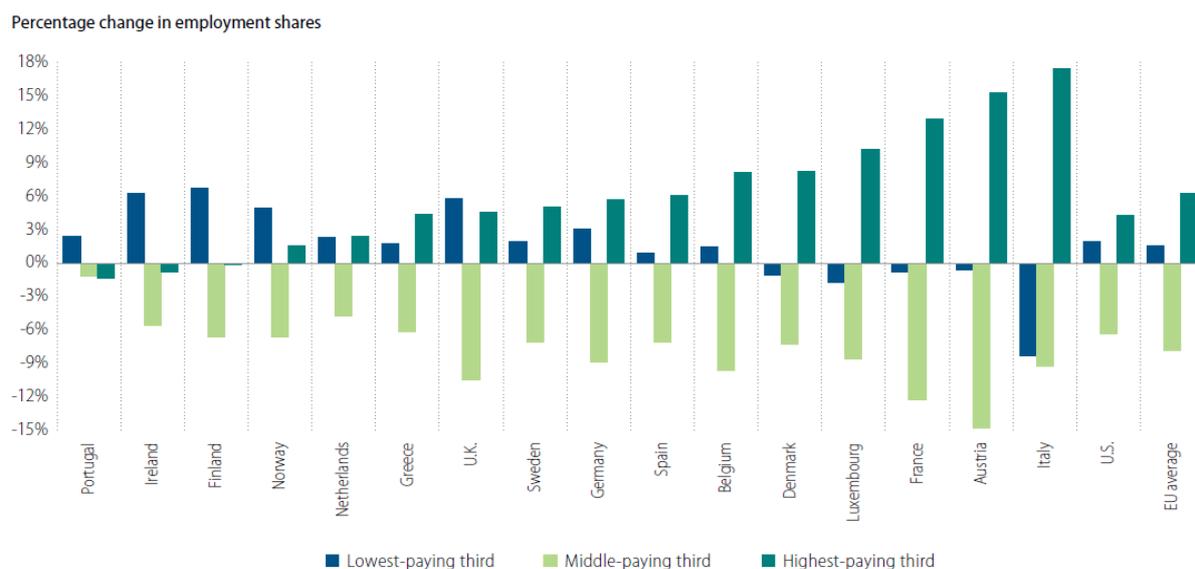
The implication of talent-biased technical change is that relative rather than absolute performance becomes the determinant for success. This phenomenon can be observed among individuals and among companies, since digital technologies make it possible for firms to generate income from every point of the distribution, i.e. a 'winner-take-all distribution' (Ford 2015, p. 78) having a significant impact on income distribution as less beneficiaries would reap most benefits.³⁰ This is made possible through several reasons: First, digital products can cheaply be replicated, enabling very high economies of scales for digitizing firms. Second, almost every consumer can easily get access to the products - only an internet connection is required. On the other hand, some digital goods also generate large economies of scale on the demand side. This is the case for networks (or platforms) like Facebook or Airbnb, because they exhibit network effects: the utility a consumer derives from the product increases with the amount of other people consuming the product (see Katz and Shapiro 1985). Thus, the platform economy will likely be important in the debate about automation and inequality, but empirical evidence is still largely missing (Allen 2017; Schor 2017).

3.4 The wage distribution: skill-biased technical change

Automation can impact different workers differently: by making high-skilled workers more productive but substituting for low-skilled workers, automation may add to inequality in the wage distribution. The basic concept behind this is a rising skill-premium (Autor et al. 2008; Katz and Murphy 1992). By increasing the relative demand for more skilled workers, technological advances also rise the *premium* for education. Empirical evidence proves that current technology induces such skill-biased technical change (Autor et al., 2008; Carneiro and Lee, 2011). Recently, though, a more nuanced phenomenon has been documented: job polarisation (Autor 2010; Goos et al. 2014). It refers to the decline of the middle-class due to the concentration of jobs in both low-skill sectors (e.g. food preparation, cleaning) and high-skill sectors (science, consulting). Job polarisation has been documented clearly especially in the US (Autor 2010; Goos et al. 2014), but also in Europe (Figure 6) between 1993 and 2006.

³⁰ When a firm offers a digital product that is only slightly better than those of its competitors, most consumers will likely only buy its product. The other firms will struggle to sell their products at all.

Figure 6: Job polarisation in Europe and the US



Source: Autor (2010).

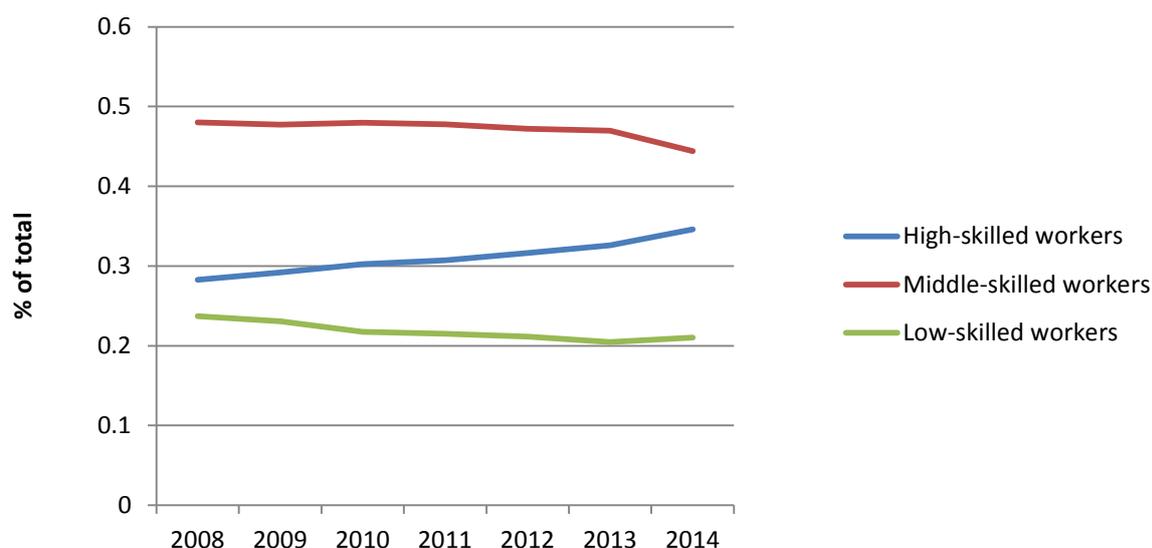
Note: The diagram demonstrates the development of employment shares, grouped into three categories, between 1993 and 2006. In every country displayed the middle class has shrunk.

School education and life-long training play a crucial role in preventing labour market polarisation. The most common explanation for labour market polarisation is the replacement of routine³¹, middle-income jobs by increasingly intelligent machines (Autor 2010; Goos et al. 2009). Often routine tasks can be accomplished by machines with sophisticated algorithms following explicit programmed rules (Autor et al. 2003; Frey and Osborne 2017). Typically, these jobs are rather middle-income than low-income jobs³² – for example an assembly line position of a large automotive manufacturer will more likely be automated than a local food vendor. Especially during recessions, middle-class jobs fall victim to saving measures or cost cuts, while jobs are created in low-wage sectors (Jaimovich and Siu 2012). As a consequence, education plays a central role in preventing these gaps between different skill groups. People need the opportunity to acquire new, demanded skills to prevent falling into the low-wage category. With the right skills, workers may collaborate with machines instead of being replaced by them. Besides technology, other potential factors of job polarisation are: (i) offshoring, as particularly routine tasks are moved to countries with cheap labour (Goos et al. 2014; Ottaviano 2015) and (ii) labour market institutions, as the bargaining power of workers has weakened over the past decades (Fernández-Macías and Hurley 2014).

³¹ A task is routine if it follows well-defined procedures and requires methodical repetition.

³² Routine middle-income jobs include manufacturing jobs, but also clerical and administrative work in the service sectors (Fernández-Macías and Hurley 2014, p. 16). It has also been observed that intelligent machines face high difficulties with seemingly simple tasks. More concretely, while they perform well at high-level reasoning and analytical tasks, robots have very low sensorimotor skills, i.e. those that require “sensing the physical world and controlling the body to move through it” (Brynjolfsson and McAfee 2014, p. 29).

Figure 7: Employment shares of different skill levels



Note: Author's elaboration on EUKLEMS data (Jäger 2016). Low-skilled workers are defined as those without a high-school degree. Middle-skilled workers include those with a high school degree plus those with some college education and those with non-academic professional degrees. High-skilled workers include those with a college degree and above.

Our estimations using the robotics data do not confirm the job polarization hypothesis.

We found neither a significant negative effect of robots on the employment share nor on the wage share of middle-skilled workers.³³ The figure below also demonstrates that the share of middle-skilled workers has hardly declined between 2008 and 2014, whereas the number of low-skilled workers declined relatively to the number of high-skilled workers. Thus, our analysis provides evidence against automation driving job polarization in Europe.

Manufacturing or routine occupations are not the only ones at risk. The most recent advances in artificial intelligence are not only reaching for routine, middle-income jobs, but also for typical white-collar and high-skill jobs. New intelligent machines – often through machine learning³⁴ - are capable of financial trading, conducting research, diagnosing diseases or even creating music and art (Ford 2015, pp. 104-115). As these new technologies also put non-routine jobs at risk, one should observe closely whether job polarisation and skill-biased technical change will persist in Europe – and which occupations are most at risk.

³³ Robust standard errors were employed, time and country-industry effects are included in the estimations. Control variables: Value added and employment. The independent variable was $\ln(\text{robots})$ and in a second estimation robot density (defined as robots per 1,000 employees). The effect of robots on the employment shares of low- and high-skilled workers was inconsistent, regarding whether $\ln(\text{robots})$ or robot density was included as the independent variable.

³⁴ A technique in which a computer churns through a large amount of (usually) unstructured data and “writes its own program based on the statistical relationships it discovers” (Ford 2015, p. 91).

4. Inequality of opportunity and some of its dimensions

Inequality can be seen from a different sociological and economic perspective, away from a view looking at differentials in income only. Luhmann (1975) defined inequality as exclusion from social systems, like education and power. Similarly, Sen (2006) looks at inequality studies as a way to understand the structures that prevent people from leading the kind of life they 'have reason to value'. In this context, the issue is that many people do not have the option to improve their welfare as they lack opportunities.

The issue of inequality can be tackled by levelling the playing field for individuals. This lack of income opportunities and life choices is related to growth, too. As highlighted by Bourguignon and Dessus (2009), it is not so much the inequality of income or consumption which is responsible for slow growth as the inequality of endowments, wealth in particular. Other factors include access to markets, income generating facilities and public decision making. Income inequality and slow growth are then consequences of inequalities in the areas where individuals find opportunities to generate income and increase their welfare. This is particularly relevant as inequality has been considered an autoregressive process, since the degree of past inequality affects present scale (Piketty 2014; Krueger 2012). In particular, exogenous factors like race, gender, birthplace, family background, explain a large percentage of income inequality at an aggregate level (Brunori et al. 2013) and chances of social mobility at the micro or individual level (Chetty et al. 2016; Rothwell and Massey 2015). From this angle, the inequality of opportunities (or inequity), affects with some time lag the inequality of income distribution. But it can also affect growth and the efficiency of the economy, through three main channels: (i) impediment to the realisation of individual economic potential (lack of access to income generating opportunities); (ii) persistence of inefficient institutions for public decision making, the regulation of the economy and justice (representing disincentives to effort); (iii) political tension and conflict preventing people from participation in public decision making (Bourguignon and Dessus 2009).

The impact of inequality of opportunity on growth is complex to assess, especially in developed countries. The multiple dimension of inequality does not allow identifying a single coefficient that can be related to the pace of economy growth in cross-country studies (Bourguignon and Dessus 2009). Instead, this relationship is more evident through micro-economic approaches showing that factors such as limitation in credit affects individual outcomes and potentially reduces economic efficiency at the aggregate level³⁵. As

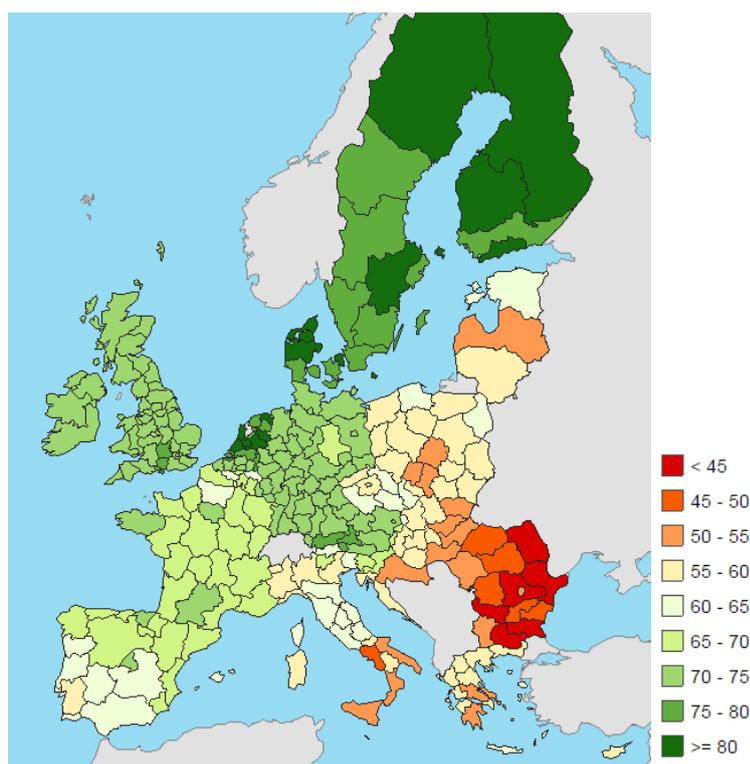
³⁵ See WB's World development report 2006

a consequence, a more evident relationship can be identified in poorly developed countries where public decision-making processes are controlled by restricted elites³⁶. In this section are analysed some factors such as geography, education, health and entrepreneurship can have a huge impact on personal success, productivity of economic activities and can reduce inequality on the long run.

4.1 Geography

The place where people and businesses are based matters for success. There are different scales in the relationship between inequality and space. First, income, income distribution and opportunities to increase personal income are diversified across countries, as shown earlier. Second, this differentiation is also evident across regions within the same country, even though fiscal policies and social transfers to correct for these inequalities are broadly the same. Third, territories and spatial segregation within cities also matter, with large inequalities both in terms of income and in terms of opportunity.

Figure 8 – EU Social Progress Index (2016)



Source: DG Regio.

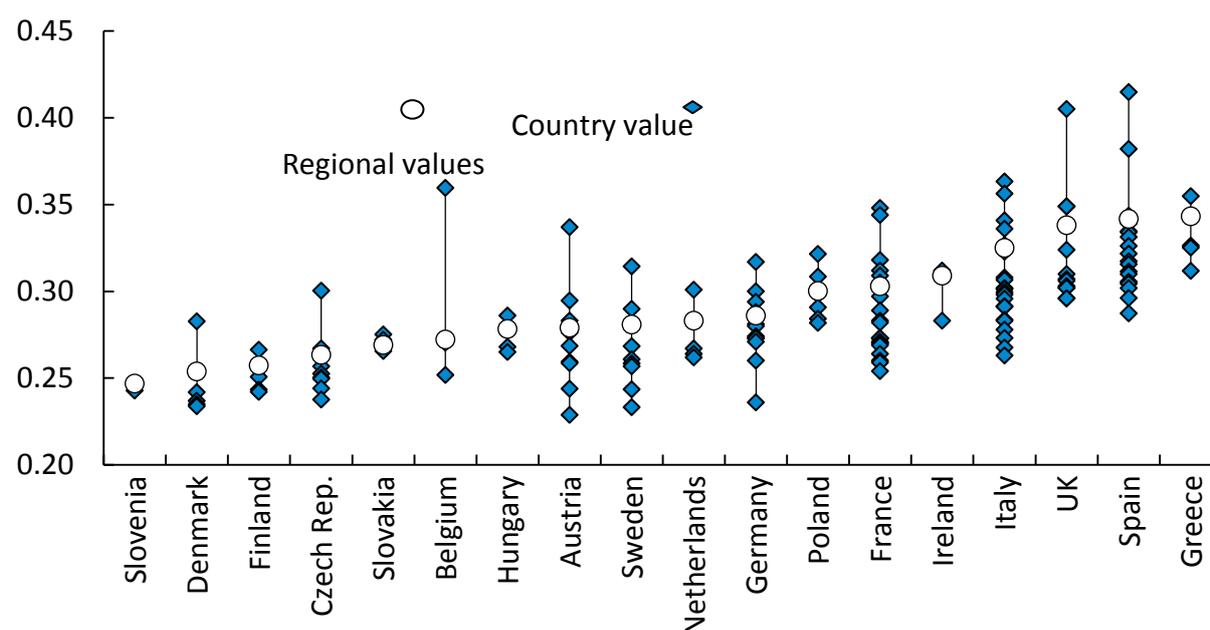
High GDP is no guarantee of social progress. Recently the EU Commission (DG Regio) has launched an attempt to measure the inequality of opportunity across Europe at sub-national level through the Social Progress Index (figure 8). Social progress is defined as the capacity of society to meet the basic human needs of its citizens, establish the building blocks that

³⁶ For poverty traps, see Ferreira and Bourguignon (2007)

allow citizens and communities to enhance and sustain the quality of their lives, and create the conditions for all individuals to reach their full potential. The index is divided in three pillars and takes into consideration Europe's NUTS2 regions. For the first pillar, basic human needs (water, sanitation, basic health, shelter and safety), most regions of Europe perform well, with the exception of those in Bulgaria and Romania. In the second pillar, foundations of wellbeing (basic education, access to information and environmental quality), performance is generally lower in the regions of EU-13, but not for education indicators. Finally, the opportunity pillar (including personal rights, tolerance and inclusion, access to tertiary education) registers low scores for most regions outside Northern Europe, with Italian regions and the ones in EU-13 performing worse (the latter in particular for tolerance and inclusion). Some of the most interesting findings are that a high regional GDP is no guarantee for high social progress and high unemployment does not go hand in hand with low social progress. While the basic human needs dimension increases significantly with GDP, the relation with foundations of wellbeing is far weaker. Another interesting point is that high social progress is highly correlated with regional competitiveness.

Many EU countries show large intra-national variation of inequality metrics. The analyses carried out by the EU Commission (EC 2014) and OECD (2016), show how wide regional disparities are in Europe for a multiplicity of dimensions, including economic performance, access to public services and well-being. Also income inequality is diversified within the same country, and this might lead to political and social tensions based on regional gaps. As shown in figure 9, reporting OECD countries' data, differences in Gini index across regions are larger than across countries. Differences are particularly prominent in Belgium, Austria and in Spain.

Figure 9 – Regional values of Gini index of disposable household income, 2013



Source: OECD regional statistics database.

Cities are hubs of economic activities and the places where inequalities are highest. Within the same country, metropolitan areas (in many cases the capitals) are the most developed region. In the OECD metropolitan areas have an income per capita 17% above their countries. But metropolitan areas host greater inequality than their respective countries, and inequality increases usually with size (Boulant et al. 2016). When income, jobs and health are considered together, differences in overall living standards in the different places within a country are starker than those in terms of income only, showing that different well-being outcomes amplify the concentration of prosperity or exclusion in regions (OECD 2016). In this context, an interesting point is that, since capital and larger cities are usually the most productive part of the national economy they belong to, urban policy becomes the most salient tool for the governance of the nexus between competitiveness and inequality.

Local conditions also play a role on access to income opportunities. Recent literature shows that these conditions, beyond individual or family factors, can affect a person's chance of achieving better results later in life³⁷. People living in disadvantaged areas often have lower quality public services, which undermines opportunities.

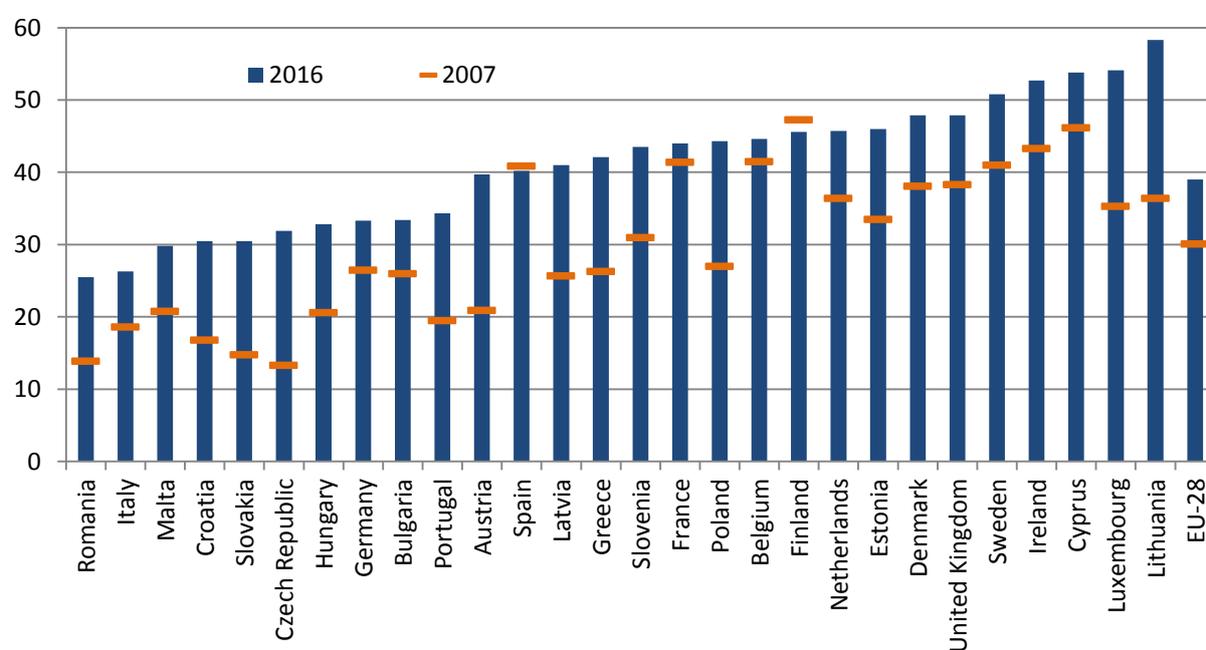
4.2 Education

Educational attainment is a key determinant of future earnings. Education is beneficial both for the economy (higher labour productivity) and to individuals (longer life, higher well-being). As stressed by Jerrim and Macmillan (2015), educational attainment is an important driver of the relationship between intergenerational mobility and income inequality, since higher income affects both access to education and returns of education. For these reasons, access to public education for children, regardless of the income of their parents, can be an equalising force by promote inter-generational earnings mobility and reduce inequality. This is particularly relevant in a context of economic and spatial segregation, with schools in better locations providing better education (Stiglitz 2015). Krueger (2012) shows how income inequality is strongly correlated to generational earnings mobility with the 'Great Gatsby curve'. In other words, in countries with high inequality future earnings are linked with family background. Instead, in countries with lower inequality, personal economic success is not dependent on family background.

³⁷ An analysis on the Netherlands, which is by many standards an egalitarian country, shows that children who grew up in the poorest neighbourhoods have, on average, adult incomes that are 5-6% lower compared to those who grew up in the most wealthy neighbourhoods, controlling for socio-economic characteristics (OECD 2016). Similarly, the average income of the neighbourhood where an American grows up has an impact on future earnings that is roughly half that related to parental income (Rothwell and Massey, 2015) and every year of exposure to a better socio-economic environment at the neighbourhood scale improves a child's chances of economic mobility (Chetty et al. 2015). Within a city the reputation of the place of residence has been found to affect the chances of getting a job interview (Bunel et al. 2015). The role of spatial segregation has been also analysed by Boulant et al. (2016), highlighting that the way cities are organised and the way they coordinate sector policies (such as housing, transport and land use) can help to make them more inclusive.

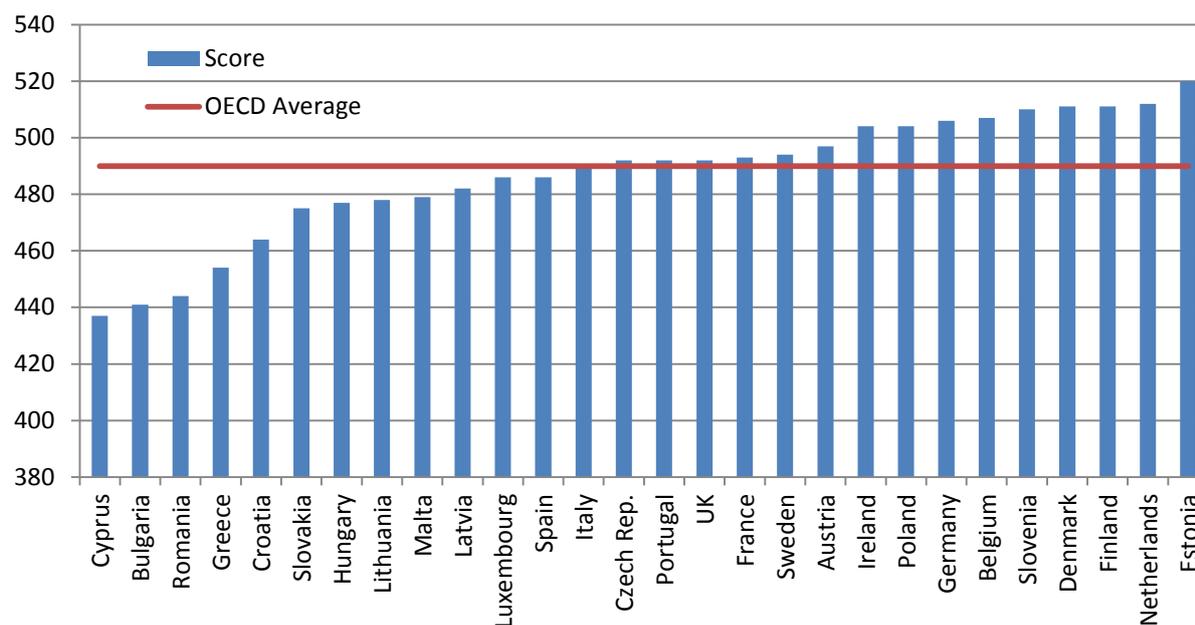
Access to quality and tertiary education is crucial for tackling inequality in Europe. Many countries have focused their educational policies on improving the educational outcomes of the lowest performers but this is not necessarily enough to tackle inequality since individuals with higher educational qualifications continue to benefit from wage premiums (McKnight et al. 2016). Programmes that favour access to primary education seem to work in a developed country context (see Heckman et al. 2013), but primary education in developed countries is not a crucial factor: in a context of skill-bias technological change, a broad access to tertiary education is the key for social mobility and for tackling inter-generational transmission of income inequality (Stiglitz 2015). In Europe, in particular, income inequality in the long run is related to a starting secondary and tertiary education inequality (Rodriguez-Pose and Tselios, 2009). As reported in this section, over the last few years there has been a rapid expansion in tertiary education across Europe, in line with the targets of the Europe 2020 strategy. However, many countries have reformed their educational models creating distorted access (McKnight et al. 2016). Looking at tertiary education, as shown in figure 10, the attainment for those aged 30-34 is particularly low in countries such as Romania, Italy, Malta and Croatia. Also in Germany young people register an educational attainment well below the EU average. Compared to the 2007 levels, large progress in this area is registered in Lithuania, Luxembourg, Austria, Czech Republic and Poland. Marginal decreases are registered, instead, in Spain and Finland.

Figure 10 – Population aged 30–34 having completed at least tertiary education



Source: Eurostat.

Figure 11 – Average PISA score in Mathematics, 2015.



Notes: only OECD member countries; Source: OECD.

A recent report by OECD (2016c) shows that high-quality mathematics education, and thus education policy and practice, are an essential part of the solution to redressing social inequality. Quality of education in mathematics in Europe, as reported in figure 11, is particularly low in a number of countries with relatively high income inequalities, in particular in Bulgaria and Romania. Overall, 13 EU countries are below the OECD average.

4.3 Health

Health is an essential aspect of well-being, but it also enhances opportunities to participate in the labour market and to benefit from economic growth. People with poor health are more likely to be unemployed and suffer more working disruptions than people in better health. At the same time, people with higher level of education and higher income tend to live longer in better health conditions than those with lower level of education and income.

People with lower income report, as shown in table 3 below, in all EU member states, more obstacles in accessing healthcare. From a policy perspective, greater emphasis on public health and disease prevention, as well as improved access to health services, can improve the health status and life expectancy of disadvantaged groups, and also increase their employment rates and social inclusion.

Table 3 – Share of people with self-reported unmet needs for medical examination by income quintile (reasons: too expensive, too far, waiting for too long), 2014

	EU	LV	EE	EL	PL	IT	RO	BG	CY	IE	PT	FR	LT	BE	FI
1st	6.4	25.5	11.0	15.3	9.8	13.8	9.9	11.7	8.5	4.2	7.3	7.4	5.7	8.7	3.8
2nd	4.0	13.5	10.2	14.5	7.9	8.8	7.2	6.0	6.7	3.8	4.8	3.3	2.6	2.9	2.9
3rd	2.9	9.7	9.4	11.6	6.5	5.5	5.8	4.0	5.2	5.9	2.1	2.2	2.3	1.9	3.0
4th	2.1	6.8	9.8	5.0	5.5	3.4	4.9	2.9	3.0	4.5	2.0	1.6	1.9	1.0	2.6
5th	1.4	3.5	9.7	1.2	4.7	1.8	2.4	1.6	1.2	1.9	0.4	0.7	2.9	0.3	1.9
Total	3.3	10.9	10.0	9.4	6.9	6.7	6.1	5.0	4.8	4.0	3.3	3.1	3.1	2.8	2.8

	HU	UK	HR	SK	SE	DK	DE	CZ	MT	LU	ES	NL	AT	SI
1st	7.7	2.2	5.3	3.9	3.3	3.8	3.3	2.7	2.2	2.4	1.8	1.8	0.3	0.5
2nd	2.6	1.8	2.4	1.8	2.4	2.3	2.2	0.9	1.8	0.8	0.7	0.6	0.3	0.1
3rd	0.9	2.7	1.5	1.4	2.1	0.8	1.1	0.5	0.7	0.4	0.5	0.4	0.1	0.3
4th	0.7	1.9	1.0	1.4	0.8	0.7	0.9	0.8	0.5	0.3	0.2	0.1	0.1	:
5th	0.2	2.4	0.7	1.3	0.6	0.9	0.8	0.3	0.3	0.3	0.1	0.1	0.0	:
Total	2.6	2.2	2.1	1.9	1.8	1.6	1.6	1.0	1.0	0.9	0.7	0.6	0.2	0.2

Source: Eurostat. Note: no data for 4rd and 5th quantiles of SI.

5. Inequality, politics and policies

5.1 Income inequality and redistribution policies

Income distribution varies across countries mainly because of policy decisions. While technological change and global trade through globalisation have played a role in widening the distribution of labour income, the large variation in income across countries is actually linked to differences in policies and institutions shaping income distribution (OECD 2012). One fundamental aspect is the way policy decisions are taken: as pointed out by Acemoglu and Robinson (2013), income inequality could lead to political inequality as access to policy making is biased towards those that have economic advantage. Persson and Tabellini (1994) argue that in a society with high inequality, political decisions are likely to generate less growth. Grigoli et al (2016) also show that the relationship between inequality and growth is correlated with institutional quality. In other words, control of corruption, rule of law, and government effectiveness can reduce the negative effect of income inequality on economic growth.

Fiscal policy, through taxes and benefits, can make distribution of income less unequal and promote development at the same time. Besides more direct effects (such as financing pensions, education and health), fiscal policy has also a more indirect effect on inequality by providing resources for growth-enabling infrastructure that can increase social equity and promote inter-generational mobility. The impact of such measures is not negligible: in developed countries, Gini after taxes is usually 25% lower than before taxes, while poverty is 55% lower after taxes.

Beyond its primary targets, fiscal policy faces many trade-offs between efficiency and redistribution, in the context of the debate on the relationship between inequality and economic growth. Different taxes have different redistributive impact, depending on their size, their combination and their progressivity, as well as their impact on growth ([see Annex 1](#)).

The most efficient way to achieve fiscal redistribution is through personal income taxes (rather than consumption) on the revenue side and targeted transfers to poor households on the expenditure side (IMF 2014). As shown by OECD (2012) household taxes are a primary policy tool in more unequal countries, which tend to redistribute more through this category of taxes than more equal ones. At the same time, countries where taxes are higher tend to have less progressive household taxes.

Fiscal policy might affect economic growth if high taxes and transfers generate a waste of resources and aggregate inefficiencies. For instance, marginal tax rates on income might be a disincentive for investing in human capital or for entrepreneurship. Corporate income

taxes can have impact on capital accumulation and productivity. A way to increase the efficiency could be to shift taxes from income to less-distortive taxes such as property and consumption, but this would create a trade-off with redistribution since income taxes are progressive. This trade-off, however, could be compensated by the expenditure side of fiscal policy through targeted transfers.

There are only a few policies options that can achieve a double dividend, both having a positive impact on inequality while supporting growth (see table 4), albeit the magnitude of both effects depends on the progressivity and size of each measure, on the characteristic of income distribution in the country and on the mix with other policy tools.

Table 4 – Policies with impact on inequality and growth

Double dividend	Ambivalent	Trade-off
> Human capital accumulation, promoting access to education	> Unemployment benefits	> Strict collective wage agreements
> Overcome labour market dualism	> Minimum wages	> Shift from labour and corporate income taxes to consumption and real estate taxes (without compensation for the poorest groups)
> Increase labour market participation (e.g. women, migrants, disabled)	> Capital taxes	> Moving from social security contributions to consumption taxes
> Reducing tax reliefs for wealthier groups and VAT exemptions		
> Improve functioning of tax and welfare administrations		
> Replace universal subsidies with targeted subsidies		
> Urban policies for inclusiveness		

Most win-win measures are not necessarily confined to fiscal policy only, as they need a more complex policy-mix to achieve the double dividend (e.g. integration of migrants, larger participation of women in the labour market). Targeted measures have usually a reduced fiscal burden compared to universal measures and achieve a distributional objective in a more efficient way. However, adequate administrative capacity should be in place to design, implement and assess the policy mix including targeted measures.

The policy response in times of crisis is a crucial inequality driver. One of the recent research questions has been whether fiscal consolidation in response to the crisis has fostered inequality through its impact on distribution of market disposable income, via the channels of unemployment and reduction of welfare spending (IMF 2014; Rawdanowicz et al. 2013; Ball et al. 2013; Avram et al. 2013; Agnello and Sousa 2012). Ball et al. (2013) show

that consolidation usually leads to a decrease of output and employment, driving a contraction of wages³⁸. As wage is the largest component of income for lower-income groups, an increase of market income inequality is observed (Jenkins et al 2011). But this is not the only channel. As mentioned earlier, fiscal policy composition and its changes over time have a direct effect on income distribution, combined with the magnitude and presence of social safety nets. As a consequence, the distributional effects of fiscal consolidation measures depend on the specific instruments chosen and whether these instruments reinforce regressive tools or weaken progressive ones. There is some evidence that spending measures, by reducing social transfers, affect more inequality than tax measures (Agnello and Sousa 2012; Ball et al. 2013). However, progressive taxation and targeted social benefits and subsidies in a context of a decline in public spending can help offset some of the adverse distributional impact of consolidation (Woo et al 2013). Moreover, fiscal policy can also support long-term growth by preserving spending for education and training among low-income workers (ibid.).

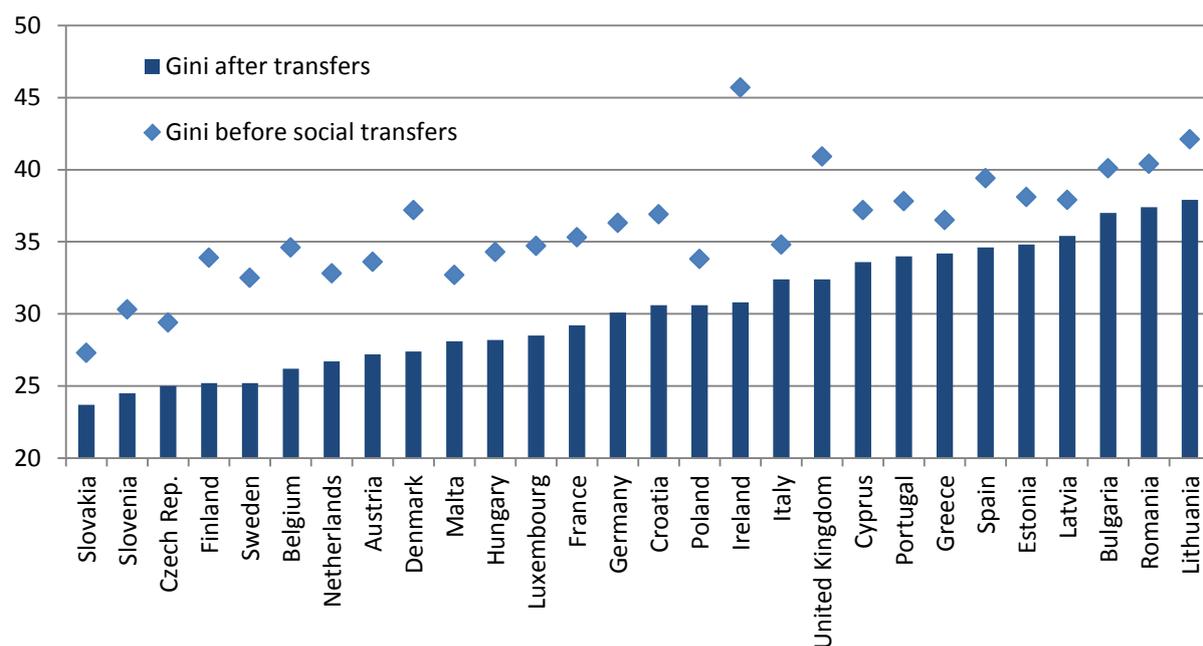
5.2. The impact of the crisis on inequality trends

Inequality might be both a cause and an effect of economic and financial crises. As mentioned in previous sections, inequalities in income distribution may create incentives for people to improve their situation through work, acquiring new skills or start new economic activities. However, income inequalities are often linked to lower growth and to social distress.

Labour income inequality is largely determined by differentials in wages, worked hours and inactivity. In Europe, these dimensions are extremely diversified across and within Member States. As shown in figure 12, the most equal countries are central European (Slovenia, Czech Republic, and Slovakia) and Nordic (Finland and Sweden). At the other end of the spectrum, the Baltics, Romania and Bulgaria are the countries where income inequalities are the largest, followed by the southern Member States. In many countries, as shown by the gap between the Gini calculated before social transfers (not including pensions) and after social transfers, the welfare system is responsible for a large reduction of inequality. This is in particular the case of Ireland (gap of 14.9 points), Denmark (9.8) and Finland (8.7). Instead, only a modest reduction of inequality is achieved through transfers in most countries where inequality is high, in particular in Greece (2.3 points) and Latvia (2.5).

³⁸ According to Ball et al. (2013), on average, consolidation of 1% of GDP generates an increase of long-term unemployment rate of 0.6 percentage points and raises by 1.5 points the Gini within the five years. The authors have assessed the distributive consequences of over 170 episodes of fiscal consolidation in OECD countries.

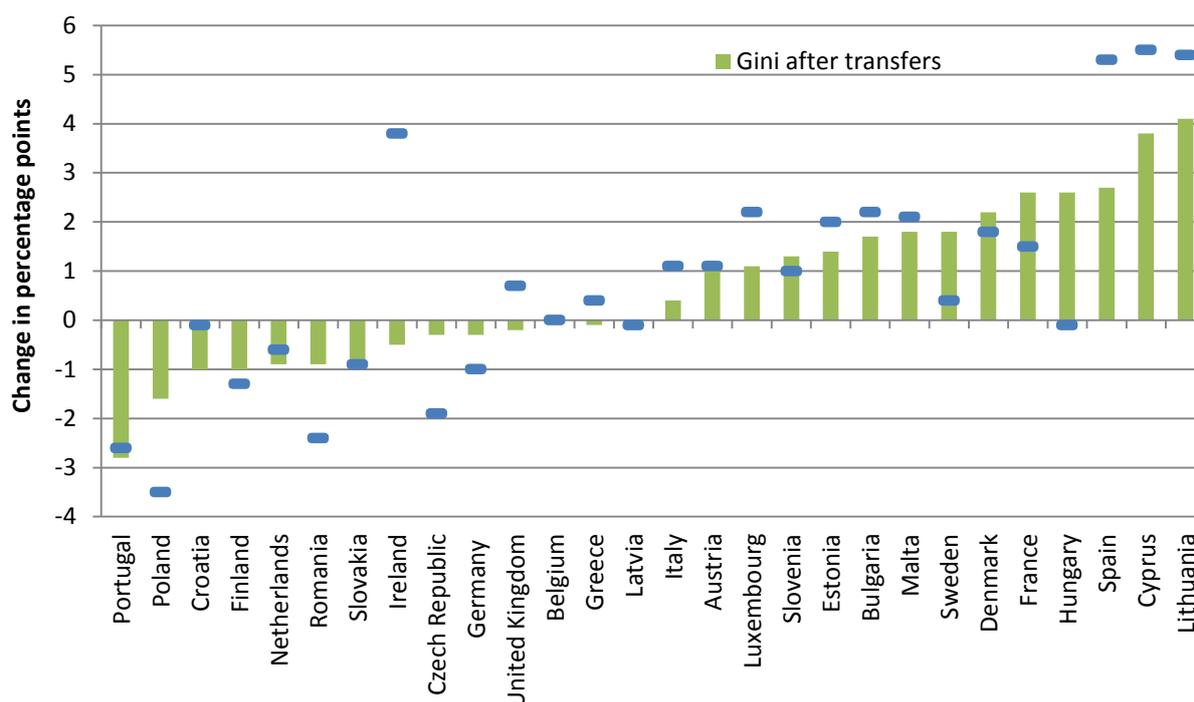
Figure 12 - Gini index (.00) after and before social transfers, 2015



Data source: Eurostat database.

European welfare systems have performed in a differentiated way during the crisis. As mentioned in previous sections of this paper, the Gini index in Europe has not changed remarkably over the last years in Europe. However, changes are considerable in some countries, with an increase of inequalities in France, Spain, Lithuania, Cyprus, and – albeit from low levels – Denmark, Sweden and Slovenia. Instead, income inequalities have decreased in particular in Portugal, the Netherlands, Finland and in Romania. Figure 13 reports the changes between 2007 and 2015 of the Gini coefficient before and after social transfers, showing the redistributive impact of the expenditure side of fiscal policy (with the exception of pensions). In a number of countries social transfers had a more limited impact in reducing inequality in 2015, compared to 2007. This is the case of countries that both witnessed a reduction in inequality with a decline of Gini (e.g. Poland, Romania, Czech Republic and Germany) and an increase (e.g. Hungary, Sweden, Denmark and France). Instead, in some countries the Gini before transfers increased markedly, but this did not correspond to an increase of the net Gini of the same order of magnitude (e.g. Ireland, Spain, United Kingdom), showing that social transfers had indeed an impact in reducing inequality or to limit the effects of market inequality. In a number of countries transfers did not have a significant distributive impact, for instance in Belgium, Latvia and Italy.

Figure 13 – Changes in Gini coefficient in 2007-2015 (before and after social transfers)



Data source: Eurostat database.

The policy mix in Europe has been moderately progressive in most EU Member States, partially contrasting market dynamics. Taking into account recent cases of fiscal consolidation, market income inequality increased over fiscal consolidation periods (IMF 2014; see also previous sections). However, adjustment measures contributed to a decrease of inequality or to offset partially the increase in inequality in a large majority of countries (in particular, in Romania, Portugal, Netherlands and Germany). Some measures are found to be progressive, in particular cuts in untargeted benefits and public sector wage cuts and, to some extent, increases in income tax. Instead, proportional reductions in pensions and increases in VAT are found regressive (*ibid.*). Clearly, the minimisation of the impact of fiscal consolidation on inequality depends on the extent of preservation of progressive measures. For instance, preserving progressive taxation might ensure the persistence of social transfers. Another possibility is to reduce regressive taxes and increase taxation of wealth and property.

Once again, European countries followed diversified paths of fiscal consolidation. Avram et al. (2013), by analysing nine European Countries implementing fiscal consolidation packages, show that the impact of these strategies on disposable income has ranged from 1% to 11%, with differentiated policy mixes across countries and the common strategy of VAT increase. While in Lithuania and Latvia the measures have been regressive, some progressivity is found in the fiscal consolidation packages of Greece, Spain, Portugal, Romania and (moderately) in Italy. However, in Spain the poorest were worse-off, due to a large increase (5 percentage points) of VAT between 2010 and 2012. In Greece the poorest 10% of the population was hit hard by the decline of the tax-free income threshold.

However, in Greece there was also an overall fall of disposable income and deterioration of living conditions, with a combination of wage cuts for civil servants, the significant reduction of social spending, rise in unemployment and limited coverage of the unemployment insurance system and health insurance system (Darvas et al. 2014).

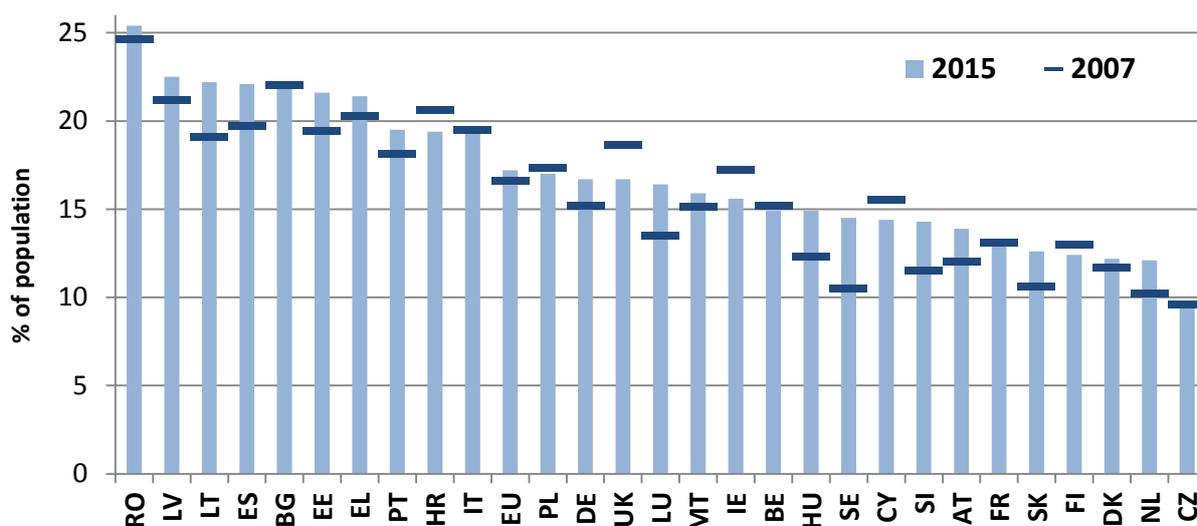
Table 5 - Share of national income by income quantile, difference 2007-2015, percentage points

	EU	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV
1st	-0.2	0.1	0.2	0.0	-0.3	-0.3	-0.7	0.0	-0.7	-1.2	-0.3	-0.5	-0.7	-0.2
2nd	-0.1	-0.1	-0.6	0.2	-0.7	-0.2	-0.5	0.5	0.3	-0.5	-0.6	0.2	-1.5	0.0
3rd	0.1	0.0	-0.8	0.1	-0.6	0.1	-0.1	0.2	0.5	-0.3	-0.7	0.1	-1.6	0.2
4th	0.2	0.1	-0.9	-0.1	-0.2	0.5	0.9	-0.6	0.5	0.2	-0.8	0.1	-0.7	-0.1
5th	0.0	-0.1	2.3	-0.2	2.0	-0.2	0.5	-0.1	-0.8	1.7	2.3	-0.1	4.5	0.0
	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK
1st	-1.0	-0.7	-1.0	0.0	0.0	-0.5	0.3	0.0	-0.3	-0.6	-1.1	0.1	-0.9	0.0
2nd	-1.1	-0.2	-0.8	-0.6	0.2	-0.3	0.3	1.0	0.6	-0.3	0.6	0.2	-0.5	0.1
3rd	-0.9	0.2	-0.2	-0.5	0.4	0.1	0.3	1.4	0.8	0.2	0.8	0.1	0.0	-0.1
4th	-0.2	0.6	0.4	-0.3	0.5	0.2	0.3	0.7	0.5	0.0	1.0	0.2	0.5	0.3
5th	3.2	0.2	1.6	1.4	-1.2	0.4	-1.2	-3.1	-1.5	0.8	-1.2	-0.8	0.9	-0.3

Note: 2014 for EU average, DE, EL, FR, IT, CY, LU, MT, PL, SK. HR not included. Source: Eurostat.

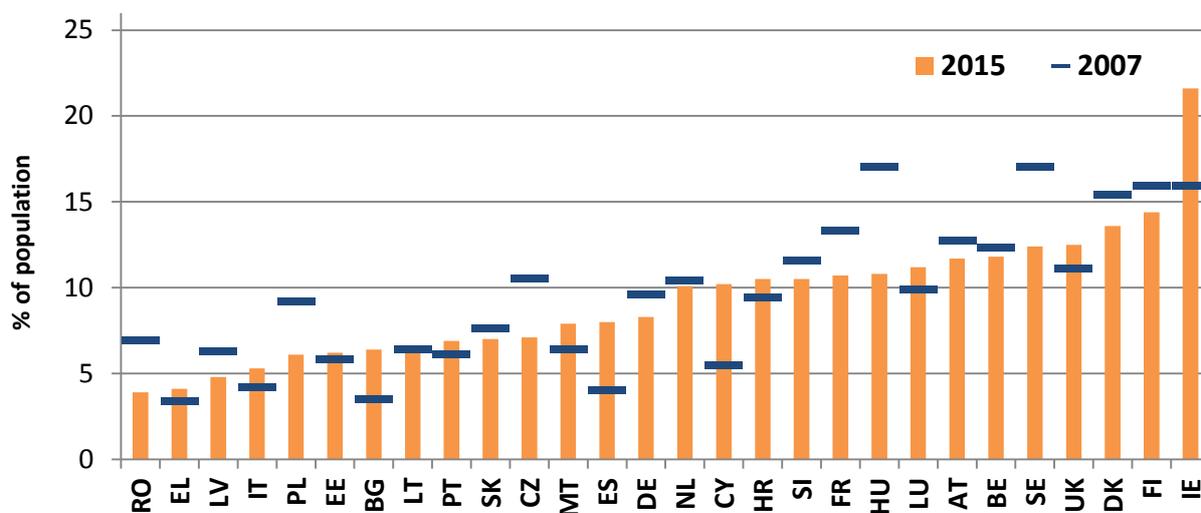
In many countries, the share of income detained by the highest quintiles increased. As shown in table 5, the diversified trend in inequalities can be associated in particular with the trend of the share of total income detained by the 1st and 2nd quintiles vis-à-vis the income of the 5th quintile of the distribution. In countries where inequality increased the most (Lithuania, Cyprus, Spain, Hungary) the fifth quintile of income distribution registered a remarkable increase in the share of total income, way above the respective lower quintiles. The opposite can be observed in Portugal, Poland and the Netherlands, where the 5th quintile has registered the most significant decrease. An important point here is that a fall in average income does not trigger automatically an increase in inequality through a worsening of the situation of the poorest cohorts: in Greece (and Portugal) the largest fall in share of total income is actually registered by the 5th quintile.

Figure 14 - At risk of poverty rate (after social transfers)



Note: 2014 for DE, EI, FR, IT, CY, LU, MT, PL, SK. 2010-2014 for HR. Source: Eurostat.

Figure 15 – Impact of social transfers on poverty



Note: difference in at risk of poverty rates before and after social transfers. 2014 for DE, EI, FR, IT, CY, LU, MT, PL, SK. 2010-2014 for HR. Source: Eurostat.

In a number of countries social transfers have not only lost some effectiveness in tackling inequality, but also lost their impact in lifting people out of poverty. A fall in average disposable income does not trigger automatically an increase in the rate of people at risk of poverty, since this rate is based on the number of people living below the national poverty threshold. Overall, in Europe, the share of population living below the at-risk-of-poverty line (60% of national median disposable income) after social transfers ranges from 10% to 25%. The EU average is 17% (24% without social transfers). At risk of poverty rates are particularly high in Romania, the Baltic States, Spain, Greece and Bulgaria. In these countries one person

out of five is below the poverty threshold. The impact of social transfers is very significant in a number of countries, but in particular in Ireland, where more than 20% of population is lifted above poverty line by transfers (and where, compared to 2007, the % of people below the line has actually decreased). The impact of welfare is very significant also in highly developed European countries such as Finland, Denmark and Sweden while it is particularly low in Romania, Greece, Latvia, Italy and Poland. Compared to 2007, the impact of social transfers has decreased in most EU member states.

5.3 The rise of populism: is income inequality a driver?

The connection between income inequality and populism has been long analysed in political sociology, mainly with a focus on authoritarian regimes of the twentieth century. In early analyses, support to these regimes have been seen as a reaction by the petite bourgeoisie, feeling a loss of social status, being squeezed between organised labour and elites in a period of structural change and market openness. In more recent studies, instead, authoritarian movements are thought to have gained political support among low-skilled blue-collar workers with low job security.

An 'inequality argument' has been used by many economists to explain the recent rise of populist parties, which has been connected with the effects of globalisation and concentration of wealth (Wolf 2017). This view is based on the fact that rising economic insecurity among those left behind (in particular low-skilled, unemployed and in general poorer native-born populations) has fuelled political resentment against the political classes and 'establishment elites' (Gros 2016), with little faith in traditional parties to respond to concerns for inequality, exclusion and insecurity (Hirsh 2016). This generates consequent vulnerability leading to in-group solidarity, rejection of outsiders and protection offered by authoritarian leaders (Inglehart and Norris 2016). One of the factors that made the growth of populist parties' support so overwhelming is the little resistance shown by traditional parties in contrasting it. This process has been taking place while the traditional electoral bases were eroded by growing secularization (weakening centre-right parties, see Norris and Inglehart 2011) and social individualisation and fragmentation (weakening centre-left parties, see Keating and McCrone 2015). Within the leftist side of the political spectrum, the weakening of the negotiating power of collective movements, vis-à-vis global corporations, has also played a crucial role in the reduction of the electoral base. At the same time, as reported by IMF (2014), the popular support for redistribution has increased over time, especially in countries where inequality increased and where the crisis was particularly severe.

The cultural backlash thesis proposes a different interpretation. As emphasized by Inglehart and Norris (2016) it would be a mistake to attribute the rise of populism to economic inequality alone: a key underrated reason is to be found in the retro reaction by

once-predominant sectors of the population (older, native, less educated in particular) to progressive value change (*ibid.*). These sectors have a higher vulnerability to populist appeal as they react to the erosion of their privileges and status. In this context, economic insecurity becomes a factor of second order for the rise of populist parties. As a matter of fact, populist parties are on the rise even in countries where inequality has not increased significantly in the long run (such as France³⁹), increased marginally (Austria) or within egalitarian, educated and secure countries (Denmark and Sweden). Under this assumption, compared to the past, western societies face more unpredictable contexts, with anti-establishment populist parties challenging the legitimacy of liberal democracy, and potential disruptions to long-established patterns of party competition (*ibid.*).

Inequality concerns can boost protest vote, in combination with other factors. Recently, the results of the Brexit referendum have been related to increased inequality in the UK, but there is not a single factor explaining the causality for the vote, and the picture is much more nuanced (see Darvas 2016). The UK has not experienced a large increase of inequality over the last fifteen years, but rather a slowing down of income growth, low intergenerational mobility (Corak 2013) and a generational divide in terms of living standards. As shown by Nolan (2016) the ‘remain’ vote by local area is correlated to employment, proportion of students and people with a degree, and social capital. Instead, the ‘leave’ vote is correlated to the change in non-UK born population and home owner population. There is no significant correlation, instead, with change in employment in manufacturing, hourly pay, change in median pay, proportion of non-UK born and old-to-young population (Nolan 2016). As highlighted by Darvas (2016) younger and better educated people voted for ‘remain’ in greater proportions and older and uneducated people tended to vote for ‘leave’. As a consequence, high inequality and poverty not only undermine personal well-being and social cohesion, but can also boost protest votes in referenda and elections (*ibid.*).

³⁹ See <http://www.chartbookofeconomicinequality.com/inequality-by-country/France/>

6. Conclusions: what can be done?

A lively debate on a multidimensional topic. This note has provided an overview of the recent debate on inequality, from a global and European perspective, and to provide a snapshot of the trends in Europe. Traditionally, a large part of the literature on growth and inequality focuses on economic inequality within and between countries and its impact on economic growth. More recently, the focus has shifted to the impact of globalisation, technological change, the crisis and the policy response to it.

The analysis on inequality of opportunity appears to be particularly interesting for multilateral development banks. Access to the underpinning ingredients for individual success such as the availability and quality of basic services, finance, possibility to develop skills and knowledge, being in good health, participation to policy making are key drivers of personal income growth. As reported in the 2006 World Development Report (World Bank 2006), inequality of opportunities prevents economic agents from fully expressing their economic potential, reducing economic efficiency and slowing growth. From this angle, inequality of opportunities or inequity is responsible both for slowing down growth and high income inequality, representing a cost for society (Bourguignon and Dessus 2009). Most importantly for EIB, tackling inequality of opportunity for EU citizens and increasing the potential of the economy is a viable strategy given its mandate and the scope of its activities.

Quality of policies, institutions and reforms matter in shaping the income distribution structure and promoting growth. Win-win measures can deliver stronger growth and greater inclusiveness, but this is the result of a complex policy mix involving policy areas such as economic governance, labour market, education and skills, competition and product market regulation, innovation and entrepreneurship, financial markets, infrastructure and public services, development and urban governance. As stressed in this note, national fiscal policy is crucial for inclusiveness. Hence, national governments should adapt fiscal policies to avoid distortionary effects on lower income quintiles and tailor welfare systems to avoid social distress and increase their efficiency.

For the EIB, focusing on inequality of opportunity can bring considerable results in reduction of inequality in Europe. The evidence calls for reinforcing policies to enhance competitiveness and equality of opportunities, which should move alongside the efficiency of EU market. Key factors for individual success are related to the availability and quality of basic services (such as education, health), and the creation of favourable business conditions (business opportunities, business financing, a favourable market and the possibility to reach it). The three dimensions of inequality discussed in this paper (geography, education and health) are areas where the EIB has a relevant financing role in

Europe. An additional contribution is the support to cohesion policies in less developed regions of Europe. In fact, while intra-national welfare policies do not seem to support economic convergence across regions (see the long standing divides in Germany and Italy), investments in public services provision, infrastructure and education can promote competitiveness of less developed territories and the performance of their businesses. Probably one of the most obvious synergies is that investing in the education and skills of people at the bottom of the distribution will pay long-term dividends for the economy and enhance individual well-being.

An essential condition, though, is to increase the growth pace and enabling a job-creating business environment. Low growth generates fewer opportunities for individuals and more pressures and fewer resources for welfare systems. In a low-growth environment, economic agents would be more vulnerable to technological change. Upgrade skills for employees and innovation capabilities in businesses is therefore crucial to reverse the potential negative outcomes of the race between education and technology.

New technologies can cause income inequality through several and unexpected ways in Europe. Robots and other automation technologies compete especially with low-skill and routine jobs, while high-skill workers and capital owners mostly benefit from the productivity increases. Education is key when it comes to people whose jobs are threatened by automation – to help unemployed workers find new jobs as well as to prevent an increasing skill premium and/or job polarisation. Policy-makers should quickly focus on skills upgrade and on ways to reconcile technological innovation with welfare.

Annex – Fiscal policy measures and impact on income distribution: an overview

Among taxes, **personal income** ones tend to be progressive, since individuals with higher income fall into higher brackets, paying a higher percentage of their income in tax. Among others, Paulus et al. (2009) show the major role of income taxes both for redistribution and for poverty reduction in developed countries. In the OECD, personal income tax is not only the most progressive tax but has also increased its progressivity over time with policy changes (Jourmard et al. 2012).

Social security contributions, consumption taxes and real estate taxes, instead, tend to be regressive as they absorb a larger share of the income of poor households. Social security contributions are generally charged at flat or even regressive rates, and often only up to a contribution ceiling, resulting in a proportionately larger burden being borne by low-income workers compared to higher earning workers (Thomas and Picos-Sanchez 2012). Consumption taxes in the OECD are regressive when measured as a percentage of household income, while they are neutral or slightly progressive when measured as a percentage of expenditure. For this reason, preferential or reduced VAT rates should be assessed case by case, as reductions for non-economic reasons (such as cultural activities and products or leisure) actually benefit the rich cohorts more than the poor ones, both in aggregate and proportional terms (OECD-KIPF 2014). However, the impact of a reform in tax system increasing consumption taxes can be still progressive if the effects of the taxes are balanced by transfers (ibid.).

Real estate taxes are usually regressive, but this depends on their design. Regressivity is due, in many countries, to the fact that these taxes are designed as fares for access to local services. In this case, the amount of the tax does not increase significantly with income. Another explanation is that in some countries these taxes are paid by renters, which are on average less wealthy. Finally, retired people, that receive relatively little income, owe on average larger houses (Jourmard et al. 2012).

Tax reliefs tend to be regressive as in many cases benefit more high-income people. Instead, corporate taxes are usually believed to be progressive, by weighing on owners of capital benefitting from economic rents. However, as reported by IMF (2014), this view is debated as a large component of corporate tax burden is transferred on wages, with negative consequences on wage earners. Moreover, with high capital income taxes, some distortionary effects on savings and investment might be observed.

On the expenditure side, **social transfers (pensions and unemployment benefits)** are the main policy tool, in developed countries, for reducing income inequalities (IMF 2014). The OECD has shown that three quarters of the reduction in inequality induced by the fiscal system is due to transfers. Most of the transfers are actually pensions, which distribute mainly across the lifetime of contributors. However, the redistributive impact across people depends crucially on the design of the retirement system, with large variations across countries (see OECD 2013). Moreover, the

retirement system's progressivity is also influenced by the interrelations with income taxes and social security contributions for retired people.

Unemployment benefits also have a redistributive impact, but this depends crucially on their design. In general, these benefits are progressive and in the last years their progressivity has increased. However, analyses on these systems are difficult to carry out as these benefits are often combined with minimum-income programmes or other social assistance schemes.

Targeted cash transfers are usually progressive, but their efficiency is highly diversified across countries. In fact, programmes highly targeted at those in need are more efficient than transfers distributing income across the life-cycle of individuals. While family cash benefits for low-income groups are found to have a strong redistributive impact, some transfers, like disability benefits, increase the risk to create poverty traps for beneficiaries (Jourmard et al. 2012).

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Economics Department

 economics@eib.org
www.eib.org/economics

Information Desk

 +352 4379-22000
 +352 4379-62000
 info@eib.org

European Investment Bank

98-100, boulevard Konrad Adenauer
L-2950 Luxembourg

 +352 4379-1
 +352 437704
www.eib.org