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WORLD BANK REPORT
ON THE EUROPEAN UNION

Growing United

Upgrading Europe's Convergence Machine

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WORLD BANK GROUP

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Foreword

In 2012, even as the European Union was still struggling with the after-effects of the crisis, the World Bank's *Golden Growth* report reminded readers that "Europe has achieved economic growth and convergence that is unprecedented … by fostering a regional economic integration unique in both depth and scope, Europe has become a 'convergence machine.' By engineering entrepreneurial dynamism while balancing market forces with social responsibility, it has made 'brand Europe' globally recognized and valued. And by striking a balance between life and work, it has made Europe the world's 'lifestyle superpower.'"

During the crisis, as a member of the European Commission I would often use this quotation — and also quote more widely from the *Golden Growth* report itself as I sought to remind colleagues that Europe's strength rests in its unity. Today, as the continent rebounds from the depths of recession, these stories resonate once again. It is a good time to recall them and, in so doing, to remind Europeans that they are stronger together.

A decade after the last wave of accession, new Member States are experiencing some of the world's highest growth rates: Poland has leapt from middle-income to high-income status faster than any other country apart from South Korea. European firms are among the world's leaders in innovation, creativity and productivity: firms like Denmark's Coloplast in medical technology and Ireland's Perrigo in pharmaceuticals rank among the global elite in their fields. And the European Union blazes a path in social and environmental issues by committing to sustainable progress and upholding the rights of individuals both within and beyond its borders.

Yet, in spite of these accomplishments, European polity and society are suffering a malaise unlike any in recent history. Income insecurity nags and gnaws at families even while the data boasts of record low unemployment rates. While magazine articles extol the innovators who have grown their companies from brainchilds to behemoths, many small businesses struggle to stay afloat. Bucharest, Lisbon and Sofia are emerging tech hubs with global reach, but some regions in Romania, Portugal, Bulgaria and elsewhere in the EU are falling behind. As bold steps are being taken to lower the EU's carbon footprint, some of its citizens across Eastern Europe cough and splutter their way through smogs caused by industrial pollution.

In *Growing United*, the World Bank returns to examine these seeming paradoxes. The European economic experience has been used as an example for reforms across the world — not least by the new member countries that joined the Union in the last decade. For the World Bank as a global economic institution, therefore, it is important to ask this question: is the convergence machine no longer capable of raising the livelihoods and lifestyles of Europeans?

The answer, elaborated over the following pages, is less dire. The convergence machine still works. But it is not working for everyone. Europe is growing, but more needs to be done to ensure that it grows united. The convergence machine requires an upgrade — to enhance its power to adapt to a world that is changing faster than its creators could imagine.

The driving force in today's world — and which powerfully affects Europe and Europeans — is accelerating technological change. New products driven by internet connectivity, vast processing powers

and artificial intelligence are altering opportunities for firms. And the changing nature of work and the skills needed to succeed are changing opportunities for people. New products and jobs are refashioning aspirations and lifestyles for all.

This is the crux of the growing divide identified by this report. Many individuals and firms in Europe can and will prosper as a result of these changing opportunities. But many also view these evolving options with despair as the old certainties crumble. The convergence machine 1.0 has worked well for those who find themselves in the first category. Version 2.0 will need to work for all.

For individuals, the changing nature of work requires higher-order cognitive skills — not just mathematics and science but also creative thinking, adaptability and problem-solving. While many students with excellent education are well-placed to fill these new roles, the reality is that many others — especially those from poorer backgrounds — still lack even basic literacy and numeracy skills. As a result, socio-economic mobility is increasingly a challenge while family and place of birth becomes more of a determinant of success than ability.

Firms, meanwhile, need to be ever more nimble, to quickly avail of opportunities and to create or develop new niches opened by technology. Firms able to do this can grow fast, add deep value globally as well as locally and create large numbers of jobs. Many European firms are doing exactly that. Others are still handicapped by bureaucratic and regulatory obstacles, insufficient connectivity and inadequate competition. For firms caught in these traps, producing growth and jobs is almost an unattainable goal: staying small but surviving looks like the best strategy.

For both firms and individuals a convergence machine that works for all will need to provide equal opportunities to succeed. That means every European worker needs to have a basic level of skills and a labor market that facilitates easy and secure transition from one job to another as demands change. For firms, it means a level playing-field in terms of regulation and competition and a supportive environment for innovation and technology adoption.

Growing United argues that these are essential prerequisites to maintain and build upon the impressive results that Europe has achieved. And there's an urgency to act, before the schisms that have begun to manifest themselves are widened by the exploding pace of technological change.

The composer Felix Mendelssohn said, "The essence of the beautiful is unity in variety." This is so fitting for Europe. And this is why it gives me so much pleasure to introduce this report, which in many respects is a sequel to *Golden Growth* and a reaffirmation that the twin poles of Europe's strength are, and will continue to be, its diversity and unity.

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European Union Countries and Regions

Northern Europe		Denmark	DK
		Finland	FI
		Ireland	IE
		Sweden	SE
		United Kingdom	UK
Continental Europe		Austria	AT
		Belgium	BE
		France	FR
		Germany	DE
		Luxembourg	LU
		Netherlands	NL
Southern Europe		Cyprus	CY
		Greece	EL
		Italy	IT
		Malta	MT
		Portugal	PT
		Spain	ES
Central and Southeast Europe (CEE)	*North*	Estonia	EE
		Latvia	LV
		Lithuania	LT
	Continental	Croatia	HR
		Czech Republic	CZ
		Hungary	HU
		Poland	PL
		Slovak Republic	SK
		Slovenia	SI
	South	Bulgaria	BG
		Romania	RO

Abbreviations

AMECO	Annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs
CEDETOP	European Center for the Development of Vocational Training
CEE	Central and Southeast Europe
DB	Doing Business
DEIS	Delivering Equality of Opportunities in School
EPI	Economic Potential Index
EPL	Employment Protection Legislation
EQI	European Quality of Government Index
ESCS	Economic, social and cultural status
ESIF	European Structural and Investment Funds
EU	European Union
EU LFS	European Union Labor Force Survey
EUROMOD	Tax-benefit microsimulation model for the European Union
EUROSTAT	European Statistics
EU SILC	European Union Statistics on Income and Living Conditions
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
ICT	Information and Communication Technology
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
IT	Information Technology
LIS	Luxembourg Income Study Database
LiTS	Life in Transition Survey
MFF	Multiannual Financial Framework
NACE	Statistical classification of economic activities in the European Community
NRC	Nonroutine cognitive
NRCA	Nonroutine cognitive analytical
NRCP	Nonroutine cognitive personal
NRM	Nonroutine manual
NUTS	Classification of Territorial Units for Statistics
OECD	Organization for Economic Cooperation and Development
OF	Opportunities for firms
O*NET	Occupational Information Network
OP	Opportunities for people
PIAAC	Program for International Assessment of Adult Competencies
PISA	Programme for International Student Assessment
PPP	Private Public Partnership

RBTC	Routine-based technological change
RC	Routine cognitive
RM	Routine manual
RTI	Routine Task Intensity
SWIID	World Income Inequality Database
TFP	Total Factor Productivity
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
VAT	Value-added Tax
VET	Vocational Education and Training
WEF	World Economic Forum
WID	World Wealth and Income Database

Overview

Since its foundation more than 60 years ago, the European Union (EU) has become the modern world's greatest "convergence machine," propelling poorer, and newer, member states to become high-income economies, and delivering to its citizens some of the highest living standards and lowest levels of income inequality in the world.

Today, however, Europeans are increasingly recognizing that convergence is not automatic. Inequality among people has been mounting in many parts of the EU since the 1990s, as low-income Europeans have been falling behind in the labor market. And the productivity gap between Southern and Northern member states has been widening since the early 2000s. The EU is growing, but Europeans are not "growing united."

Why? *Growing United* argues that technological change, by revolutionizing product and labor markets, is slowing down the old convergence machine: technology offers ever-richer opportunities for well-skilled workers and frontier firms, while low-skilled workers and less productive firms risk falling behind. As a result, countries and regions that provide fewer opportunities for people to build relevant skills and a less supportive environment for firms to thrive are losing ground.

This calls for upgrading Europe's convergence machine, to seize the benefits of technological change for all Europeans. *Growing United* argues that the convergence machine, version 2.0, should focus on the convergence of opportunities for people and firms across the Union. It should support the capabilities of people (skills) and firms (innovation), and provide a level playing field for people and firms through "flexicure" labor markets and an enabling business environment.

The European Union has been a unique convergence machine

Over the past 60 years, the EU has delivered to its citizens some of the highest living standards in the world. The 2012 World Bank report *Golden Growth* (Gill and Raiser 2012) dubbed Europe a "convergence machine": trade and financing — fueled by the largest and deepest regional integration effort in recent history — generated convergence in living standards between member states. This, together with a strong enterprise sector and innovation, drove Europe to account for about one-third of world gross domestic product (GDP) with less than one-tenth of the world's population. Through the accession process, the convergence machine was particularly powerful for the EU's newest members. As the living standards of poorer countries converged to those of richer ones, so did the living standards of regions and households across Europe. And with the help of fiscal policy, the EU has managed to keep net income inequality at a much lower level than in the United States, despite having roughly the same level of market income inequality.

While the global financial crisis took a toll on the convergence machine, economic growth is now strong in most parts of the Union, and employment growth is bringing down unemployment to precrisis levels. The convergence machine is back in full swing in Central and Southeast Europe (CEE), where all countries are continuing to catch up in living standards with EU averages.

But there are signs of a growing divide across the EU

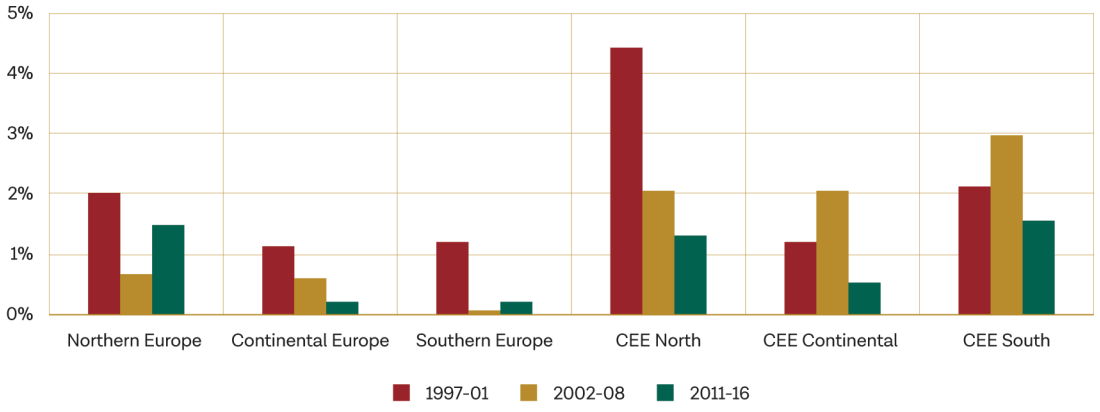
But 60 years on, the convergence machine is not working for everyone, as signs of growing divides are emerging across the EU. Two divides are increasingly evident and risk interfering with the workings of the convergence machine: first, there is a growing productivity divide between countries and regions; and second, household income inequality is increasing.

Europe has been experiencing a growing productivity divide between member states. In line with global trends, total factor productivity (TFP) growth has been slowing down everywhere in the EU. But the slowdown has been most pronounced in the Southern European countries, the previous convergence "stars" (figure O.1), while countries in CEE have been catching up, and productivity has been growing in Continental and Northern Europe. This matters because productivity levels in Southern European countries already lag behind their neighbors to the north. This has important implications for convergence in the EU, where the shrinking of the labor force and low levels of investment, more pronounced than in other advanced economies, are making long-term growth even more reliant on TFP growth.

Within countries, regional divides are widening. There are two types of lagging regions in Europe: low-income regions, with GDP per capita under 50 percent of the EU average (Bulgaria, Hungary, Poland, and Romania), and low-growth regions, where GDP per capita has not converged toward the EU average over the past decade (Italy, Greece, Portugal, and Spain). Recent World Bank research shows that these regions are lagging because of their low economic potential: their institutions are of poorer quality, they have a lower share of skilled workers, and they have limited access to markets (Farole et al., 2018). They also often have large and growing shares of elderly populations. Low-growth regions in Southern Europe are of greatest concern, as they are already diverging, but low-income regions in CEE run the risk of also becoming low-growth regions.

Figure O.1 Total factor productivity growth has been declining everywhere, but it has declined the most in Southern European countries

Total factor productivity growth, country group averages, 1997–2016



Source: Based on data from the AMECO database of the European Commission.

Household income inequality has been rising in most EU member states since the 1990s. Within-country household income inequality increased in most of today's EU member states between 1989 and 2013. The increase was most notable between 1989 and 1995, particularly in CEE countries, as a result of their transition from socialist economic systems. Inequality picked up somewhat after 2008, particularly in Southern Europe and CEE. The postcrisis recovery has not brought inequality down — in fact, it continues to grow in many countries. Average inequality in the EU is on par with the average in the Organisation for Economic Co-operation and Development (OECD), but most countries in Southern Europe and CEE already have inequality levels above the OECD average.

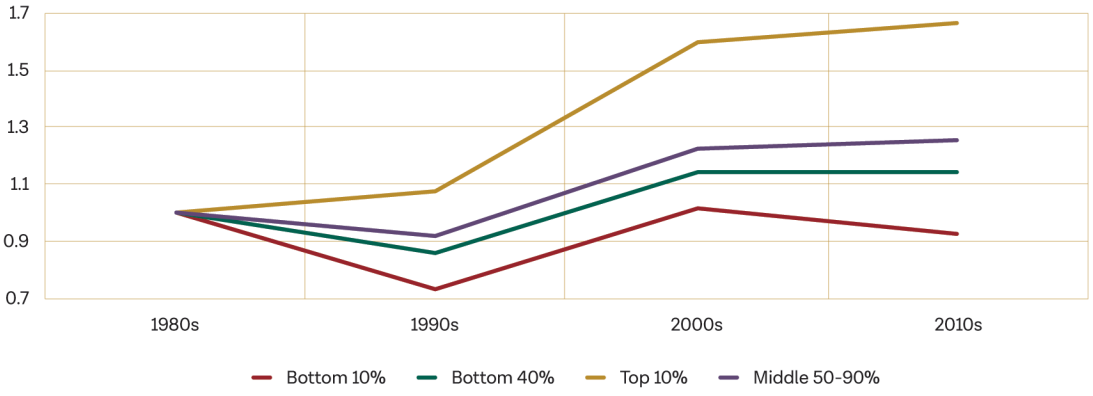
Low-income Europeans are being left behind in the labor market. The contribution of labor income to total inequality exceeds 70 percent in all countries. Per capita labor income has become more unequally distributed since the 1990s in most EU countries — a trend that intensified after 2008, particularly among countries in the south, where labor income inequality is already the highest. The increase in labor income inequality has been driven by the growing inequality between top and bottom individual earnings (figure O.2). In fact, low-pay workers saw their earnings decline during the 2000s, while middle-pay and high-pay workers saw increases. Earnings declined across the distribution between 2008 and 2014, but the drop was larger for the bottom 10 percent. The share of employed adults and earners, which are significantly lower at the bottom of the household income distribution, also dropped more for the bottom 10 percent between 2008 and 2014.

Growing inequality poses long-term consequences for economic growth because children from low-income households have fewer opportunities to thrive than do their more affluent peers. Checchi, Peragine, and Serlenga (2016) find that, on average across EU countries, two-fifths of the inequality in individual disposable labor income is explained by factors beyond the control of individuals. In some countries (such as Germany, Luxembourg, the Netherlands, and the United Kingdom), the ratio is as high as 50 percent. They also find that differences cross EU countries in inequality of opportunity are most strongly associated with how much countries spend on education relative to GDP, particularly at the preprimary level. Recent evidence shows that the relationship between inequality and economic growth is largely negative (for example, Grigoli and Robles 2017). This negative relationship works primarily through unequal opportunities for building human capital (OECD 2015). Indeed, many countries in the EU suffer from a skill divide: significant

shares of young people, mostly from poorer socioeconomic backgrounds, fail to achieve basic proficiency in reading, mathematics, or science.

Figure O.2 Low earners in the European Union have been falling behind

Trends in individual earnings by segment of the household income distribution, 1980s–2010s, index (1980s = 1), EU average



Source: Estimates using the Luxembourg Income Study (LIS) data.

Note: Figure plots individual earnings (indexed to the 1980s) in the median year of the 1980s and 1990s, and the most recent year of the 2010s, for different segments of the distribution of household disposable income per capita. EU averages include today's EU countries.

The convergence machine is due for upgrading

Accelerating technological change risks further widening Europe's divides — future convergence is not automatic. Europe's convergence machine is about the convergence of countries, regions, and households. Strong convergence between countries in the past drove convergence of household incomes and regions across the EU. However, Europe will not be able to sustain convergence with growing productivity gaps among countries and regions and increasing within-country household income inequality. *Growing United* argues that these growing divides are explained by the interplay between technological change and low opportunities for people and firms to thrive in some parts of Europe. Accelerating technological change offers ever-richer opportunities for well-skilled workers and frontier firms, while low-skilled workers and less productive firms risk falling behind. Technological change is thus boosting inclusive growth in countries and regions that provide many opportunities for people and firms to thrive, but it can be disruptive in places where there are few opportunities, thus generating divergence.

This calls for upgrading the convergence machine, to seize the benefits of technological change for all Europeans. How? By refocusing the convergence machine on promoting convergence of opportunity for people and firms.

Technological change stands out amid other "megatrends" as an increasingly potent source of opportunity and disruption. Technological change is neither a new phenomenon nor the only major force driving shifts in Europe's economies. Declining working-age populations are making productivity gains the main driver of growth (Bussolo, Koettl, and Sinnott 2015) and are inducing firms to adopt automation technology more intensively (Acemoglu and Restrepo 2017). Globalization has come with offshoring of production processes and associated jobs (including within the EU, from older to newer member states), leaving countries in the EU focused on increasingly more

sophisticated, higher-value-added activities. But the increasing adoption of automation technology will reduce the need to offshore some jobs. Looking ahead, technological change is likely to increasingly stand out as the most important, and least predictable, driver of economic development in the EU. EU countries need to prepare themselves for a significant acceleration of technological change because workplace automation and the increasingly cheap use of artificial intelligence and 3D printing stand to revolutionize activities in all economic sectors.

Technological change is not exogenous to national policies. Policies that shape opportunities for people and firms to thrive also influence the adoption of new technology by firms, including competition and labor policies, support for firms' technology adoption, and the skills of the workforce. And by creating more opportunities for self-employment, technological change is blurring the lines between people and firms. This generates greater complementarity between opportunities for firms and opportunities for people. But it also creates new tensions because, for example, social insurance institutions are built on the standard employment relationship between firms and employees.

***Growing United* proposes a simple framework for looking at the growing divides based on the principle of equality of opportunity for people and firms.** Under this framework, the potential of countries to grow inclusively is jointly determined by the opportunities for people and enterprises to thrive and contribute productively to the economy. The equality-of-opportunity principle is well established for people, and this report extends it to firms as well. Ultimately, it is about fairness: it implies the prosperity of people and firms should be determined by talent, effort, and entrepreneurship, not by circumstances at birth for individuals (for example, birthplace, parental education) or the enabling environment for firms, which are outside their control. Policies should therefore focus on equalizing opportunities and compensating for unequal circumstances. The equality-of-opportunity principle also involves allowing firms and people to move to places where opportunities are higher, be it in the same country or across the Union.

Using equality of opportunity as a policy principle would generate unbalanced growth, but that growth would be based on a level playing field — and complementary policies are needed to make growth more inclusive. Removing barriers to thrive for productive firms is good for economic growth, but not all firms will do equally well. The provision of equal opportunities for people to build relevant skills is good for growth and makes it more inclusive, but not all individuals will succeed equally. At the nexus, more productive firms will be able to generate more jobs and pay higher salaries, but the benefits would tend to accrue to high-skill workers while others could fall behind. Labor and social protection policies can reduce inequalities by supporting the employment of low-skill workers, and by providing a safety net to those who fall behind. The application of this principle shifts the policy focus of the convergence machine toward equalizing opportunities rather than leveling incomes and profits, maximizing the economic potential of regions and countries rather than convergence of GDP per capita, and supporting those who fall behind.

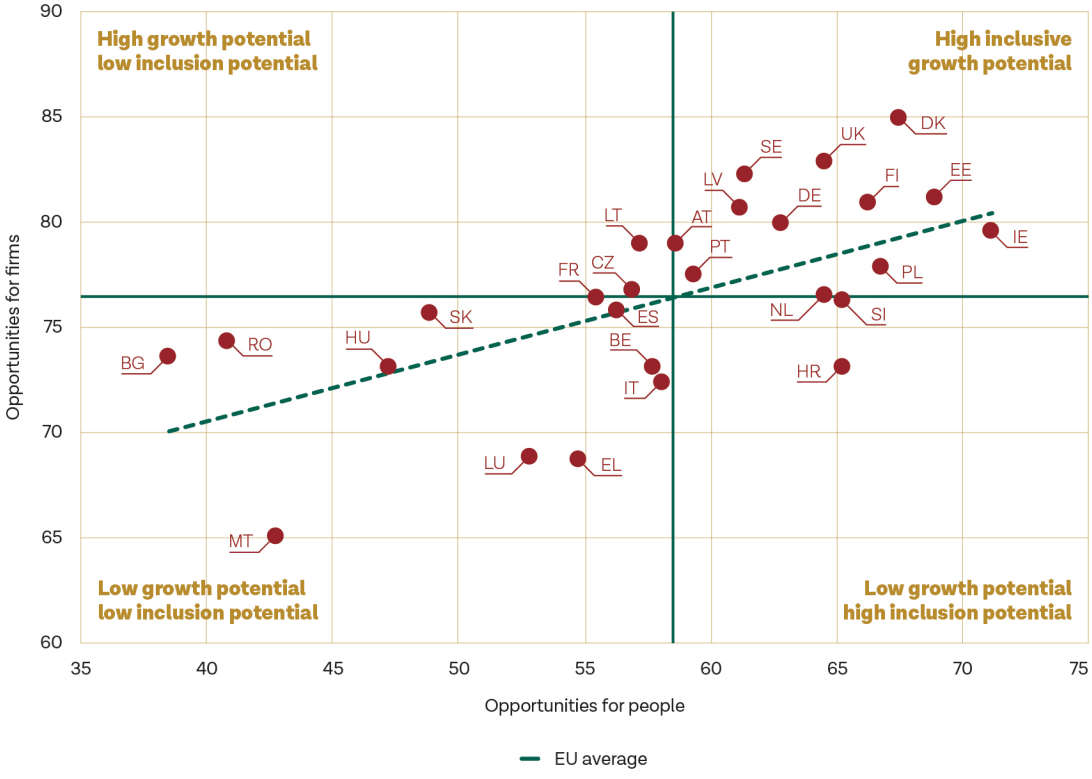
The framework can be illustrated by a two-dimensional space that maps opportunities for firms and people to thrive in each country or region and the resulting potential for inclusive growth.

- *Opportunities for firms* are determined by the business environment, supporting infrastructure, and the supporting environment for upgrading firms' capabilities through innovation and technology adoption. These opportunities result in a distribution of firms by TFP levels. A better business and innovation environment leads to a higher share of firms at the top of the TFP distribution. Burdensome business regulations lead to a high share of lagging firms.

- *Opportunities for people* include opportunities to build relevant skills and find good jobs, and second chances for people who fall behind. These opportunities mainly result in a distribution of workers by skill level. If there are many opportunities, it leads to a high share of high-skill workers, but few opportunities result in a high share of low-skill workers.
- Opportunities for firms and people are complementary and jointly determine the potential to grow inclusively. Over the long term, countries cannot sustainably emphasize one set of opportunities over the other. Having many opportunities for firms unmatched by opportunities for people would be neither economically nor politically sustainable. And having many opportunities for people unmatched by opportunities for firms would make people and firms move to places where they can thrive.

Figure O.3 maps EU countries into the opportunity space**.** It focuses on core and widely accepted measures of opportunities for firms and people: the business environment and skills. The quality of the business environment is measured by the Doing Business 2017 distance to frontier index.[1] Opportunities for people are measured by the percentage of students with basic competencies in the reading portion of the Programme for International Student Assessment (PISA) in 2015, corrected for inequality of opportunity (variation in student basic reading competency explained by socioeconomic status) and the proportion of early school leavers (people age 18–24 who only have lower secondary education or less and are no longer in education or training).

Figure O.3 The opportunities for firms and people to thrive determine the potential of countries to grow inclusively: countries in the North do well on opportunities, countries in the South do less well



Source: Calculations based on Programme for International Student Assessment (PISA) and Doing Business data.

Note: Cross-lines are European Union averages. Opportunity for people is measured by PISA reading scores in 2015, corrected for inequality of opportunities (variation in PISA scores explain by socioeconomic status of students) and the proportion of young people that leave school with at most lower secondary. Opportunity for firms is measures by the 2017 Doing Business distance to frontier index. See "European Union Countries and Regions" table for country abbreviations. Cyprus is not included as some key data were not available.

Opportunities for people and firms are indeed complementary. First, there are more complementarities than trade-offs between opportunities for people and firms, given that most countries are along the bottom-left or top-right space of figure O.3. Second, it is notable that the top-left space is virtually empty. This suggests that countries in the EU do not emphasize opportunities for firms over opportunities for people. Third, Croatia is the only country where good opportunities for youth to acquire foundational cognitive skills are not matched by good opportunities for firms.

Most Northern European countries, and Germany, Estonia, Latvia, and Poland are among the top opportunity performers: the vast majority of their youth — including those from disadvantaged backgrounds — attain basic competency in PISA reading, and their firms enjoy considerable economic freedom. Firms in Northern European countries and Germany also enjoy a supportive environment for innovation, making these economies productivity leaders.[2] These countries are characterized by a high share of technological frontier firms.

At the other extreme, many Southern and Central European countries are below the EU opportunity average. They are characterized by a high share of students below basic competency in reading, mostly from low socioeconomic backgrounds. They also tend to be characterized by more burdensome regulations and lower support for firm innovation, which generate too few top-performing firms and too many lagging firms.

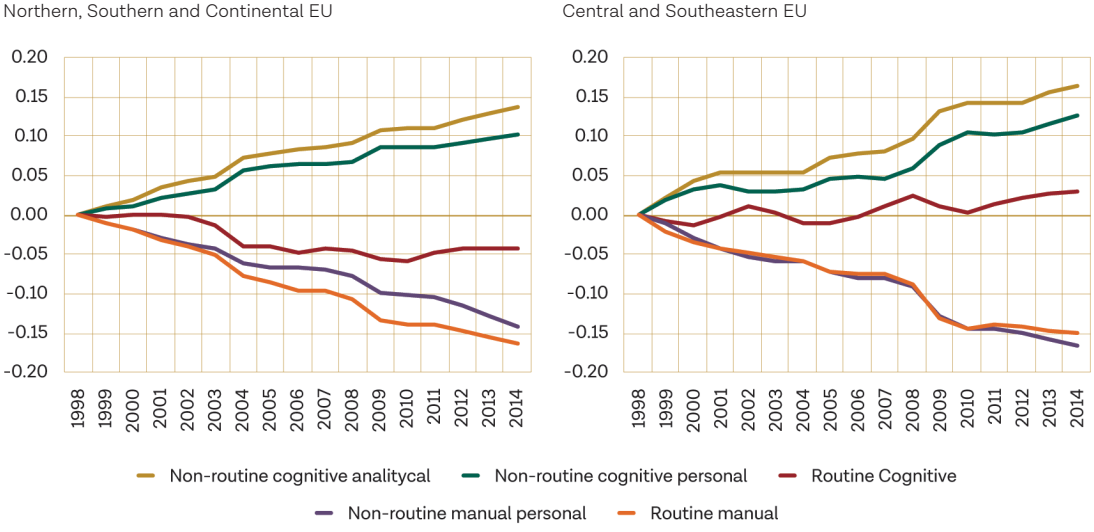
Accelerating technological change is generating growing divergence

Technological change is driving a wedge in product and labor markets by providing immense opportunities for some firms and workers while leaving others behind. The "future of work," in which technology takes over tasks once performed by humans, is already a reality in the EU. And Europe's frontier firms are among the global leaders in successfully driving, and taking advantage of, technological change.

Jobs across the EU are increasingly about cognitive and interpersonal tasks, while manual and routine tasks are declining (figure O.4). These trends have, for now, been less marked in Central and Eastern European countries, where routine cognitive tasks are still growing slightly, reflecting a less advanced stage of structural change. Technological change, offshoring and the skills upgrading of the workforce are big drivers of the changes in the task content of jobs. As a result of these changes, jobs are increasingly intensive in skills that complement technology (cognitive and social-emotional skills, see box O.1). Workers well equipped with these skills (high-skill workers) are benefiting from these changes, while low-skill workers are losing the most: the employment share of (mostly high-skill) workers in nonroutine cognitive jobs is increasing the most, and the share of (mostly low-skill) workers in manual jobs is declining (figure O.5). Thus, low-income Europeans are being left behind in the labor market because of their low skills, at a time when technological change and globalization are making jobs more skill intensive.

Figure O.4 Jobs are becoming more intensive in nonroutine cognitive tasks and less intensive in manual tasks

Occupation-specific task intensities, aggregated for each country and standardized over time, regional averages, 1998–2014

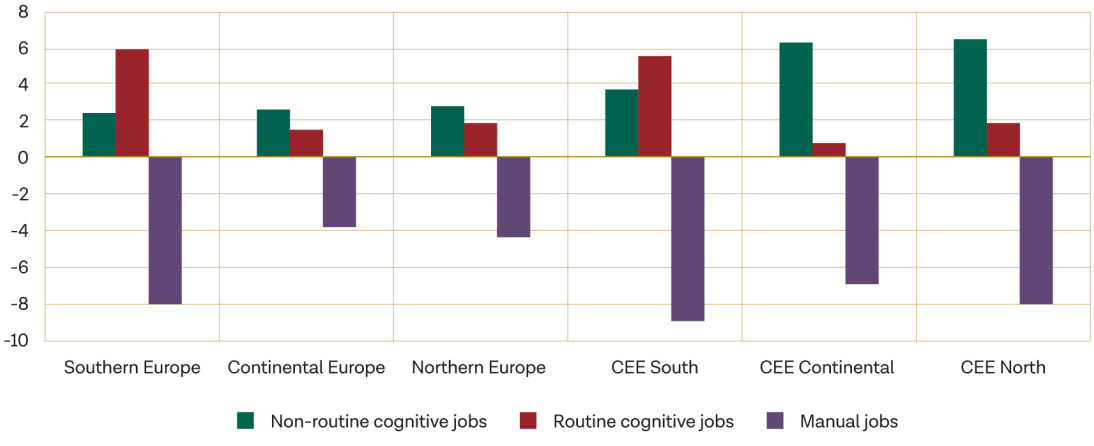


Source: Gorka et al. (2017a), commissioned for this report, using EU-LFS and O*NET data.

Note: Malta, Cyprus, and Luxembourg are excluded due to small samples. The intensity of each task is measured for each occupation, aggregated for each country and standardized over time (see chapter 2).

Figure O.5 Workers in nonroutine cognitive jobs are gaining and workers in manual jobs are losing everywhere

Percentage point changes in share of workers by job type, 1998–2014



Source: Gorka et al. (2017a), commissioned for this report.

Note: Jobs are classified by their most intensive task into nonroutine cognitive, routine cognitive, and manual.

Box O.1 What skills are needed for the age of automation?

Digitalization, workplace automation and increasing use of artificial intelligence in production have triggered a wide-ranging, and often alarmist debate about the future of work and increasing anxiety among workers in advanced economies, including in the EU about whether "robots will take away our jobs." While technological change may make certain types of jobs obsolete (Frey and Osborne 2017), they have not necessarily led to less demand for work on aggregate (Autor 2015).

Rather, the most important impact of technological change on jobs, is through shifts in the nature of tasks that workers will handle as part of their jobs — with increasing prominence of nonroutine and cognitive over routine and manual tasks (Autor et al. 2003; Gorka et al. 2017a). In other words, while the profession of electrician will likely persist, the nature of tasks an electrician does is evolving: today's electrician needs to use and adapt to fast-changing technology, solve problems and be client oriented.

As machines increasingly take over routine tasks previously performed by humans, today's (and tomorrow's) jobs are becoming ever more about nonroutine, cognitive analytical and interpersonal tasks. Success in this fast-changing labor market requires advanced *cognitive* skills (such as critical thinking and problem-solving), *social-emotional* skills (such as conscientiousness, goal orientation and ability to work in teams) and up-to- date job-specific *technical* skills (such as skills that enable an electrician to work as an electrician, but also digital skills). Strong cognitive and social-emotional skills make workers more complementary to technology and resilient to change by increasing their ability to learn and adjust, solve problems and interact well with people.

Cognitive and social-emotional skills are formed from a very early age. This means early childhood education, primary and secondary education provide the critical foundation for the subsequent continuous adaptation and upgrading of job-specific technical skills in subsequent vocational education, higher education and lifelong learning, in line with technological change. For this purpose, this report focuses mostly on cognitive skills.

As Europe's frontier firms thrive and take advantage of technological change, productivity differentials are widening. Research using firm-level micro data from OECD countries show that frontier firms are benefiting the most from technological change and globalization: productivity dispersion between firms is large and rising, as the most productive firms are pulling away and bottom firms are falling behind. This is also generating increased wage dispersion between firms (Berlingieri et al. 2017).

The impact of technological change on inclusive growth ultimately depends on the opportunities that countries provide to their people and firms. The impact of technological change on growth and inequality over the long term depends on the extent to which opportunities are provided today to all young people to acquire relevant skills for the labor market, as those will shape the distribution of skills in the future workforce. Low opportunities for people would therefore tend to reduce the positive impact of technological change on growth, as fewer people can benefit and contribute, and amplify its impact on inequality. The impact of technological change on productivity growth and job creation at the country and regional levels depends on the extent to which firms can benefit from it. A more burdensome and less competitive business environment tends to generate a larger share of small, low-productivity, firms (as well as less nimble and more protected "legacy" firms, including those that are state-owned). These firms are less able to benefit from new technologies, and have less incentives to do so.

Technological change is boosting inclusive growth in places where opportunities are high, but it is disrupting it in places where opportunities are low, generating divergence. The good news: opportunities for people and firms (as measured by PISA and Doing Business) have improved in most EU countries over the last decade, particularly in those with lower initial levels. Inclusive

growth and convergence happened despite the low opportunity levels in some parts of Europe. The bad news: the acceleration of technological change is making it increasingly hard for countries and regions with high shares of low-skill workers and lagging firms to continue to grow inclusively. Technological change is boosting inclusive growth in countries with advanced opportunities to take advantage of it. But it can hold inclusive growth back in countries with low opportunities. The same is true for regions within a country: while technological change benefits urban centers, it may leave "lagging" regions further behind. This divergence can be accentuated if higher skilled workers and more productive firms move to places with higher opportunities.

How do poor opportunities for firms and people manifest themselves in lagging countries and regions and what can be done about it to help Europe grow united?

Low-skill Europeans lack opportunities to thrive in the labor market

Europe is suffering from a skill divide that is interrupting the workings of the convergence machine. Low-income European youth in many member states are significantly less likely to acquire basic proficiency in reading, mathematics and science and risk being squeezed out of the labor market as machines take over the tasks once handled by low-skilled workers. At the same time, social and labor policies in many member states are increasingly out of sync with changing needs, neglecting protection of those who fall behind, while offering little flexibility and ample security for some and not for others.

The skill divide: Education is not providing equal opportunities to build relevant skills

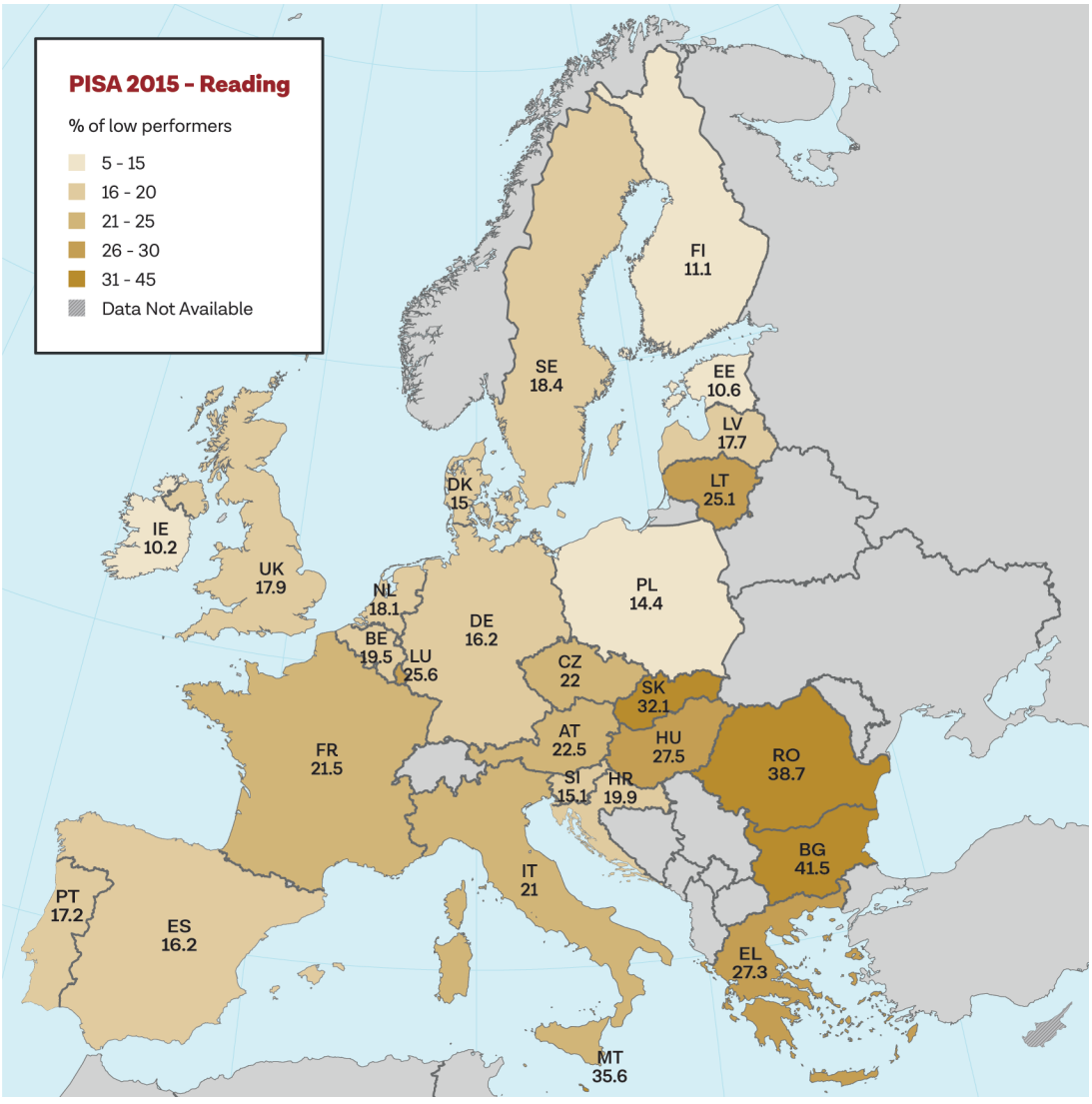
The impact of changes in the task content of jobs on inequality and growth depends on the level and distribution of skills in the workforce of today and, more important, tomorrow. The skill divide in the workforce of tomorrow will be shaped by the extent to which opportunities are provided to all young people to acquire relevant skills for the labor market — starting with foundational cognitive and social-emotional skills and complementing with up-to-date, job-specific technical skills. Unequal opportunities to build relevant skills will not only make inequality persist over time, but it will also reduce long term growth, more so with aging.

So how prepared is Europe for the labor market of the future?

While education attainment has increased throughout the EU, too many young people still do not obtain basic cognitive skills. The share of tertiary-educated people increased substantially between 2000 and 2015 across all EU countries except Lithuania. In the latest PISA round of 2015, some EU countries, like Finland, Ireland and Estonia, are almost on par with the leading countries in East Asia, but several EU countries lag significantly behind. More important, many young people across Europe leave schools not having acquired basic cognitive skills. Part of the problem in some countries is that youth leave school too early: early school leaving is close to 20 percent in Malta, Spain, and Romania.[3] The other problem, affecting a lot more countries, is the high share of 15-year-olds that perform below the basic proficiency level in PISA: in half of the EU more than 20 percent of 15-year-olds perform below basic proficiency in reading

(and mathematics), and in Bulgaria, Malta, Romania, and the Slovak Republic, a third and more (figure O.6).

Figure O.6 The share of low performers is large in many EU countries



Source: World Bank staff calculations based on PISA 2015.

Much of the skill divide is because of students' socioeconomic background. It is fair to say that, across much of the EU, education is not acting as an engine of social mobility — children from poor background often fail to acquire basic cognitive skills. The share of students below basic cognitive skills is significantly higher among 15-year-olds who belong to the poorest socioeconomic strata and often more than double the average shares presented in figure O.6. More than 60 percent of bottom quintile students in Romania, Slovakia and Bulgaria fail to acquire basic proficiency. This has serious consequences: the learning gap between top and bottom socioeconomic quintiles translates into the equivalent of between two (Latvia) and five (the Slovak Republic) years of schooling. Europe's skill divide has not narrowed much over the last 15 years on aggregate, but

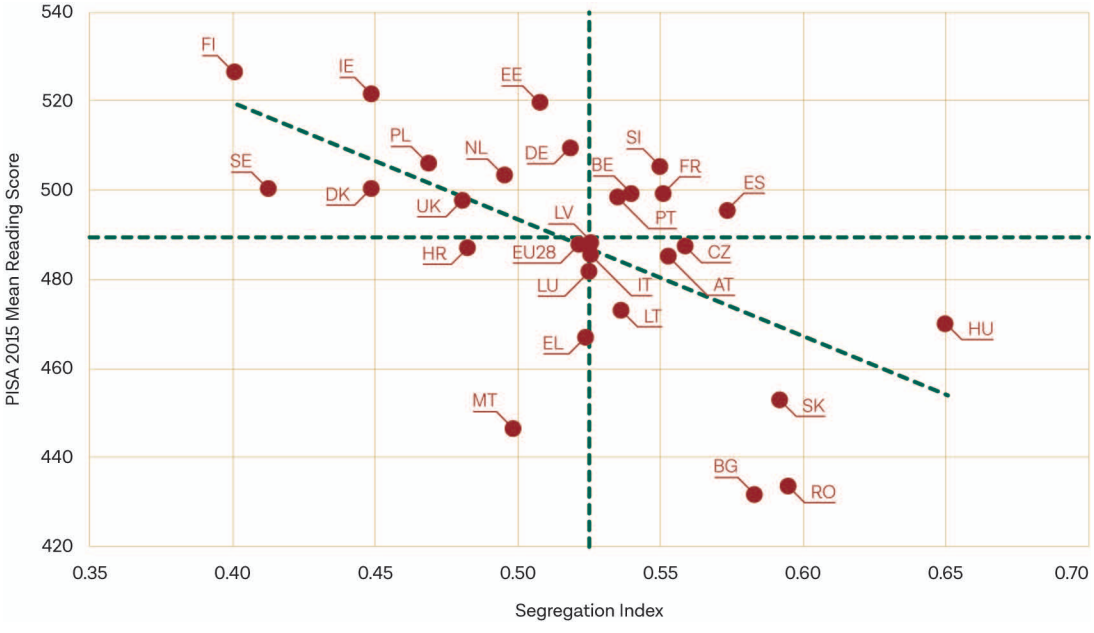
countries like Germany have managed to reduce it significantly. Finland, long considered an example of excellence and inclusion, has seen a growing skill divide in recent years. And there are large differences within countries: for example, five regions of Spain, including the Basque Country, have a higher PISA score and lower inequality than the EU average, while Murcia and Andalucia are well below the Spanish average.

Social segregation in schools is a big driver of the skill divide. Part of the reason why students from disadvantaged background do not perform as well is because they are clustered together in lower quality schools. The correlation between the socioeconomic level of each student with the average socioeconomic level of his or her school, a measure of school segregation, is high in many countries in the EU, with Hungary being the most segregated, and Finland the least (figure O.7). And the schools poorer students go to are often of poorer quality. This matters for inclusion but also excellence: students in more equal, less segregated education systems in Europe tend to perform better on aggregate.

Social segregation is the result of the interplay between residential patterns, educational policies and parental choice. Residential patterns are a given, while school zoning and school assignment policies for students, the nature and extent of school choice, information on school performance and public subsidies to private schools are all matters of education policy. These policies interact with parental choices in shaping school segregation, starting as early as in preschool and primary education, and are often reinforced by policies that separate students by ability into vocational education and academic tracks. Because it often reinforces social divides, 'tracking' is one of the core drivers of social segregation. The earlier the selection between vocational and academic tracks takes place, the bigger the risk to social mobility.

Figure O.7 Poor students often end up with other poor students in the same school, but socially less segregated systems perform better

PISA 2015 mathematics scores and segregation scores across the EU



Source: World Bank staff calculations based on PISA 2015.

Note: The school segregation coefficient measures the correlation between the socioeconomic level of each student with the average socioeconomic level of his or her school.

Labor and social policies often fall short of addressing the needs of workers left behind

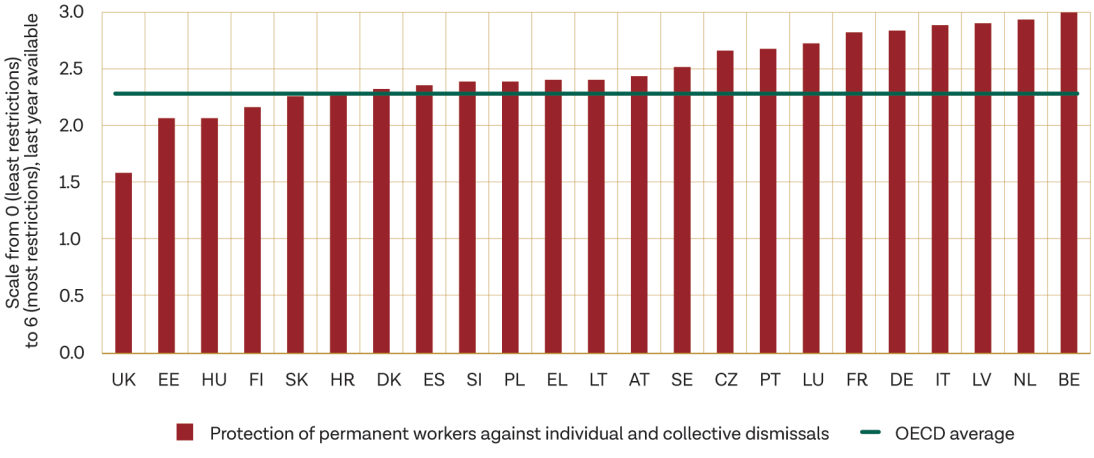
Labor and social policies are key tools to reduce inequality of opportunity. First, labor policy can promote flexibility to facilitate access to jobs for new labor market entrants and low-skill workers and to avoid sustained and entrenched duality. This can be done through eased hiring and separation regulations covering permanent contracts, paired with appropriate use of temporary and (voluntary) part-time employment opportunities. Second, social policy can provide adequate security through income protection to Europe's poor and the newly poor who fall behind in the changing labor market, paired with measures to support their reemployment. These principles are embedded in the "flexicurity" principle spearheaded by Denmark, which are becoming increasingly relevant in response to the opportunities and disruptions emanating from technological change. Third, adequate and well-targeted cash transfers and social work are an important investment to address social disadvantage of children and youth, a key determinant of Europe's social skill divide.

However, a closer look at Europe's labor and social protection systems today reveals significant variations in countries' ability to deliver on those ambitions. "Flexicurity" is not yet a reality in many parts of Europe.

Technological change accentuates the challenge of striking the right balance between job security and wage protection, on the one hand, and greater flexibility to facilitate access to jobs for new entrants and low-skill worker, on the other hand. Today this balance varies significantly across the EU. First, while employment protection legislation (EPL) and wage-setting institutions have been successful at reducing wage inequality, there is also evidence that too much of it can hurt firm productivity and job creation (particularly among low-skill workers and new entrants).[4] Although EPL have become less stringent since the 1990s, the strictness of EPL for permanent contracts remains high (relative to the OECD) in much of the EU (figure O.8). In countries with high degrees of protection for permanent workers, employers face a lower incentive to create new jobs, resulting in worse employment prospects of low-skill workers at a time when technological change is reducing the demand for these workers. Second, while the extent of nonstandard employment

Figure O.8 Employment protection regulations for workers on permanent contracts are above the OECD average for most EU countries

Protection of permanent workers against individual and collective dismissals



Source: World Bank staff calculations based on the OECD Employment Protection Database.

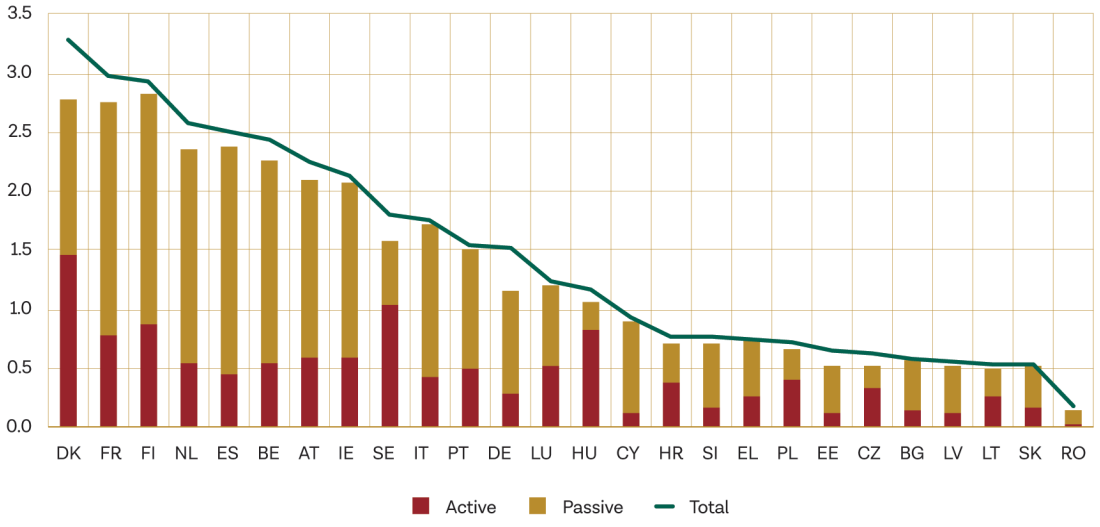
varies significantly across the EU, temporary employment (especially among younger workers) and part time work (among prime age and older workers) have increased significantly in many countries. These trends have gone hand in hand with rising efficiency and equity concerns associated with growing duality between contract types (well-protected open-ended versus less protected temporary) and increases in involuntary part-time work (OECD, 2013).

Labor market policy across Europe is not sufficiently geared toward active measures to help workers retain their jobs or quickly return to employment after job loss. Central to the "flexicurity" principle, these policies are becoming more important with the new realities in the labor market, particularly job-search assistance and skills upgrading. Countries across Europe vary significantly in the way they leverage labor market policies. First, spending on such policies varies significantly between more than 3 percent in Denmark and less than 0.5 percent in Romania (figure O.9). While spending is arguably an imperfect indicator of effective use of labor market policy, the fiscal envelope for such programs defines room to maneuver and reflects their importance in a national policy mix. Second, beyond aggregate spending, passive measures (such as income support and early retirement) dominate active measures across most of the EU.

Looking ahead, labor market policy needs to expand its focus toward enhancing the opportunities for the newly unemployed to return to work, including through better targeting and tailoring of employment support programs to needs and better monitoring and evaluation. "Flexicure" Denmark stands out both in terms of aggregate spending and the share that goes to active measures: hiring and separation rates in Denmark are high, but so is the importance of an activating labor market policy as part of the flexicurity framework.

Figure O.9 Expenditures on labor market policies vary significantly across the EU

Spending on labor market policies as share of GDP, 2015 (percent)



Source: World Bank staff calculations based on Eurostat.

Note: Active includes training, employment incentives, supported employment and rehabilitation, direct job creation and start-up incentives. Passive includes income support and early retirement. Total also includes labor market services.

Social protection systems are often falling short of growing needs of workers who are being left behind in the labor market. Over time, a growing need for protection of those left behind by a changing labor market will compete with increasing aging-related claims on often already large

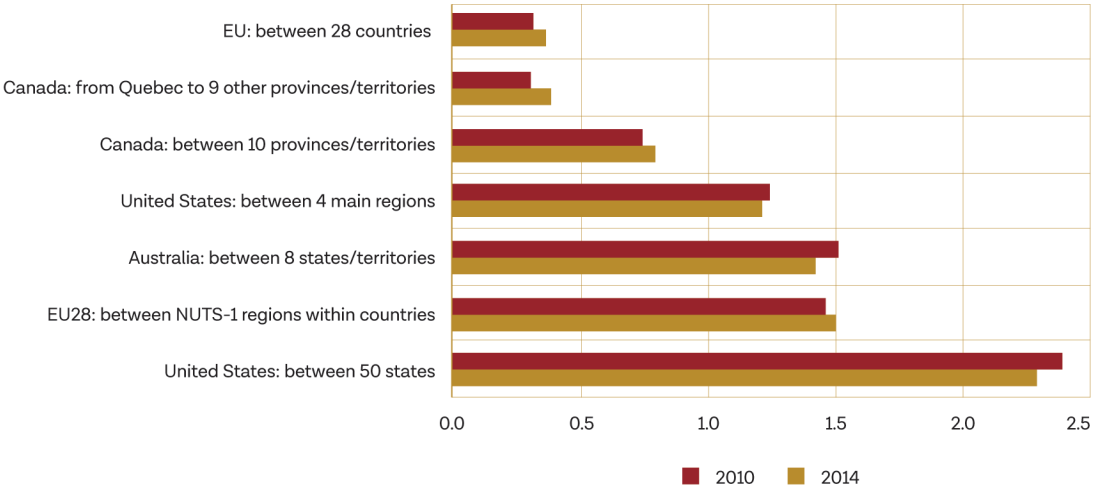
social protection systems. While welfare state spending in parts of Europe is among the highest in the world, it varies significantly across countries — between around 15 percent of GDP in Lithuania, Romania and Estonia and above 30 percent in Finland, Denmark, and France. Moreover, across all countries, the lion's share of spending is geared toward social insurance for old age and health — with benefits linked to jobs and based on a contributory principle. In comparison, spending on social safety nets and income support for those not (or no longer) covered by contributory benefits is very low in most countries, varying between 0.1 percent of GDP in Latvia, Estonia, Poland, and Hungary; and 1.3 and 1.4 percent in Denmark and the Netherlands, respectively. Therefore, even when programs are well designed to cover a larger share of the bottom 20 percent of the population (for example, the well-targeted guaranteed minimum income schemes in Estonia and Latvia), the small size of such programs means that benefit levels are low, thus undermining their protective and redistributive power.

Because they emphasize benefits linked to jobs and based on contributions, Europe's social protection systems are increasingly out of sync with a labor market with growing nonstandard employment relationships. Contribution-based social insurance schemes have been designed for standard employment relationships between firms and workers, where full-time and open-ended contracts are the norm and benefits grow with seniority. For example, unemployment benefits and pensions in the EU are mostly contributory and linked to work history, with larger benefit rights resulting from longer job tenure. This system is not well placed to keep up with changing realities in the labor market where temporary and self-employment is increasingly prominent, particularly among the young. At the core, there is a concern about how to protect people who cannot work long enough, or whose disrupted careers make it difficult to contribute enough, to qualify for these benefits. As a result, current systems need change toward a greater emphasis on noncontributory schemes and individual accounts which are linked to the worker and not the job he or she holds.

Spatial labor mobility in the EU is relatively low and does not serve as a major adjustment channel for labor reallocation and opportunities for low-skilled workers. Europe aims to achieve a single market for goods, services, capital and labor. But the integration of labor markets remains limited and labor mobility low: Only a small share of the total EU28 population is mobile *across* EU borders — and labor mobility is much less than that across United States or Australian states. EU mobility is similar to Canadian mobility between Quebec and other provinces — that is, it is similar to situations where language barriers apply (figure O.10). Labor mobility between regions *within* EU countries is higher than between countries (but still short of mobility between US states). However, EU Labor mobility has been growing in recent years in terms of permanent emigration, the temporary posting of workers in another member state and cross-border commuting. Much of this mobility has focused on a few main sending countries (in Central and Southeastern and Southern Europe) and receiving countries (in Continental Europe) (European Commission 2016).

Figure O.10 Cross-border labor mobility in the EU is low

Annual cross-border mobility, percentage of total population



Source: OECD Survey of the European Union; Australian Bureau of Statistic; Statistics Canada; US Census Bureau.

Note: Population mobility for Australia, Canada, and the United States; labor mobility for the European Union.

Firms enjoy economic freedom and a supportive innovation environment in some parts of Europe but not in others

Firms are doing better in some parts of Europe than in others in ways that affect the convergence machine. This is because of policies that define the business and innovation environment in a country or region and the institutions that enforce them. *Growing United*, like *Golden Growth*, argues that these policies play a big role in explaining differences in productivity performance across countries and regions in the EU. But it also argues that the role of these policies has gained, and will continue to gain, prominence amid the acceleration of technological change, globalization and demographic change.

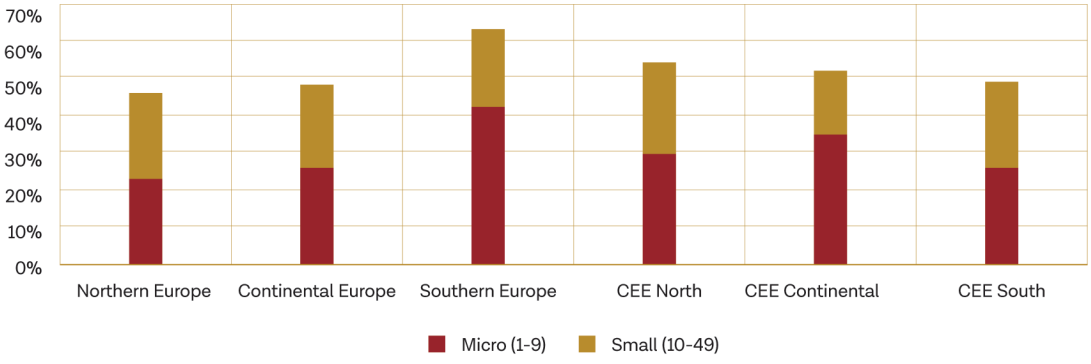
Southern European countries are lagging because of burdensome business regulations

Countries of Southern Europe have firms that are smaller and less global. Microenterprises account for a significantly larger share of employment and value added in Southern European countries than in other EU countries (figure O.11). Small is not necessarily bad, but there is a minimum scale below which size becomes a constraint to growth, particularly in a global market. And not all small firms are equal: microenterprises in Southern Europe are less productive than those in the rest of the EU. Countries in Southern Europe also have the lowest presence of foreign-owned firms in the EU. At the other end, foreign-owned firms contribute the most to employment and value added in Central and Southeast European countries, a tribute to their success at attracting foreign direct investment (FDI). This matters because foreign-owned firms are more productive than domestic firms. Firms in Northern Europe are not just more successful than those in Southern

Europe in attracting foreign capital, but they are also more global: 10 percent of Swedish firms belong to Sweden-based enterprise groups with presence in Europe, while fewer than 3 percent of Italian or Spanish firms do.

Figure O.11 Microenterprises account for 40 percent of employment in Southern European countries

Employment share of microenterprises and small firms, 2014

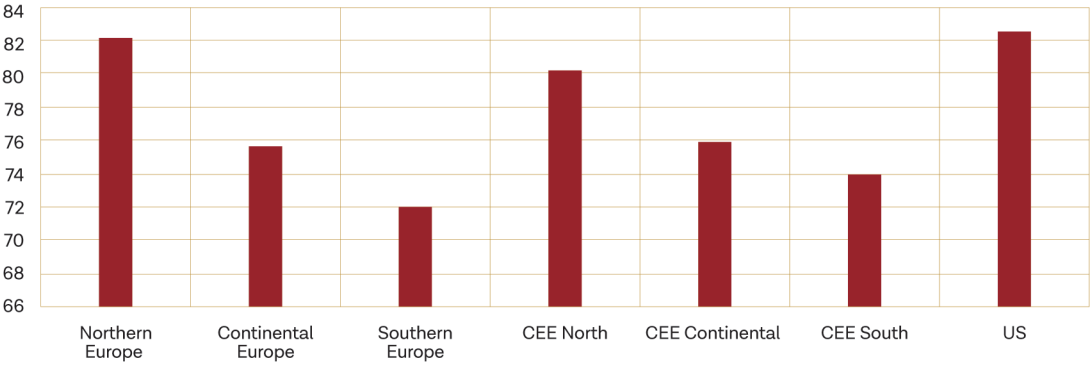


Source: Own calculations, using Eurostat data.

Excessive business regulations drive Southern Europe's firm profile. The business environment in countries in Southern Europe tends to be more restrictive than in their neighbors to the north (figure O.12). A simple and efficient regulatory framework is needed to balance the social responsibility of firms with a vibrant enterprise sector. Excessive regulations, however, constraint the ability of firms to reach the minimum size required to be competitive, to become more productive, as well as to be international (through exports or offshoring) and attract foreign investment. Small firms in the south may prefer to stay small to avoid more complex regulations (figure O.13). Excessive regulations also constrain the ability of small and medium firms to graduate into large firms.

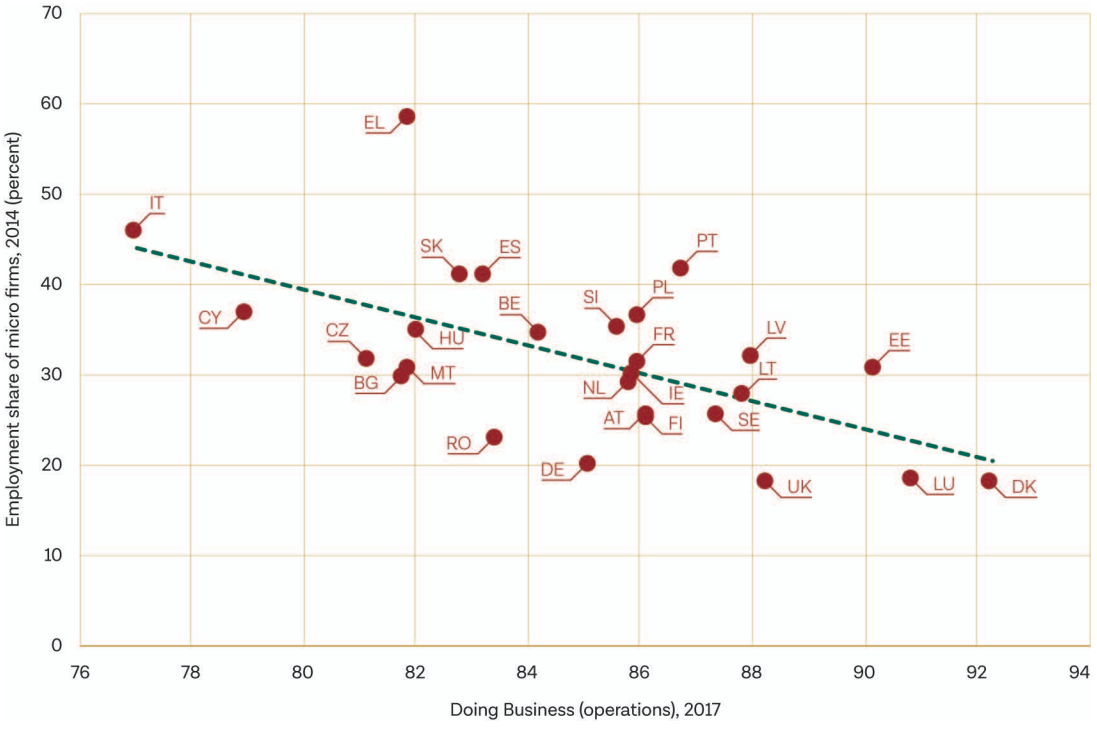
Figure O.12 Business regulations are more burdensome in Southern Europe, Bulgaria, and Romania

Doing Business, distance to best performer; best performer = 100, 2017



Source: Doing Business 2017.

Figure O.13 In a difficult business environment, firms stay small



Source: Doing Business and Eurostat.

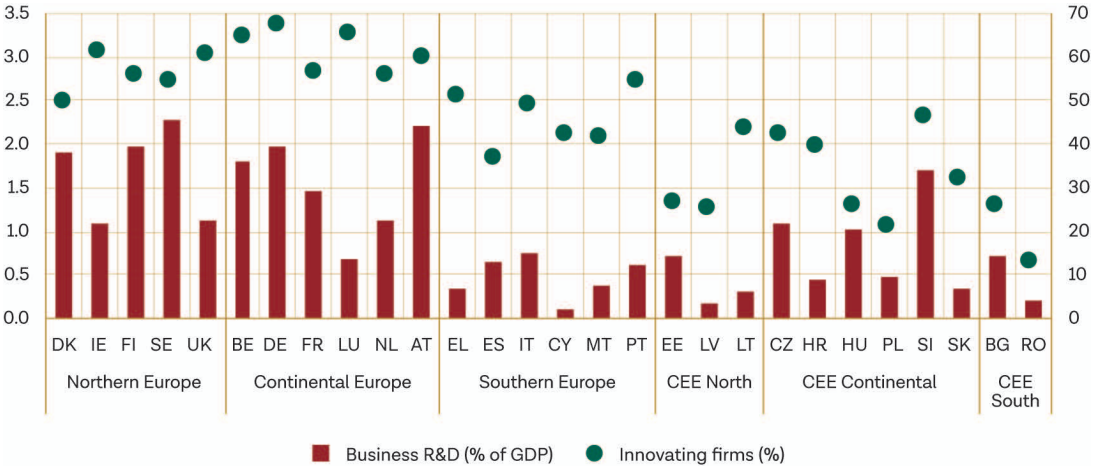
Central and Southeastern European countries have successfully attracted foreign investments, but business regulations and infrastructure remain a challenge in some countries. Foreign-owned firms contribute the most to employment and value added in Central and Southeastern Europe. And FDI inflows have been a key determinant of firm productivity growth in these countries. All this attests to the key role of FDI inflows in helping Central and Southeast European countries catch up with more advanced economies in the EU. However, the quality of public infrastructure remains relatively low, and a key binding constraint to firm productivity growth, in many of these countries. And the quality of business regulations remains a challenge in Bulgaria and Romania, particularly in their lagging regions.

Restrictions on services are holding back productivity growth across the EU. Services make up more than three-fourths of the EU's GDP and almost the same share of its employment, but contribute relatively little to productivity growth because of excessive regulation. While the EU's Services Directive was adopted in 2006 with the aim of creating a Single Market for services, many barriers to the exchange of services across EU borders persist — in stark contrast to the free mobility of goods (World Bank, 2016). Service firms face many hurdles to offer their services in another EU member states: they may have to change their residency or even nationality, adopt a different ownership structure, reorganize their insurance, find workers with different specific diplomas, or become members of specific professional associations. Professional services are the most restricted. In general, service sector regulations are much more restrictive in the EU than in other OECD member states, particularly in CEE and Southern European countries.

Northern European economies are productivity leaders because they innovate

Enterprises in Northern Europe enjoy considerable economic freedom, but they also innovate more and adopt new technologies more intensively. Northern economies are in the top 15 countries of the Doing Business rankings. Their firms enjoy considerable economic freedom, but it is really their superior innovation capacity that makes them European and, in some cases, world leaders. Business executives in Northern and Continental Europe rate firm innovation capacity and technology high, not much different from the assessment of American executives. These countries also stand out, and are similar to the US, in terms of business research and development (R&D) (figure O.14). Firms in Northern and Continental European countries also stand out as the most innovative. They also sell more online and use more sophisticated cloud computing services than firms elsewhere in the EU. Why? Because these countries provide a good business environment, with more competition and less restrictive employment protection legislation; quality information and communication technology (ICT) infrastructure; and dedicated support for firm innovation and technology adoption.

Figure O.14 Northern economies innovate more, making them productivity leaders



Source: Eurostat and 2014 Community Innovation Survey.

Note: Percentage of innovating firms is measured on the right axis. A firm is innovating if it has implemented a new/significantly improved product, process, new marketing method, new organizational method in business practices, workplace organization or external relations.

The low quality of the business environment and local institutions limits the opportunities of firms in lagging regions within countries

The divergence generated by technological change also has a spatial dimension. Technological change mostly benefits agglomeration areas with high opportunities for firms and people. Lagging regions, often peripheral and sparsely populated and characterized by a poor business environment, stand to benefit less. Thus, technological change risks widening the divide between leading and lagging regions in Europe**.**

Lagging regions rely more on agriculture and have smaller and less productive firms. Lagging regions tend to be highly dependent on the agricultural sector. And firms in lagging regions are

smaller than firms in nonlagging regions of the same country. The enterprise structure of 'low-growth' regions in Southern Europe is dominated by self-employment and family-run enterprises specialized in local nontradable activities. Firms in these regions have significantly lower productivity growth than firms elsewhere, including in the agricultural sector (World Bank, 2018a).

The economic structure and firm profile of lagging regions is partly driven by economic geography, but there are untapped opportunities for agglomeration. Periphery (that is, low proximity to economically dynamic areas) is a defining feature of lagging regions, constraining the access of firms to markets. Some regions are both peripheral and sparsely populated (mainly in "low-growth" regions). Firms in low-density lagging regions are less able to exploit sources of agglomeration for productivity growth. Lack of market scale and economic density makes competitive environment weaker, undermining the incentive of firms to upgrade their capabilities. Periphery is compounded by poor connective infrastructure, including broadband connectivity, particularly in lagging regions of CEE countries. And many peripheral lagging regions are more densely populated than the European average, indicating untapped opportunities for further economic agglomeration around secondary cities.

Opportunities for firms in lagging regions are also limited by the low quality of the business environment and local institutions. Business regulations vary considerably between cities and regions within countries. Lagging regions tend to have more burdensome regulations, particularly in Southern European countries, and less firm competition. In Italy, additional delays in obtaining construction permits and enforcing contracts result in substantially lower firm sales and profits in lagging regions. Firm competition is lower in lagging regions for structural reasons, but poor governance also plays an important role. In fact, excessive regulations, limited competition and poor connective infrastructure in lagging regions are partly explained by the low quality of local institutions — local governments in lagging regions often lack the incentives and capacity to design and deliver appropriate interventions.

How to upgrade Europe's convergence machine: Toward convergence of opportunities

The divergence of opportunities across the Union today risks undermining inclusive growth and convergence in the future. At one extreme, many countries in Northern and continental Europe manage to equip the vast majority of youth — including those from disadvantaged backgrounds — with basic cognitive skills. Firms enjoy considerable economic freedom to thrive and receive support to innovate, making these economies global productivity leaders. At the other extreme, most Southern European countries, as well as Bulgaria and Romania, tend to have a high share of low performing students, mostly from low socioeconomic backgrounds, and high early school leaving. They also tend to have burdensome regulations and low support for firm innovation, which generate too few frontier firms and too many lagging firms. Technological change is boosting inclusive growth in countries and regions that provide high opportunities for people and firms to thrive, but it is disrupting it in places where opportunities are low, generating divergence.

The convergence machine 2.0 should be about convergence of opportunity for people and firms across the Union. Europe's convergence machine is due for upgrading to seize the benefits of technological change for all Europeans. How? By accelerating reforms to provide better opportunities for firms and people to thrive. An upgraded convergence machine would propel low-opportunity

countries to converge to a high-opportunity equilibrium, and those above the EU opportunity average to move closer to the frontier. Even the leading countries in Europe cannot afford to be complacent take Finland, a global role model for PISA excellence and inclusion, which has recently seen a widening skill divide. The message is that all countries, leaders and laggards, need to continuously adapt policies to promote opportunities for people and firms, or else risk falling behind. That requires a clear policy focus on equaling opportunities and bold action at the regional, country, and EU levels.

Equalizing opportunities for people

Equalizing opportunities for people is about three things: building their capabilities (skills), providing a level playing field with flexible and secure ("flexicure") labor markets, and supporting those who fall behind.

How to equip Europe's workers with the right skills?

Europe's skill divide shows that education policy is due for an update. Education systems across the European Union today are highly diverse. Diversity comes in many ways, including around basic features like compulsory schooling ages and structural pathways (general vs. vocational schooling), teacher policies and remuneration and school assignment policies. Europe also features diversity in reform experiences — good and bad. While this diversity reflects different history and rich traditions, it is increasingly evident that some of these systemic and policy differences translate into diverging capabilities of countries to provide equality of opportunity to its future workforce. In learning from these diverse experiences, countries in Europe need to critically reexamine their education systems. Many do so already, but now is the time to do it jointly.

In the age of accelerating technological change, ensuring foundational cognitive and social-emotional skills for all is a necessary, if not sufficient, opportunity policy. To enhance equality of opportunity, education systems need to equip all students, including those with disadvantaged background, with the necessary basic cognitive and social-emotional skills to make them resilient to technological change. In other words, the goal is to achieve universal basic proficiency in national and international student assessment, for example maximizing the share of 15-year-olds who achieve basic proficiency in mathematics, reading and science in PISA. The goal of achieving universal proficiency would require a step up in monitoring of cognitive skills at various ages as well as investments in measuring social-emotional skills. Given important regional variations within countries, this would ideally involve producing a disaggregated picture at the regional level in each member state (for example, at the NUTS 2 level). Necessary data could be collected in sufficiently large sample sizes to produce a regionally disaggregated picture.

To close the skill divide, governments need to revisit fundamental questions about education systems and policy and their impact on equity. First, governments need to revisit the systemic policies in education that might fuel social segregation in schools. This includes school assignment policies, the nature and extent of school choice, information on school performance and public subsidies to private schools — and their interaction. This is not to say that all these policies should be dropped, but their potential impact on school segregation needs to be questioned and understood. Second, governments need to rethink policies to make up for disadvantaged background. While teachers cannot fight their students' disadvantage alone, schools need strong outreach to community and parents. Governments need to examine how to promote closer alignment between social and educational policies at the local level, for example through close collaboration

between teachers and social workers, to tackle disadvantage. Third, governments should encourage innovation in teaching methods and classroom practices to foster the formation of cognitive and social-emotional skills and to ensure that innovation spreads from leading to lagging schools.

Europeans need to become lifelong learners, but can only do so with a strong foundation of cognitive and social-emotional skills. Lifelong learning is becoming ever more important and yet ever more difficult as the acceleration of technological change makes technical skills redundant at an ever-faster pace. At the same time, strong cognitive and social-emotional foundation skills are essential foundations for continuous and lifelong learning. This is why governments should rethink policies related to technical skills formation. First, teaching technical skills should not come at the expense of building foundational skills in school: should technical skills formation through vocational schools therefore be delayed to the postsecondary level to emphasize cognitive skills over technical skills during secondary education? Second, how can industry-school/university partnerships be strengthened to ensure that the technical skills that students learn are not already out of date when they graduate? Should governments encourage the private sector and enterprises to play a greater role in driving content and delivery in vocational training, higher education and adult learning — a greater role which is already visible in the case of private coding schools across Europe?

How to adapt Europe's labor market and social policy?

As technology disrupts labor markets, labor regulations and social policies are also in line for upgrading. More than ever before, policies and regulations should aim to protect people, rather than jobs. To protect people, Europe should bring back to the center of the discussion the question of how to achieve the right balance between labor market flexibility and security (the right mix of "flexicurity"). More flexible labor markets with eased hiring and redundancy regulations offer more opportunities for lower skilled and vulnerable workers. But more flexibility should not be about promoting less well-protected temporary jobs while open-ended jobs retain full protection — the result would be further rises in (inequitable and inefficient) labor market duality. Rather, is there a case for reducing protection for open-ended contracts or introducing a single contract as the standard arrangement under which protection increases with seniority? To deliver the other part of the flexicurity bargain, countries in Europe need to consider how to modernize protection: by balancing increased income protection for the unemployed and the poor with more effective active labor market policies and expanded tax-financing of old age security.

Boosting intra-EU labor mobility is a core element of the convergence machine 2.0. While labor mobility across Europe's single market has been growing in recent years, there is room for more. Increasing labor mobility can help provide opportunities for Europe's workers (and firms) and contribute to a better allocation of labor. Amid concerns of brain drain and displacement of native workers, there is a role for national and EU policy in steering labor mobility and creating a level playing field. This starts with reinforcing opportunities for young people to study, train and gain experiences across the EU (and acquire language skills), for example by further boosting the Erasmus+ program, and can be complemented by improving systems to provide information about jobs and to ensure recognition of qualifications across the EU. Effective steering of labor mobility also means combating illegal practices and enforcing labor regulations. And, as people base their mobility decisions on multiple criteria ranging from wages and cost of living and housing to the quality of social services, countries and regions are competing with each other to create attractive conditions for increasingly mobile workers.

Equalizing opportunities for firms

Equalizing opportunities for firms is about two things: providing an enabling business environment across all parts of Europe's single market and supporting the upgrading of firms' capabilities through innovation and technology adoption.

How to build an enabling business environment across Europe's single market?

Europe's convergence machine 2.0 would emphasize reforms to the business environment. Significant variations in the business environment between countries and regions suggest a need for the EU to reexamine its approach and tool-kit to promote a firm-friendly level playing field. The setting and implementation of business regulations are largely in the hands of national and regional governments, while EU-level policy is focused on rolling out the single market for goods, services, capital, and people, on deepening capital markets and on boosting investment. While this division of labor need not change, the EU could deploy its convergence machine instruments to business environment policy: setting targets, benchmarking and monitoring the business environment at the national and subnational levels, promoting mutual learning and reflecting policy upgrades in the European Semester.

Southern European countries need to accelerate reforms to improve the quality of business regulations if they are to narrow the productivity gap with their Northern neighbors. Burdensome regulations have generated an entrepreneurial profile that is not fit for a global market and the adoption of new technology, with too few top-performing firms and too many lagging firms. This is making these countries increasingly lag behind their Northern neighbors, and widening the gap between leading and lagging regions in these countries, as technological change gains pace. Southern European countries have been making progress in recent years, but reforms need to be accelerated to avoid falling further behind. Reforms should cover all aspects of the business environment, reducing excessive regulations and improving their implementation, particularly in lagging regions. (World Bank 2017).

More efforts are also needed in Central and Southeast European countries to improve the quality of the business environment and infrastructure and to continue to attract FDI. This would help to narrow the productivity gap with the rest of the Union faster. Business regulatory reforms are a priority for Bulgaria and Romania — measures which would benefit their lagging regions especially. Poor quality infrastructure is also a binding constraint for firms in many former transition countries. Their lagging regions would particularly gain from improvements in connective infrastructure, including broadband connectivity, as well as from investments in urban infrastructure in secondary cities with high growth potential, positioning them better to take advantage of the opportunities that come with technological change. Support for lagging regions should be preceded by reforms to improve the quality of local institutions. Cohesion policy should continue to play a key role in supporting these regional development efforts.

Completing Europe's Single Market for services can boost productivity across the Union. Reducing service sector restrictions to the level of the three least-regulated EU member states (the United Kingdom, Denmark, and Sweden) would increase productivity of firms operating in services and manufacturing by up to 5.3 percent within two years of implementation (World Bank 2016). Governments should focus their attention on reforms that yield the biggest economic benefits. Reforming conduct regulations, which determine how service firms operate and constitute a deterrent to foreign direct investment, and reducing barriers to the provision of professional services appear to have the largest payoff. The gains will be higher in countries with relatively weaker institutions,

for example, in many Central and Southern European countries. There would also be large productivity externalities from undertaking parallel service sector reforms across EU countries.

How to support innovation and technology adoption in Europe's enterprises?

With the acceleration of technological change, a good business environment is no longer sufficient for countries to sustain productivity growth — more support for firm innovation is needed. Firm innovation and use of digital technologies is low in many parts of the EU — Northern Europe and, to a lesser extent, Continental European countries are the exception. A good business environment, with more competition and less restrictive labor regulations, has helped. But these countries have done much more than that. They have supported firm innovation and technology adoption through better incentives for enterprise-sponsored R&D, public funding mechanisms and intellectual property regimes that foster profitable relations between universities and firms, and a steady supply of high-skill workers and managers. This has made them productivity leaders in Europe. Finland is a good example of that. Countries in Central and Southeastern Europe can also do more to support the adoption of existing technologies and knowledge, using FDI and trade links as conduits.

The time to upgrade the convergence machine is now

Technological change is a source of fundamental economic and social disruptions, providing immense opportunities and challenges alike — and the pace of its disruption is rapid. As the spread of artificial intelligence widens across production and services, and machines take over ever more tasks previously managed by humans, policymakers need to act fast to upgrade Europe's convergence machine. There is no time to lose.

The convergence machine 2.0 involves upgrading policy at the regional, national, and EU levels. This report raises several questions, without necessarily having answers to all, with the aim of stimulating further debate about what policy makers at the regional, national, and European levels can do to promote equality of opportunity. Most policy levers of the convergence machine 2.0 — from education, social and labor policies to business regulations and innovation policies — are in the hands of national and regional policy makers. But enhanced coordination of policy at the EU level and exploiting the EU's biggest asset — its single market — is a major opportunity for member states to jointly upgrade Europe's convergence machine. The EU as a global player also benefits from taking a global view in looking for inspiration and examples from policy reform innovations in countries outside of the continent.

Upgrading the convergence machine need not mean new centralization of powers to the EU level, but fully exploiting its key instruments and the benefits of a Union of countries. How? By crafting joint policies and setting joint targets, jointly monitoring progress across the Union, promoting mutual policy exchange and learning between member states, and strategically deploying European Structural and Investment Funds (ESIF) in the post-2020, multiannual financial framework (MFF) — including using ESIF as an "innovation fund" to help test new approaches. This is the European convergence machine: a machine that draws on diversity of experiences from all member states and common instruments to facilitate the charting of a shared economic and social policy path.

Notes

[1] The report also presents results using a measure of the innovation environment as proxied by the percentage of innovating firms based on Eurostat's 2014 Community Innovation Survey.

[2] The innovation environment is proxied by the percentage of innovating firms based on Eurostat's 2014 Community Innovation Survey.

[3] Early school leaving is defined as the share of people age 18–24 who have only lower secondary education or less and are no longer in education or training.

[4] A key channel is through technology adoption. Strict EPL tends to lead to higher adoption of labor-saving technology in low-skill sectors and lower technology adoption in high-skill sectors (Alesina et al. 2015).

Chapter 1:

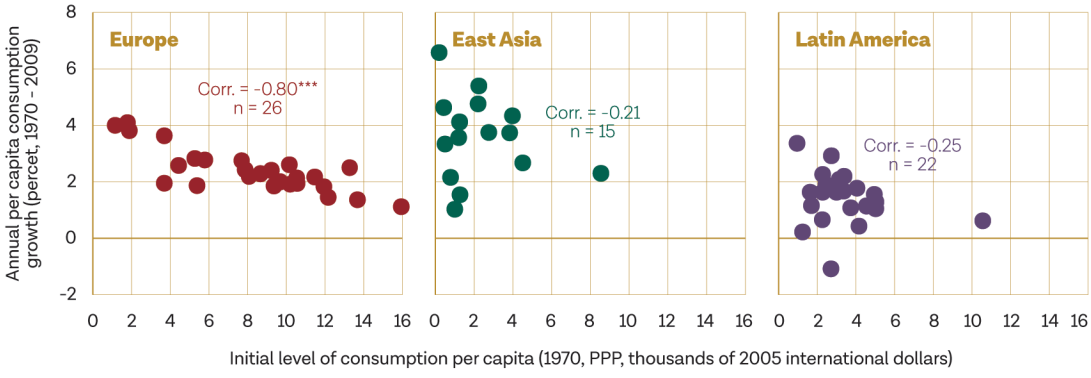
Europe's convergence machine is due for upgrading

Over the past 60 years, the EU has been a unique "convergence machine". However, there are signs of growing divides across countries, regions and households, indicating that future convergence is not automatic. The productivity gap between Southern and Northern member states has been rising since the early 2000s. At the subnational level, some regions are lagging because of their low economic potential. And most EU countries have experienced growing within-country household income inequality since 1990s, as low-income Europeans are being left behind in the labor market. While fiscal policy has a large inequality-offsetting effect in EU countries, and more so than in other parts of the world, it is becoming harder to offset the increasing labor and capital income inequality. This chapter proposes a simple framework to look at the growing divides — the rest of the report is structured around this framework. The potential of countries to grow inclusively is jointly determined by the opportunities of people and enterprises to thrive. Technological change is boosting inclusive growth in countries and regions that provide high opportunities for people and firms to thrive, but it is disrupting it in places where opportunities are low, generating divergence. This calls for upgrading Europe's convergence machine to seize the benefits of technological change for all Europeans.

Over the past 60 years, the European Union has emerged as the world's greatest convergence machine, delivering some of the highest living standards in the world to its citizens. A 2012 World Bank report, *Golden Growth* (Gill and Raiser 2012), dubbed Europe a "convergence machine": Trade and financing — fueled by the largest and deepest regional integration effort in recent history — generated convergence in living standards between member states (figure 1.1). This, along with enterprise and innovation, impelled Europe to account for about one third of world GDP with less than one-tenth of global population. Through the accession process, the convergence machine was particularly powerful for EU's newest members. As the living standards of poorer countries converged to richer ones, so did the living standards of regions and households across Europe.

Figure 1.1 In Europe, a rapid convergence in living standards — not much elsewhere

Annual growth of consumption per capita between 1970 and 2009, by level of consumption in 1970



Source: Golden Growth (Gill and Raiser, 2012).

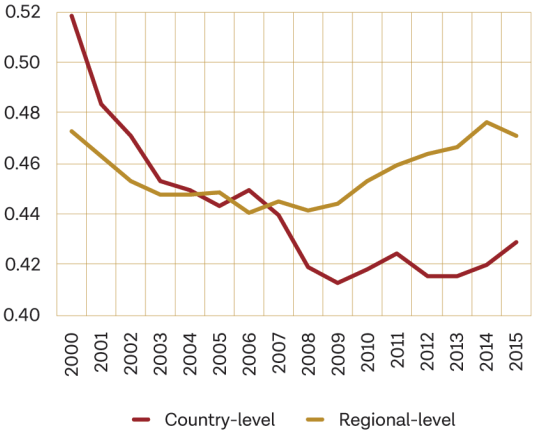
Note: n = number of countries. *** statistical significance at the 1 percent.

Convergence between countries drove convergence across regions and households in the EU until the global crisis. Between 2000 and 2008 regions of today's EU countries converged to the EU average GDP per capita (gold line in panel A of figure 1.2). Regional convergence was mostly driven by between-country convergence (burgundy line). Territorial cohesion policies also helped. The analysis of the EU-wide distribution of household income over time (the result of stacking together the income distribution of all of today's EU countries) shows that, following the initial transition shock in Central and Southeastern Europe (CEE), household incomes across the EU grew and converged between 1993 and 2008. The decline in EU-wide inequality was mostly explained by the convergence in incomes between EU countries.

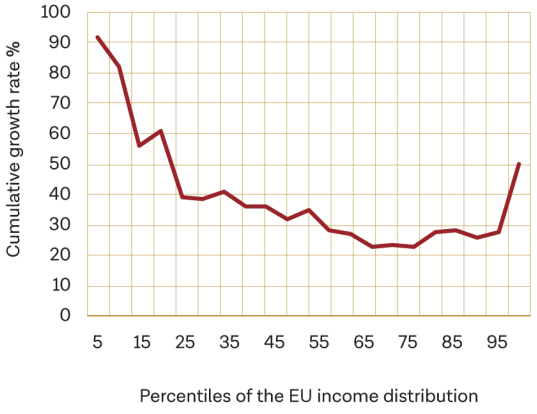
The global crisis took a toll on the convergence machine, but economic growth is now strong in most parts of the EU. The global crisis had a major negative impact on economic growth in the EU, particularly in some of the poorer member states, generating divergence (burgundy line in panel A, figure 1.2). Increased between-country divergence drove EU-wide regional and household inequality up (gold line in panel A of figure 1.2, and figure A1.1). Growth has resumed strongly in most parts of the EU and employment growth is bringing down unemployment to precrisis levels. While most of Southern Europe has been diverging since the global economic crisis, CEE countries are continuing their catch-up in living standards.

Figure 1.2 Convergence between countries drove convergence across regions and households

A. Regions across the EU were converging until 2008 (Coefficient of variation of GDP per capita, 2000–15)



B. EU household incomes grew and converged between 1993 and 2008



Source: Own calculations, based on Eurostat (Panel A) and Lakner-Milanovic data (Panel B).

Note: The Y-axis inPanel B displays the growth rate of the fractile average income (in 2005 PPP USD), weighted by population. EU averages include today's EU countries.

Signs of growing divides — convergence is not automatic

There are signs of growing divides across countries, regions and households, indicating that future convergence is not automatic. In line with global trends, productivity growth has been slowing down everywhere in the EU. However, while CEE countries have been catching up, and productivity has been growing in Continental and Northern Europe, it has flattened in Southern Europe since the early 2000s. At the subnational level, some regions are lagging because of their low economic potential. Slow-growth regions in Southern European are of greatest concern, but low-income regions in CEE countries run the risk of becoming slow growth regions. And most EU countries have experienced growing within-country household income inequality since 1990s, as low-income Europeans are being left behind in the labor market. Strong between-country convergence in the past drove convergence of household incomes and regions across the EU. However, Europe will not be able to sustain convergence across countries, regions and households with growing productivity gaps among countries and regions and increasing within-country household income inequality.

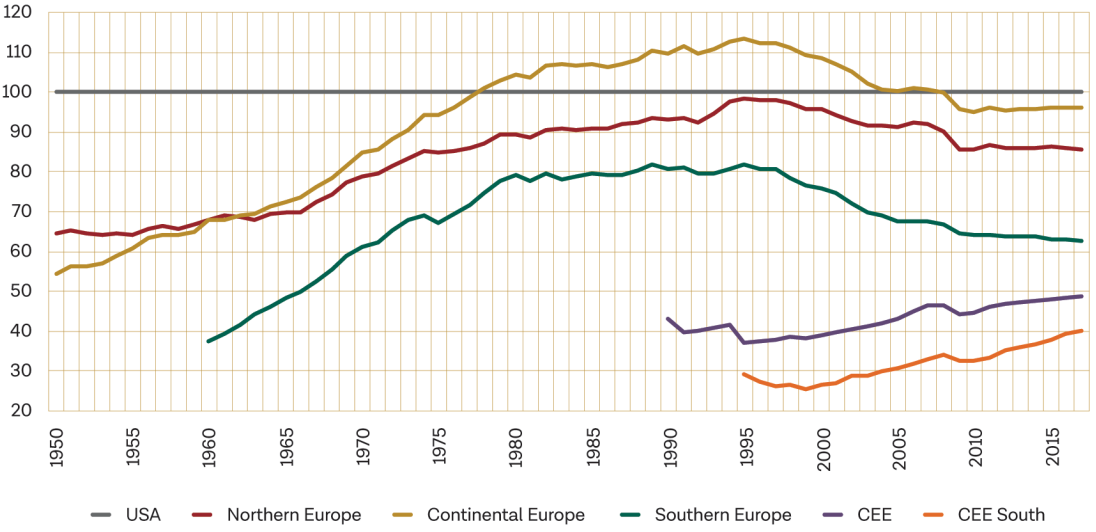
A growing productivity divide among countries and regions

Labor productivity was growing in most of the EU in the run up to the global crisis, but it flattened or even declined in the south. *Golden Growth* identified two productivity gaps: between the US and the EU, and within the EU. The labor productivity gap between the US and the EU was narrowing until the mid-1990s, but then began to widen and flattened from 2010 (figure 1.3). However, labor productivity was growing in most of the EU in the run up to the global crisis (figure 1.4). Between 2002 and 2008, productivity grew most rapidly in CEE countries, allowing them to narrow the gap with more advanced EU15 economies and the US. But while productivity continued to grow

in Continental and Northern European countries, it flattened or even declined in Southern European countries, where productivity levels were lower to begin with.

Figure 1.3 The US-EU productivity gap increased since the mid-1990s, except for CEE countries

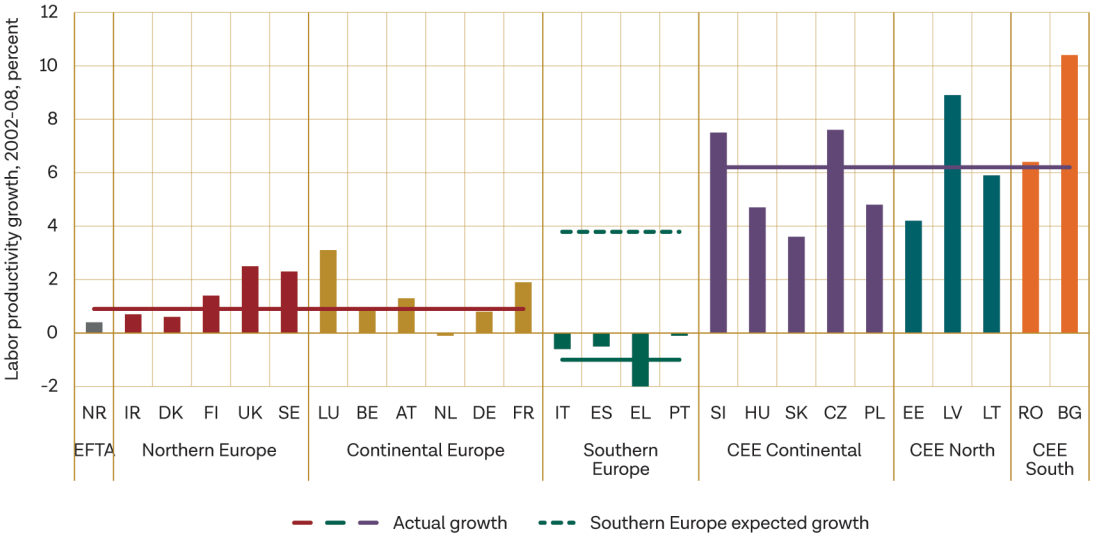
GDP per hours worked; United States = 100: 1950–2017



Source: Conference Board.

Note: Labor productivity is measured as GDP per hours worked in 2016 US$ (converted to 2016 prices with 2011 PPPs).

Figure 1.4 While CEE countries were catching up in 2002–08, EU15–South countries were lagging



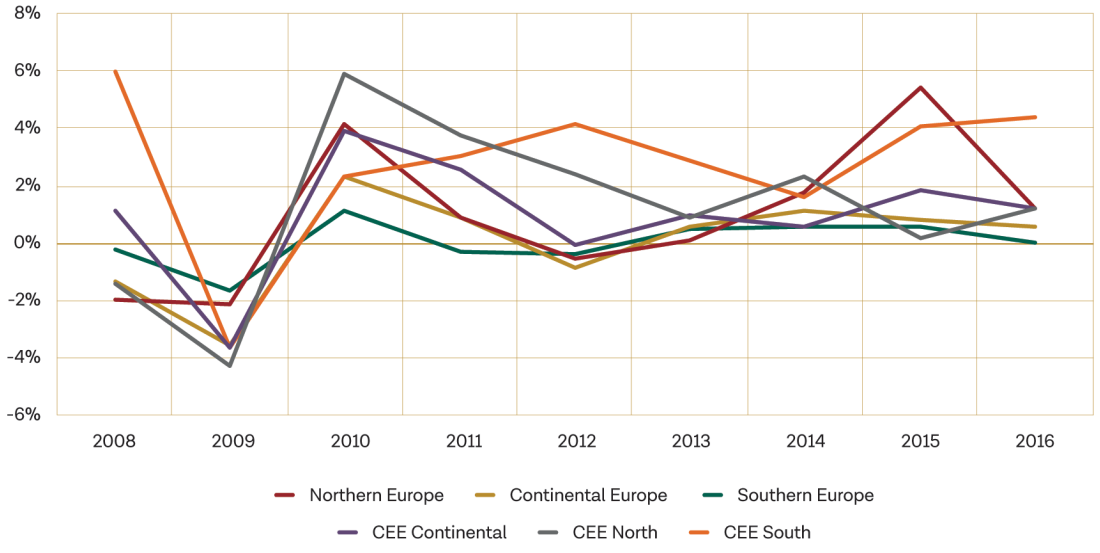
Source: Golden Growth (Gill and Raiser 2012).

Labor productivity declined in all countries between 2008 and 2009, then rebounded to gradually return to the precrisis productivity growth pattern. The global crisis took a toll on productivity growth everywhere between 2008 and 2009, and then gradually rebounded in most of Europe (figure 1.5). In the period after 2011, labor productivity growth has been lower than before the crisis (not just

in Europe), but while CEE countries are still catching up, and productivity is still growing in Northern and Continental Europe, productivity has reached a standstill in Southern European countries.

Figure 1.5 Labor productivity declined everywhere in 2008–09, then rebounded to gradually return to the precrisis productivity growth pattern

Growth of real labor productivity per person, country group averages, 2008–2016

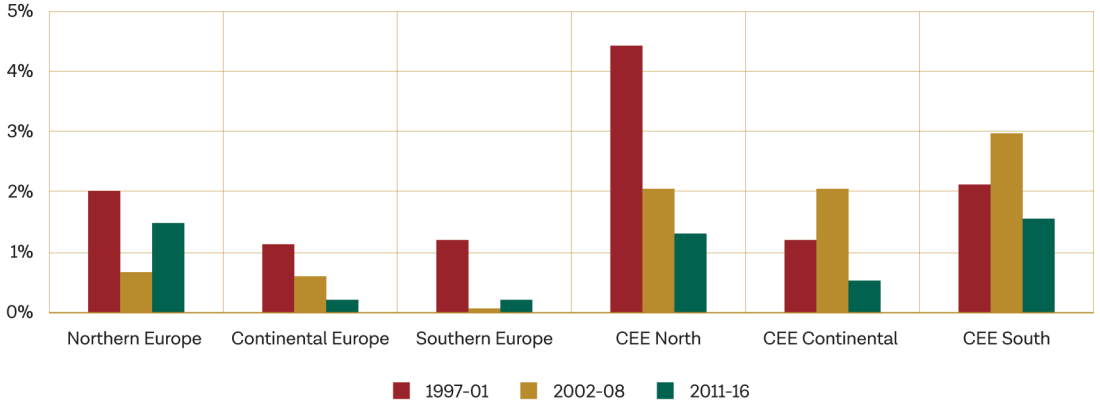


Source: Eurostat.

Labor productivity dynamics are driven by Total Factor Productivity (TFP) growth. Syverson (2017) shows that 0.9 percentage points of the total 1.1 percentage point drop in labor productivity growth for 18 OECD countries is explained by the reduction in total factor productivity (TFP) growth.[1] TFP growth has slowed down everywhere, including in other non-EU advanced economies, but it has declined the most in Southern European countries (figure 1.6).

Figure 1.6 TFP growth has been declining everywhere, but it has declined the most in Southern European countries

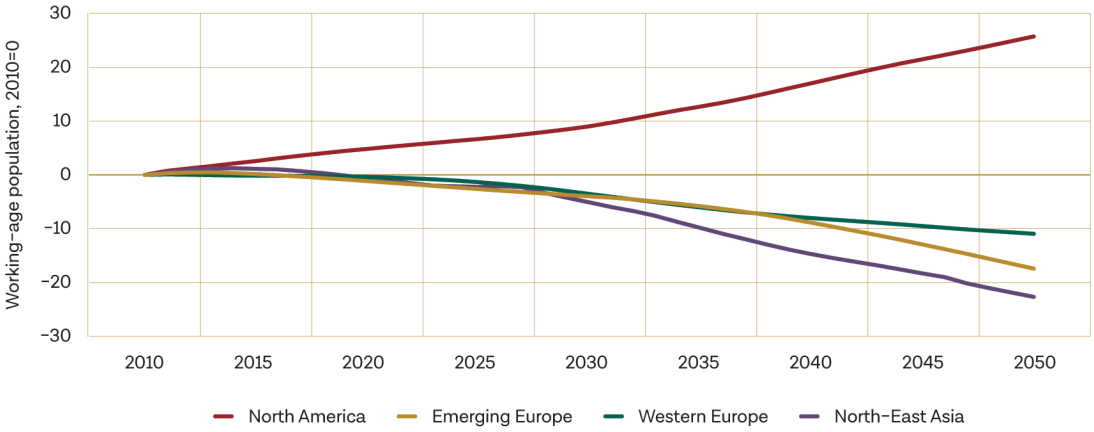
TFP growth, country group averages, 1997–2016



Source: Own calculations, based on data from AMECO.

The TFP growth slowdown matters a lot for growth and convergence in the EU. With the shrinking of the labor force (figure 1.7) and low levels of investment, long-term growth in EU countries will increasingly come from TFP growth, more so than in other advanced economies (figure 1.8).

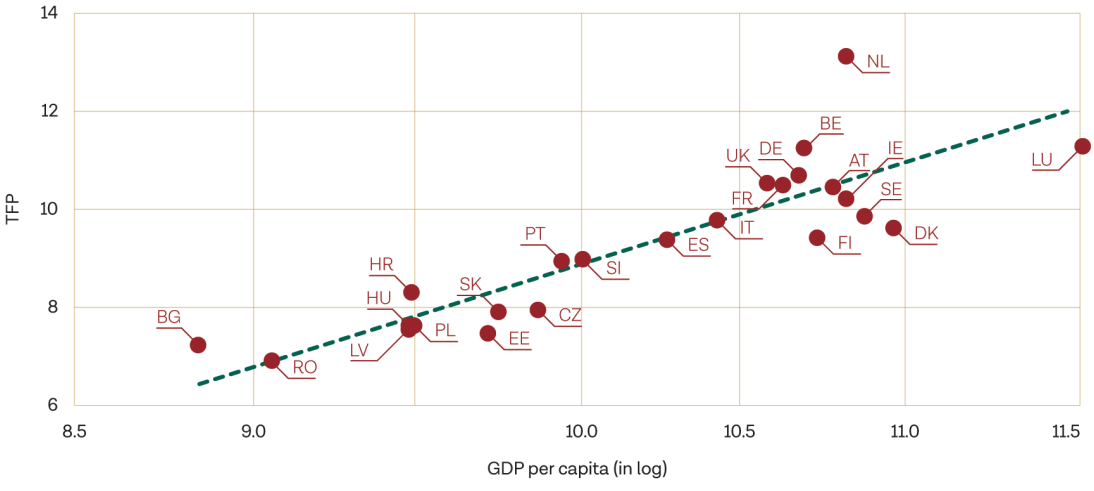
Figure 1.7 The working-age population is shrinking rapidly in Europe



Source: U.S. Census Bureau, International Data Base (Figure 1.28); Amadeus/Orbis and World Development Indicators.

Figure 1.8 EU member states with more productive firms are richer

TFP and per capita GDP levels in 2013

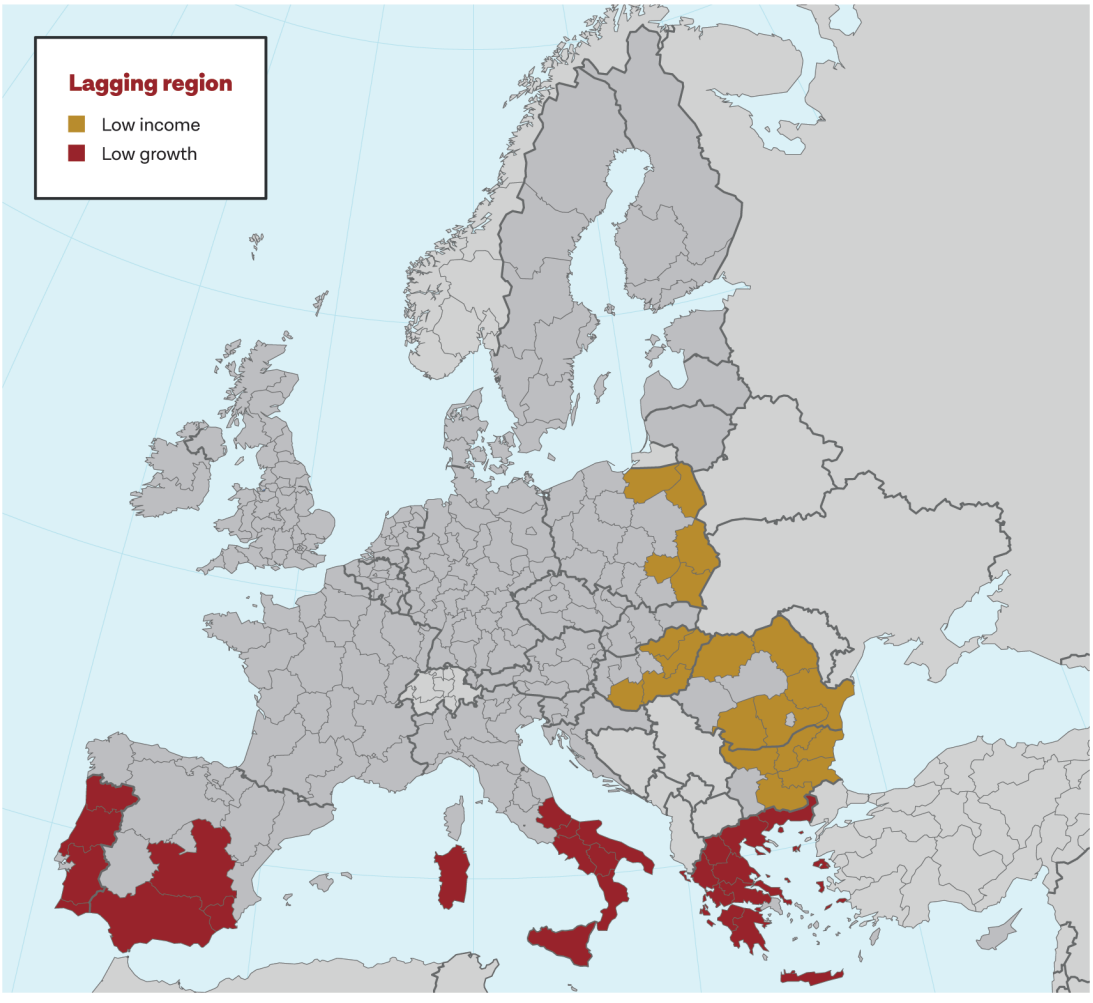


Source: U.S. Census Bureau, International Data Base (Figure 1.28); Amadeus/Orbis and World Development Indicators.

Within countries, regional divides are widening. Even when regions were converging to the EU average in the run up to the global crisis, regions within CEE countries were diverging, while regions within EU15 countries were largely not converging (figure A1.2). There are two types of 'lagging regions' in Europe: low-income regions, with GDP per capita under 50 percent of the EU average (located in Bulgaria, Hungary, Poland, and Romania); and low-growth regions, where GDP per capita has not converged toward the EU average over the past decade (located in Italy, Greece, Portugal, and Spain) (figure 1.9). Between 2005 and 2015, 'low growth' regions experienced zero growth in GDP per capita compared to the EU average of 2.1 percent annually, while 'low income'

regions grew on average by 4.6 percent annually. Slow growth regions in Southern European are of greatest concern, as they are already diverging, but low income regions in CEE countries run the risk of becoming slow growth regions.

Figure 1.9 Some regions are lagging



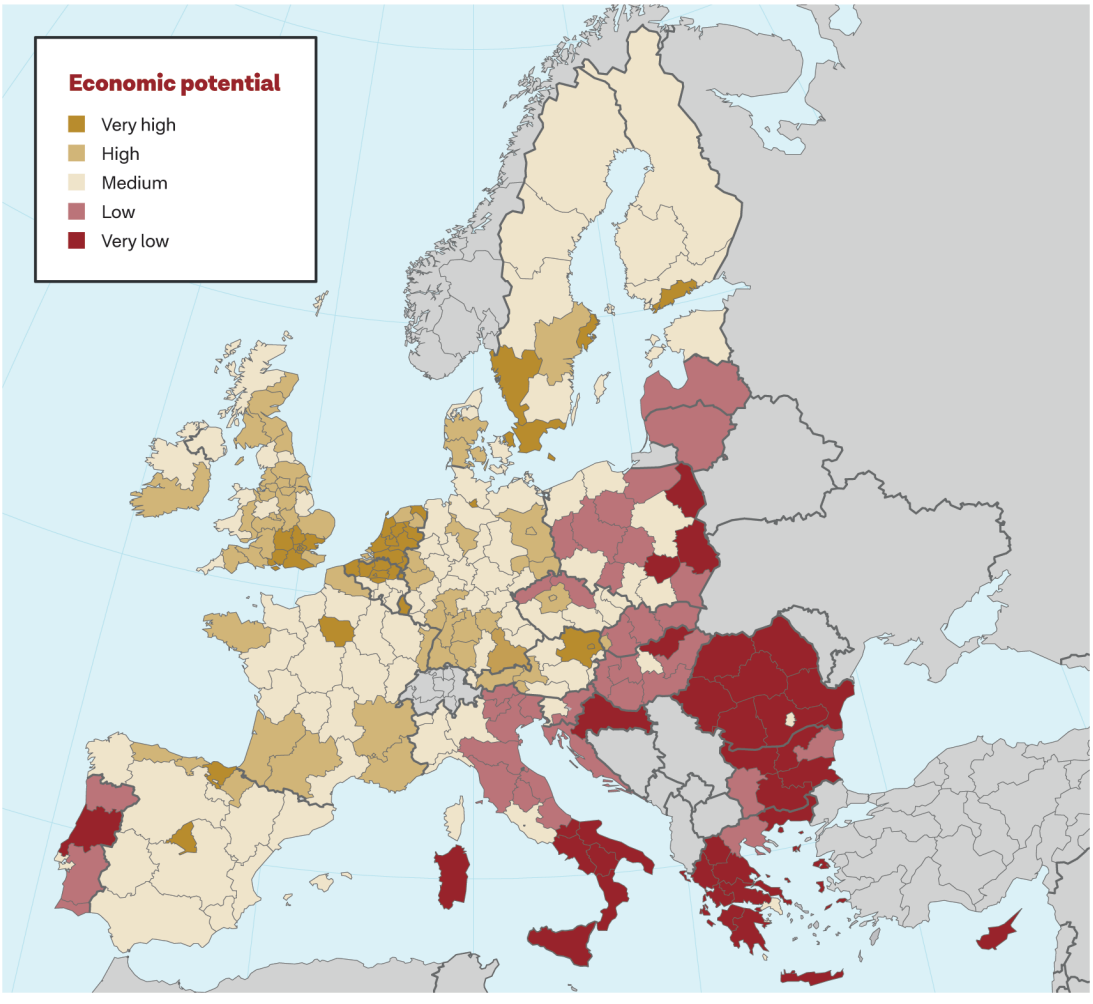
Source: EUROSTAT.

Lagging regions are held back by their low economic potential. Recent work by the World Bank (Farole et al. 2018) has developed a measure of economic potential of regions (Economic Potential Index, EPI), which explains most of the variation in GDP per capita across regions in terms of 'endowments' like population density, market access, education, institutions, sectoral structure, and investment. Lagging regions map closely to "very low" potential regions (figure 1.10). The bottom 20 percent EPI regions are highly dependent on the agricultural sector — their score in this dimension is nearly 4 times higher than the EU average. Their institutions are of poor quality, with a score 60 percent below the EU average.[2] Skills also appear to be a significant differentiator, with the top 20 percent EPI regions having roughly 50 percent higher share of skilled labor pool (as measured by the share of tertiary-educated workers), while bottom regions are 40 percent below average. The share of early school leavers is also much higher in the bottom

EPI regions. Market access also distinguishes high and low potential regions, with top EPI regions scoring regions nearly 20 percent above the EU average, while bottom regions roughly 30 percent below average.

Figure 1.10 Lagging regions have substantially lower economic potential

Mapping of NUTS-2 regions by EPI category



Source: World Bank and the European Commission (forthcoming).

Low-income Europeans are being left behind in the labor market

Within-country inequality has increased in most of today's EU countries since the 1990s, particularly in CEE countries. The increase in within-country household income inequality (inequality henceforth, unless otherwise noted) was most notable between 1989 and 1995, particularly in CEE countries, as they transitioned into market economies (figure 1.11 and box 1.1). Inequality remained largely unchanged in run up to the global crisis in non-CEE EU countries, while it continued to increase in CEE countries. Inequality picked up somewhat after 2008. And recovery has not brought inequality down — in fact, it continues to grow in many countries (figure A1.3).

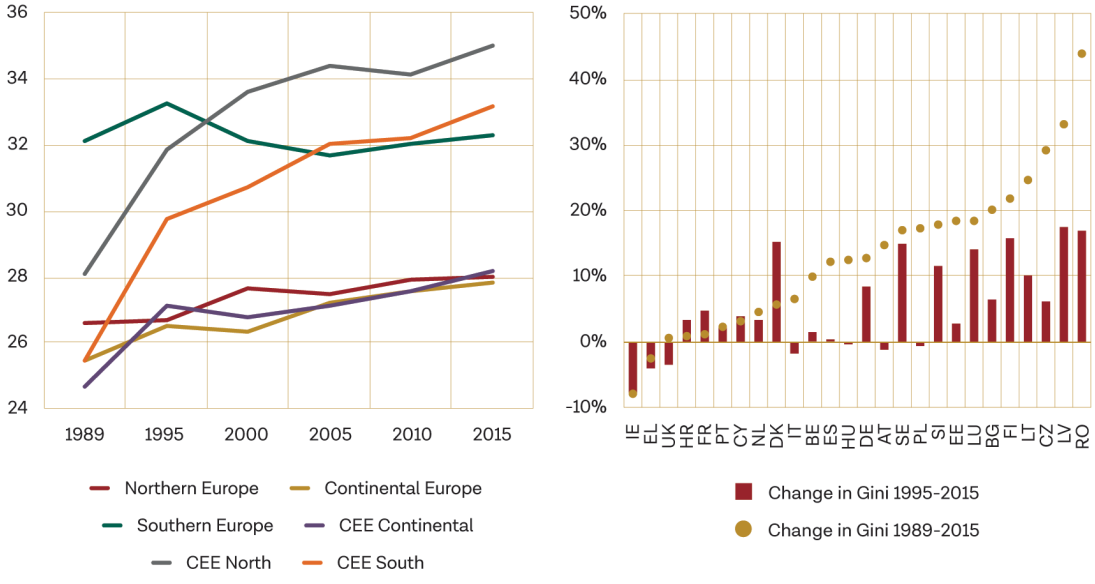
Box 1.1. Decomposing the EU-wide convergence of regions and households

The convergence of regions and households across the EU is determined by what happens between countries (between-country convergence) and within countries (dynamics of within-country inequality between regions and households). Between-country convergence drove the convergence of household incomes across the EU in the period up to 2008, offsetting the negative impact of the increase in within-country household income inequality. Household incomes diverged after 2008 as between-country convergence stalled and within-country inequality increased. The same pattern is observed for EU-wide inequality between regions.

Figure 1.11 Within-country household income inequality has increased over the long term

A. Gini coefficients 1989–2015

B. Changes in inequality, 1989–2015



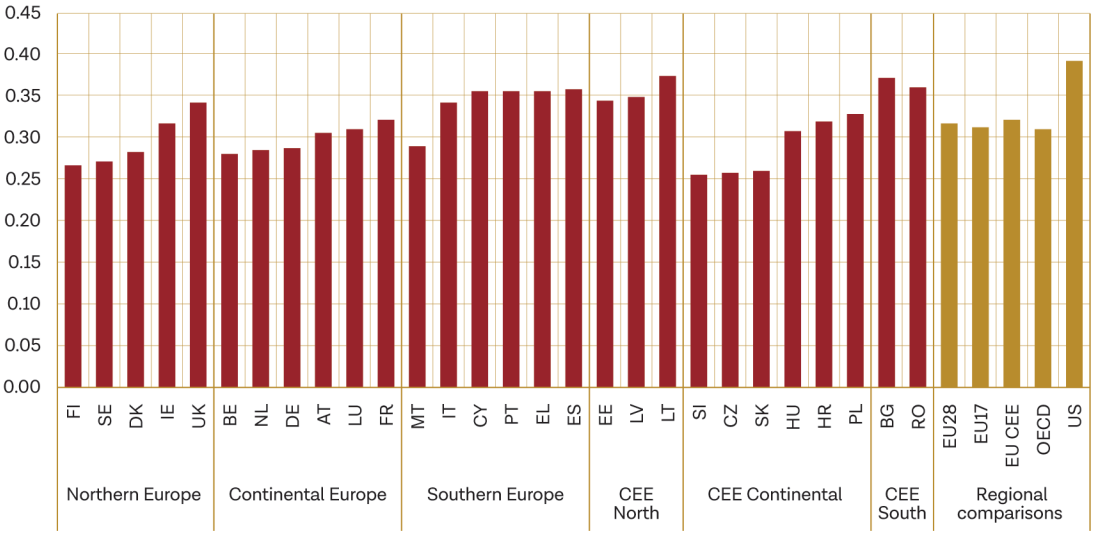
Source: Own estimates using the Standardized World Income Inequality Database (SWIID) version 6.1 (Solt, 2017).
Note: Countries on Panel B are ranked by the change in Gini between 1989 and 2015.

Average inequality in the EU is *on par* with the OECD average, but most CEE and Southern European countries are above the OECD average. Average inequality for the EU is very similar to the OECD average (figure 1.12). But inequality is higher than the OECD average in most CEE and Southern European countries. Although average inequality in the EU is well below that in the United States, inequality in Romania, Bulgaria, and Lithuania is not far behind.

Inequality may be higher and growing faster than estimated. Household surveys, which are typically used to estimate income inequality, tend to underestimate top incomes, particularly from capital. Tax data provide a more accurate picture of top incomes. Between 1989 and 2014, the share of the richest 1 percent in total fiscal income increased in all countries except France and Spain (figure A1.4). The largest shares and increases over time are observed in Northern European countries, although even there, levels are still below those in the US.

Figure 1.12 Inequality in most CEE and Southern European countries is above the OECD average

Gini coefficients of disposable income per capita, 2014



Source: EUSILC (authors' calculations), OECD and German Socio Economic Panel.

Note: Gini coefficients estimated for disposable income per capita. Regional averages are unweighted.

What's behind the growing income inequality?

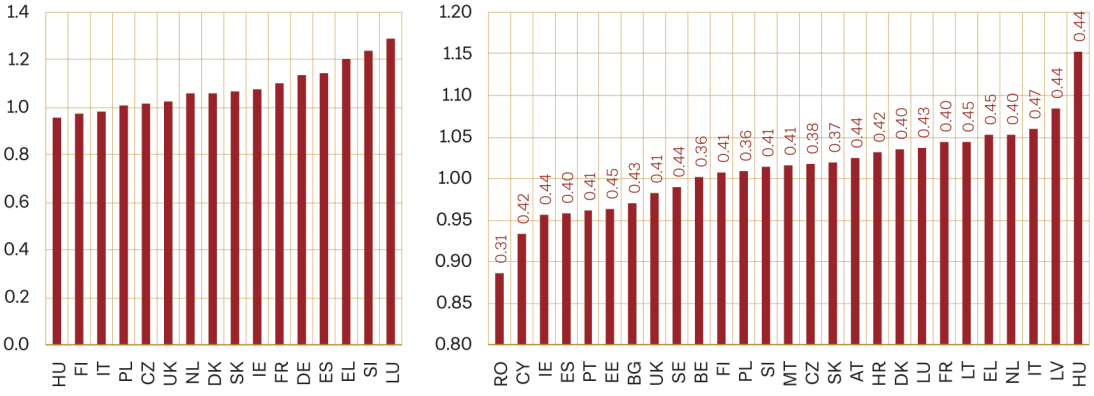
- At core: labor income inequality is gradually increasing as low-income people fall behind — and it is still the main driver of total income inequality.
- Capital income and wealth are increasingly more concentrated at the top of the distribution, having an increasing impact on total income inequality as the capital share in GDP increases (box 1.2).
- Fiscal policy has a large inequality-offsetting effect in EU countries, more so than in other parts of the world, but it is becoming harder to offset the increasing labor and capital income inequality.

Labor income inequality has been rising in most EU countries, particularly in the south, and accounts for most of total income inequality. Per capita labor income has gradually become more unequally distributed since the 1990s in most EU countries, a trend that intensified after 2008, particularly among Southern countries (except for Romania), where labor income inequality is already the highest (figure 1.13). Changes in employment and earnings accounted for a large share of the increase in household income inequality in most EU countries between 2009 and 2014.[3] The contribution of labor income to total inequality exceeds 70 percent in all countries (figure 1.14) and is relatively higher in CEE countries.

Figure 1.13 Labor income inequality has been rising in most EU countries

A. Ratio of labor income Gini, 1990s–2010s

B. Ratio of labor income Gini, 2009–14, and labor income Gini in 2014 (values on top of bars)

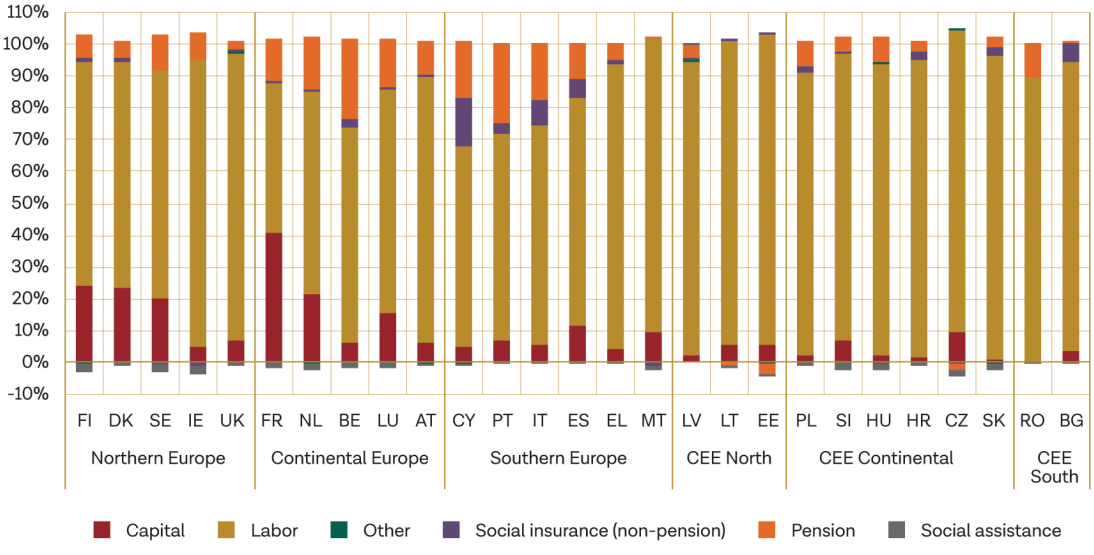


Source: Own estimates using LIS (left) and EU-SILC (right).

Note: Left panel plots the ratio of the Gini of total household labor income per capita in the most recent year of the 2010s and the median year of the 1990s. Right panel: values on top of bar are labor income Gini coefficients in 2014.

Figure 1.14 Labor income inequality accounts for most of total income inequality

Contribution of gross income components to per capita household gross income inequality, 2014



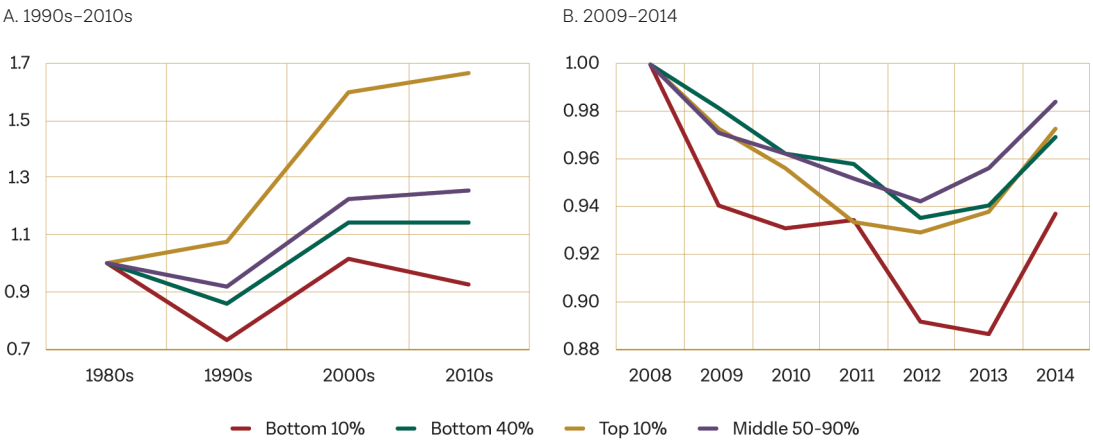
Source: Own estimates using EUSILC Surveys.

The increase in labor income inequality is driven by the relative fall of low-income households in the labor market. Per capita household labor income growth at the bottom of the distribution has been much slower than that in the middle and, particularly, the top of the distribution since the 1980s (figure A1.5). In the 1990s, the top 10 percent grew while the bottom 10 percent saw a decline in average incomes. Incomes recovered during the 2000s, but growth at the top outpaced growth at the bottom. Incomes declined across the distribution during the global crisis, but those at the bottom fell more than those at the top. Since 2014, there has been a recovery, but the bottom 10 percent are still well below their incomes before the crisis. The increase in labor income inequali-

ty is driven by the growing inequality between top and bottom individual earnings (figure 1.15). In fact, low-pay workers saw their earnings decline during the 2000s, while middle-pay and high pay workers saw increases.[4] Earnings declined across the distribution after 2008, but the drop is significantly larger for the bottom 10 percent. The shares of employed adults and earners, which are significantly lower at the bottom of the household income distribution, also dropped disproportionally for the bottom 10 percent between 2008 and 2014 (figure A1.6).

Figure 1.15 Low earners have been falling behind

Trends in individual earnings by segment of the household income distribution, 1980s–present, index (1980s = 1), EU average

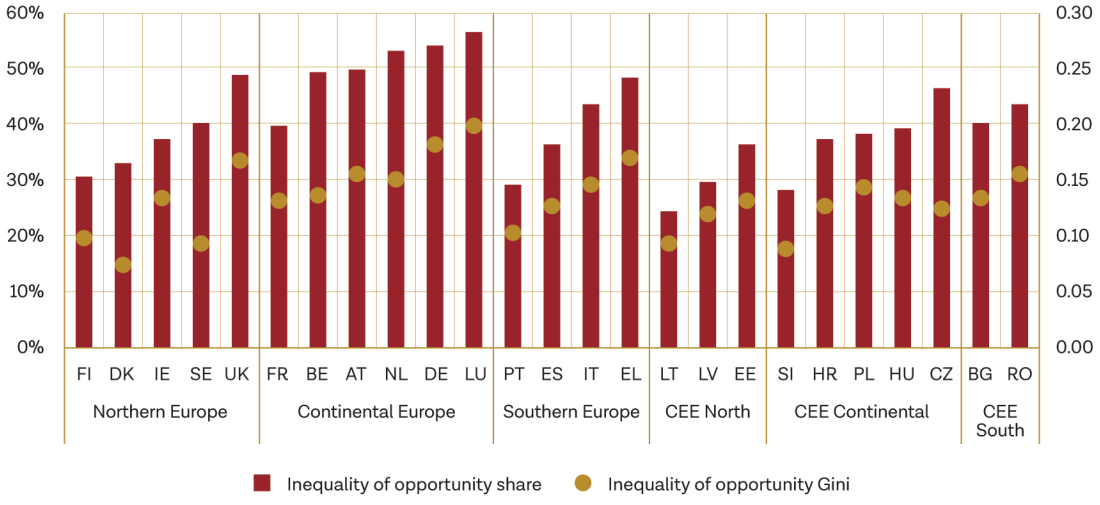


Source: Own estimates using the Luxembourg Income Study (LIS) data (left) and EU-SILC (right).

Note: Left panel plots individual earnings (indexed to the 1980s) in the median year of the 1980s and 1990s, and the most recent year of the 2010s for different segments of the household disposable income per capita. EU averages include today's EU countries.

These growing inequalities are likely to persist over time and impact long term growth negatively, as children from low income households have fewer opportunities to thrive than their more affluent peers. Checchi et al. (2015) find that, on average across EU countries, two-fifths of the inequality in individual disposable labor income is explained by factors beyond the control of individuals (that is, inequality of opportunity) (figure 1.16). They also find that differences cross EU countries in inequality of opportunities are most strongly associated with how much countries spend on education relative to GDP, particularly at the preprimary level. Recent evidence shows that the relationship between inequality and economic growth is largely negative (for example, Grigoli and Robles 2017). This negative relationship works primarily through unequal opportunities to building human capital (OECD 2015).

Figure 1.16 A large share of labor income inequality is explained by unequal opportunities



Source: Checchi et al. (2015).

Note: Inequality of opportunity refers to inequality due to factors outside of the control of individuals: Parental education, country of origin, gender and age-cohort. Labor income is net of taxes (disposable). The inequality of opportunity Gini is measured on the right axis.

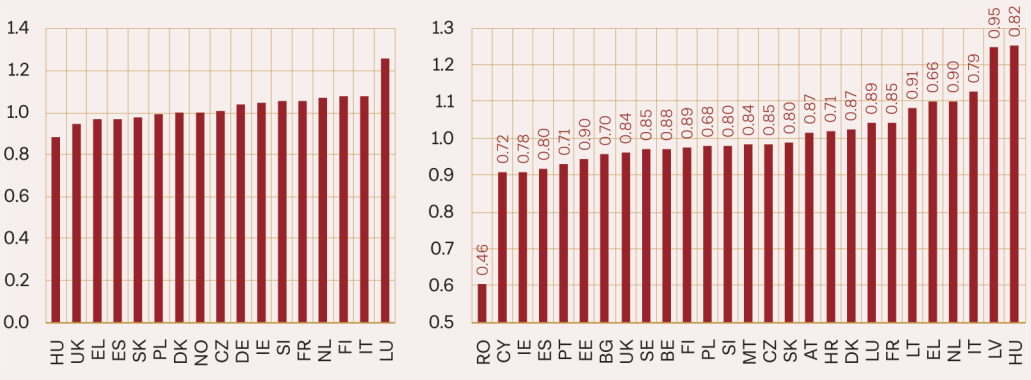
Box 1.2. Capital income inequality is worsening, as wealth is increasingly concentrated at the top of the distribution

Capital income inequality in Europe is high, especially in the richest countries, and has been rising in most countries over time, increasing its contribution to total income inequality as the share of capital income in GDP increases. Capital income inequality levels are significantly higher than labor income's, particularly in wealthier countries of North and Continental Europe and Latvia (figure 1.17). Given the relatively small share of capital income in total household income, the contribution of capital income inequality to total inequality is low (see figure 1.14). But it is increasing in countries where capital income inequality is already high. Capital income inequality has increased in many countries since the 1990s,

Figure 1.17 Capital income inequality is worsening

A. Ratio of capital income Gini, 1990s–2010s

B. Ratio of capital income Gini, 2009–2014, and capital income Gini in 2014 (values on top of bars)



Source: Own estimates using LIS (left) and EU-SILC (right).

Note: Left panel plots the ratio of total household capital income per capita in the median year of the 2010s and the same in the 1990s. Right panel: values on top of bar are capital income Gini coefficients in 2014.

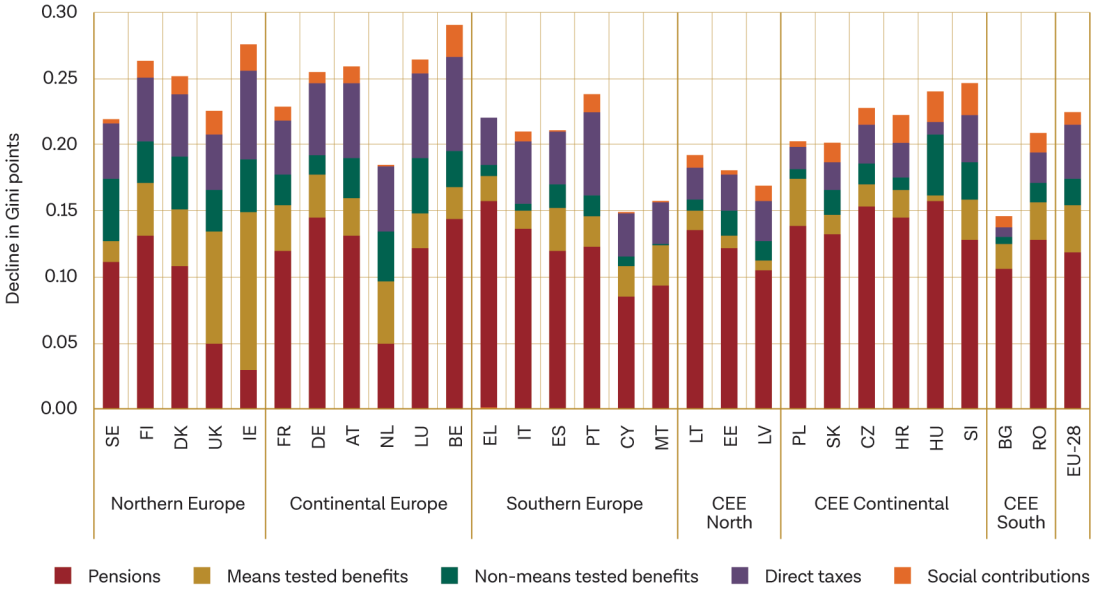
as capital income doubled among the richest 10 percent of households and declined for the bottom 40 percent. Capital income inequality increased in a few countries after 2008, particularly in Latvia and Hungary. As noted earlier, capital income inequality is likely to be higher, growing faster and contributing more to overall inequality than estimated. This is consistent with the observed gradual increase in the capital income share in GDP over time in most EU countries.

A high and increasing concentration of wealth at the top underpins capital income inequality. Between 2010 and 2016 wealth inequality increased in most EU countries, particularly in non-CEE EU countries (figure A1.7). Wealth inequality is significantly higher than income inequality and it is particularly high in Northern and Continental European countries. Wealth and income inequality reinforce each other, as higher wealth holdings, especially financial assets, generate higher capital income and, conversely, higher income results in higher wealth as saving increases with income. Wealth inequality is increasing as wealth is becoming increasingly concentrated at the top of the distribution, particularly the wealthiest 1 percent of the population. Historical data from the World Wealth and Income Database for France and the US show that the share of the wealthiest 1 percent has increased the most since 1990. Today, although EU countries are far from the levels in the USA, the wealthiest 1 percent of the population already commands more than 20 percent of total wealth in many EU countries (figure A1.8).

Fiscal policy has a large inequality-offsetting effect in EU countries, more so than in other parts of the world, but it is becoming harder to offset the increasing labor and capital income inequality. Between 1995 and 2008, fiscal policy had a larger impact on inequality in the EU than the US, driving EU-wide net income inequality down at a time when US net income inequality was increasing (figure A1.9). Today, net income inequality is significantly lower in the EU than in the US, despite having essentially the same level of market income inequality. In 2016, fiscal policy reduced income inequality by 20 points in the EU on average, well above the average for non-EU OECD countries (9 points). The impact is consistently large across EU countries, particularly in countries with higher fiscal capacity (figure 1.18).

Figure 1.18 Fiscal policy has a large redistributive impact across EU countries, particularly pensions

Redistributive impact of fiscal policy and its instruments, 2016 policies



Source: Based on Euromod microsimulations of 2016 policies.

Note: Values indicate changes in Gini between income with and without each fiscal intervention.

The most redistributive instrument is pensions, followed by direct taxes, with means tested benefits playing a smaller role. Pensions is the single most powerful redistributive instrument, accounting for at least 50 percent of the overall impact of fiscal policy on inequality across EU countries, except in the UK, Ireland and the Netherlands (figure 1.18). Means tested benefits play an important role in Ireland and the UK, but are relatively small elsewhere. Direct taxes and social contributions are relatively important, particularly in the Northern and Continental countries. The redistributive impact of tax and benefits depend on the design of policies as well as on their relative size (chapter 3). Progressive tax and benefits have a more limited impact when the tax base is low and programs are small.

Growing United: A conceptual framework

Growing United argues that the growing divides between countries, regions and households are explained by the interplay between technological change and low opportunities for people and firms to thrive in some parts of Europe. Technological change is boosting inclusive growth in countries and regions that provide high opportunities for people and firms to thrive, but it can be disrupting in places where opportunities are low, thus generating divergence. This calls for an upgrading of the convergence machine to seize the benefits of technological change for all Europeans. How? By refocusing the convergence machine on promoting convergence of opportunity for people and firms.

Technological change is nothing new, but it is accelerating and becoming the most important source of opportunity and disruption. Technological change is not the only megatrend generating divergence. The increasing offshoring of production processes and jobs is also a major source of opportunity and disruption, although some of that could be reversed in the future as the price of automation technology goes down. Population aging is making TFP growth more crucial than ever for long term economic growth, and it is also inducing firms to adopt automation technology more intensively. However, technological change is likely to stand out as the most important, and least predictable, driver of inclusive growth in the EU. Technological change is accelerating, as automation of previously unimagined tasks and the increasing use of artificial intelligence and 3D printing stand to revolutionize activities in all economic sectors.

Technological change is not exogenous to national policies: policies that shape the opportunities for people and firms to thrive also influence the adoption of new technology by firms: competition and labor policies, support for firms' technology adoption, and the skills of the workforce. And by creating more opportunities for self-employment, technological change is blurring the lines between people and firms. This generates greater complementarity between opportunities for firms and opportunities for people, but it also creates some tensions, as social insurance institutions are built on the standard employment relationship between firms and employees.

This report proposes a simple framework to examine the growing divides, whereby the potential of countries to grow inclusively is jointly determined by the opportunities of people and enterprises to thrive. There are many factors that affect growth and inequality, but this report argues that the potential to grow inclusively is fundamentally determined jointly by the opportunities of people and enterprises to thrive and contribute productively to the economy. These opportunities are influenced by policies at the levels of the EU, member states and regions. The potential of individuals to prosper is mainly determined by their access to opportunities to build relevant skills for work and to find good jobs, which can only be realized if enterprises use these skills effectively.

And the opportunities of firms to grow and generate jobs are mainly shaped by the business and innovation environment, as well as by the supporting infrastructure.

The framework is built on the principle of equality of opportunity for firms and people. This principle is well-established for people (World Bank, 2005), but this report extends it to firms as well. It means the prosperity of people and firms should be determined by talent, effort and entrepreneurship, not by circumstances at birth for individuals (for example, birthplace, parental education) or the enabling environment for firms, which are outside of their control. Policies should therefore focus on equalizing opportunities and compensating for unequal circumstances. To be clear, this report does not argue against business regulations. A simple and efficient regulatory framework is needed to balance social responsibility of firms with a vibrant enterprise sector. Excessive regulations, however, constrain the ability of firms to reach the minimum size required to be competitive, to become more productive (including through the adoption of technology and the movement to agglomeration centers) as well as to be global (through exports or offshoring) and to attract foreign investment. And the equality of opportunity principle also involves allowing firms and people to move to where opportunities are higher, be it in the same country, or across the Union.

Using equality of opportunity as a policy principle would generate unbalanced growth, but based on a level-playing field — and policies can make growth more inclusive. Relieving productive firms from barriers to thrive is good for economic growth, but not all firms will do equally well. The provision of equal opportunities for people to build relevant skills is good for growth and makes it more inclusive, but not all individuals will succeed equally. At the nexus, more productive firms will be able to generate more jobs and pay higher salaries but the benefits will tend to accrue to high-skill workers, increasing inequality (see chapter 2). And some people will inevitably fall behind. The resulting growth will be unbalanced across people, regions and countries — more so if people and firms move to places where opportunities are higher, but based on a level playing field. Labor and social protection policies can reduce inequalities by supporting the employment of low-skill workers, and providing a safety net to those who fall behind. The application of this principle shifts the policy focus of the convergence machine toward equalizing opportunities rather than incomes and profits, maximizing the economic potential of regions and countries rather than convergence of GDP per capita, and supporting those who fall behind (box 1.3).

Box 1.3. This report's perspective on the convergence machine

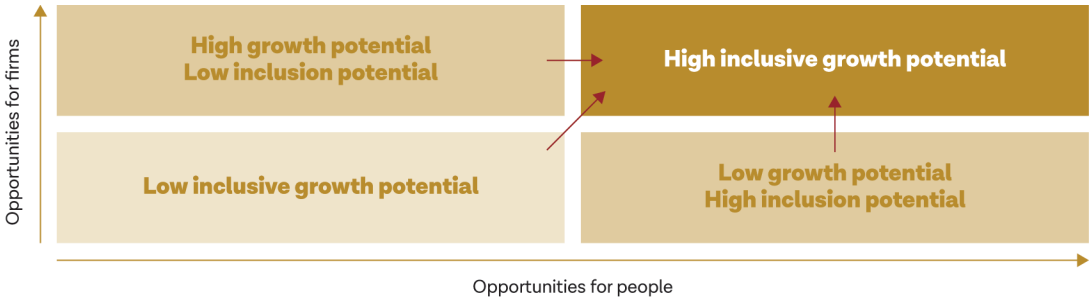
Convergence "on what": countries, regions and household across the EU. Between-country convergence is not sufficient to have convergence between regions and households — within country inequalities need to be reduced.

Convergence "of what": equalizing opportunities of people and firms — rather than incomes and profits, maximizing the economic potential of countries and regions — rather than convergence of GDP per capita, and supporting those who fall behind.

The framework can be illustrated by a two-dimensional space that maps opportunities for firms and people to thrive in each country or region and the resulting potential for inclusive growth. Opportunities for firms (OF) are determined by the business environment, supporting infrastructure, and the supporting environment for upgrading firms' capabilities through innovation and technology adoption. These opportunities result in a distribution of firms by TFP levels. A better business and innovation environment leads to a higher share of firms at the top of the TFP distribution. Burdensome business regulations lead to a high share of lagging firms. Opportunities for

people (OP) include opportunities to build relevant skills and find good jobs, and second chances for people who fall behind. These opportunities mainly result in a distribution of workers by skill level. High opportunities lead to a high share of high-skill workers, low opportunities result in a high share of low-skill workers. This report argues that OF and OP are complementary and jointly determine the potential of countries and regions to growth inclusively, as illustrated in figure 1.19.

Figure 1.19 The opportunities for firms and people to thrive jointly determine the potential of countries and regions to grow inclusively



Opportunities for people and firms are complementary — some parts of Europe are doing well on opportunities, others less so. Chapter 5 maps countries into the opportunity space (see chapters 3 and 4 for details)**.** OF and OP are largely complementary, as most countries are along the bottom left-top right space of figure 1.19. At one extreme, the vast majority of youth — including those from disadvantaged backgrounds — in the Northern European countries, Germany, Estonia, Latvia, and Poland achieve basic competency levels, and their firms enjoy considerable economic freedom to thrive. Firms in Northern European countries and Germany also enjoy a supportive environment for innovation, making these economies productivity leaders, with a high share of frontier firms. At the other extreme, most Southern European countries as well as Bulgaria and Romania tend to have a high share of low performing students, mostly from low socioeconomic backgrounds, and high early school leaving. They also tend to have burdensome regulations and little support for firm innovation, which generate too few frontier firms and too many lagging firms.

Technological change is boosting inclusive growth in countries and regions with high opportunities, but it is disrupting it in places where opportunities are low, generating divergence

Technological change is driving a wedge in product and labor markets by providing immense opportunities for some firms and workers while leaving others behind. Jobs are becoming more cognitive- and less routine-task intensive (see chapter 2). This is making jobs more intensive in skills that complement technology (cognitive and social-emotional skills). Workers well-equipped with these skills (high-skill workers) are benefiting from these changes, while low-skill workers are losing the most. Thus, low-income Europeans are being left behind in the labor market because of their low skills, at a time when technological change and globalization are making jobs more skill intensive. On the firm side, frontier firms are benefiting the most from technological change and globalization. Productivity dispersion between firms is large and rising, as top firms are pulling away and bottom firms are falling behind.

The impact of technological change on inclusive growth ultimately depends on the opportunities that countries provide to their people and firms. First, the impact of technological change on growth and inequality over the long term will likely depend on the extent to which opportunities are provided today to all young people to acquire relevant skills for the labor market, as those will shape the distribution of skills in the future workforce (see chapter 3). The impact will also be shaped by the extent to which labor markets and social policy balance flexibility with security. Low opportunities for people would therefore tend to reduce the positive impact of technological change on growth, as fewer people are able to benefit from it, and amplify its impact on inequality. Second, the impact of technological change on productivity growth and job creation at the country level depends on the extent to which firms in each country are able to benefit from it (chapter 4). A more burdensome and less competitive business environment tends to generate a larger share of small, low-productivity, firms. These firms are less able to benefit from new technologies, and have less incentives to do so.

Technological change is boosting inclusive growth in places where opportunities are high, but it is disrupting it in places where opportunities are low, generating divergence. The acceleration of technological change is making it increasingly difficult for countries and regions with high shares of low-skill workers and lagging firms to continue to grow inclusively. Technological change is boosting inclusive growth in countries and regions with advanced opportunities to take advantage of it. But it can hold inclusive growth back in countries with low opportunities — more so if higher skilled workers and more productive firms move to places with higher opportunities.

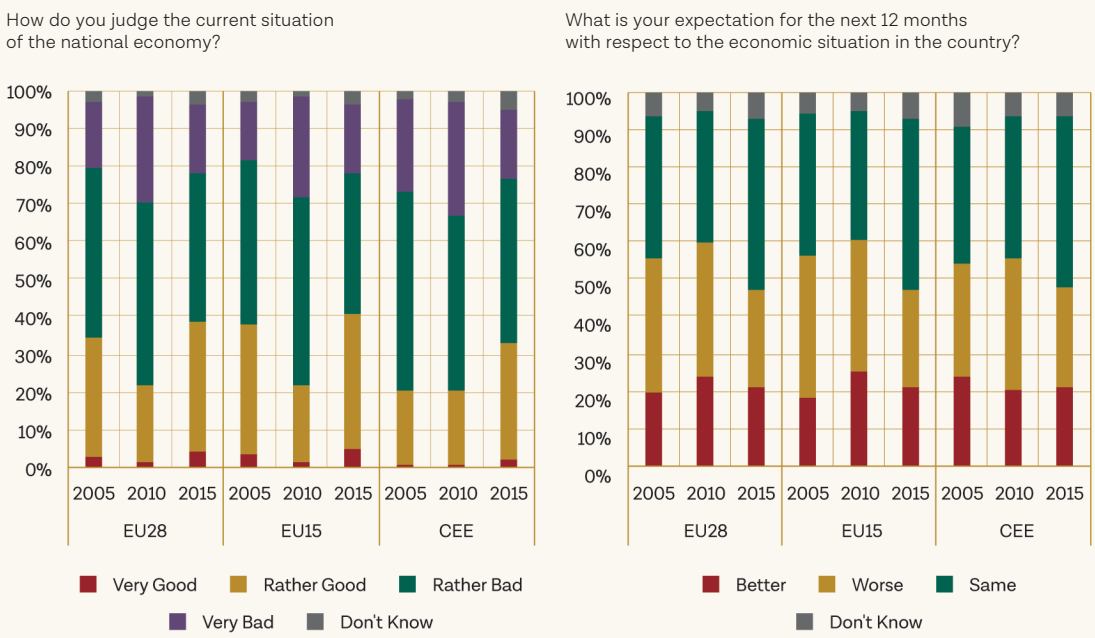
Notes

1 TFP is a measure of the efficiency with which countries transform factors of production and intermediate inputs into final output.
2 The quality of institutions is measured by the European Quality of Government Index.
3 Based on authors' micro decompositions of changes in household disposable income using EU-SILC and given household composition as well as different sources of market and non-market income.
4 This is consistent with the findings of Naticchioni et al. (2014) for 17 EU countries (mostly EU15) between 1995 and 2007.

Spotlight:
Beyond the "hard data": Growing dissatisfaction among Europeans

Most Europeans are pessimistic about the economy beyond what realities would suggest. Beyond the "hard data" on the growing divide, there is a high level of dissatisfaction among Europeans. Most Europeans consistently believe the economic situation in their countries is not good and will not improve in the future (figure S.1). Although perceptions improved in 2016 relative to 2010 and are gloomier in countries where the economic situation is worse, they are persistently dire across EU countries and time. In and of itself, this pessimism should be of great concern for EU institutions and countries. From a policy perspective, however, it is very important to identify possible 'objective' explanations for the apparent over-pessimism, which are analyzed next.

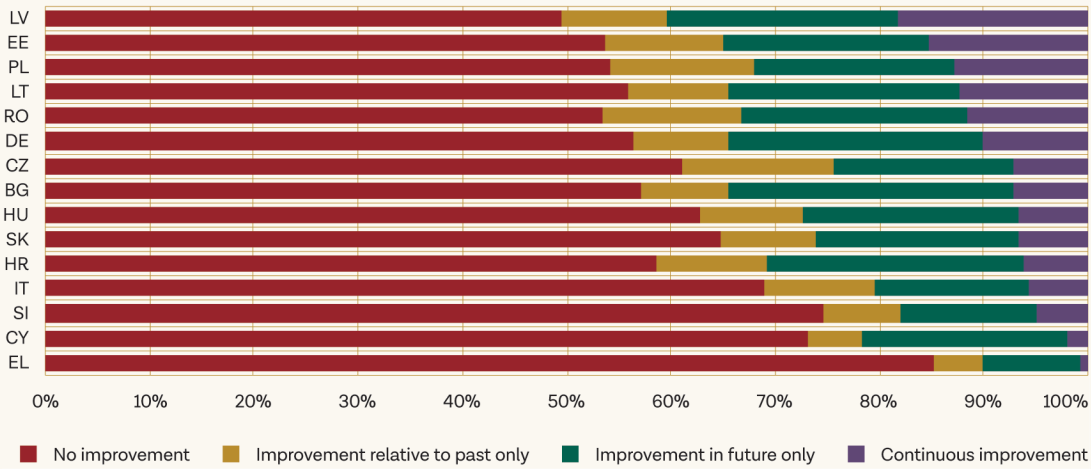
Figure S.1 European pessimism about the economy



Source: Eurobarometer.

Perceptions about the economy are partly influenced by the different realities people face — yet people also seem to be over-pessimistic about their own well-being. Most people in all 15 EU countries surveyed by the Life in Transition Survey (LiTS) perceive no improvement in their welfare relative to the past and looking to the future (figure S.2). Not surprisingly, perceptions are more dire in countries where the economic situation is still gloomy, like in Greece and Italy. Older, less educated, and unemployed people are less likely to perceive less improvement in their welfare, but these variables only explain a small part of the gloomy perceptions. And people who perceive no improvement in their own welfare are significantly more likely to have a negative view of the economic situation in their countries after controlling for individual characteristics.

Figure S.2 Most Europeans in LiTS perceive no improvement in their welfare



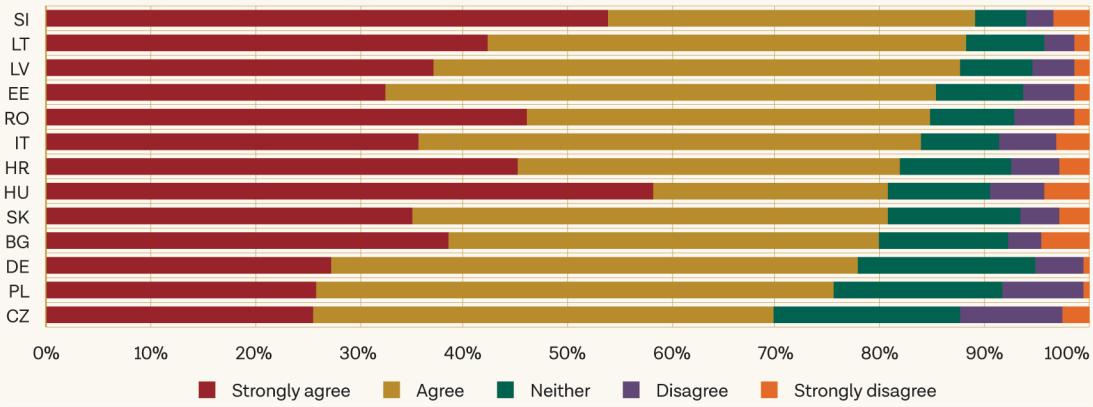
Source: Own estimates based on the Life in Transition Survey III (2016).

The apparent over-pessimism about own welfare may be explained by people comparing themselves to others who are doing better, rising expectations and increased uncertainty about the future. Most Europeans in LiTS benchmark their economic well-being against others, most notably friends, neighbors and Western Europeans, suggesting that part of the reason why people are pessimistic when they themselves are doing better is because they are increasingly comparing themselves with others that may be doing better. Younger and more educated Europeans are more likely to compare themselves with peers in Western Europe than with their parents. Also, younger people are more likely to view themselves worse-off than their parents, and that perception is over and above actual intergenerational mobility, suggesting that people may be becoming more pessimistic simply because expectations are rising. Finally, jobs are becoming more temporary and less secure, particularly among low-skilled youth, but social protection and labor institutions are ill-prepared for those changes (see chapter 3), suggesting some segments of the population are facing increased uncertainty, which tends to make them more pessimistic.

The apparent over-pessimism about the economy may be partly explained by the increasing concern for inequality and the lack of trust in governments and EU institutions. Most Europeans in LiTS believe inequality should be reduced, and social injustice is perceived to be the most important reason for people to be in need (figure S.3). And people who are more concerned about inequality tend to be more pessimistic about the economy, other things being equal. About 54 percent of Europeans trust neither the government, nor the EU to solve their problems, and those with low trust tend to have a significantly more negative view of the economy, other things being equal (figure S.4).

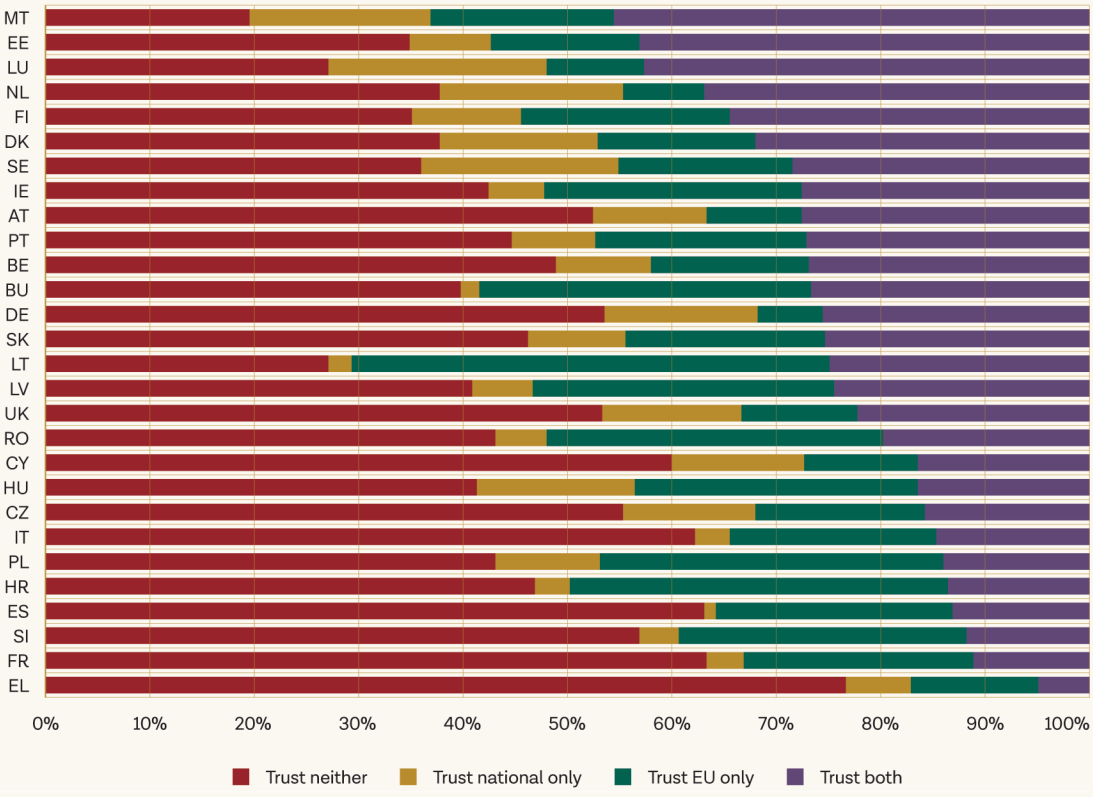
But populist movements also play a role in driving negative perceptions. So far, all the explanations for the apparent over-pessimism are rational and, as such, EU institutions and national governments should take them very seriously. However, are populist movements exploiting frustration to make people believe things are worse than they really are for political gain? The answer is probably yes, but it is hard to prove it empirically. That said, Europeans in countries with a relatively higher share of votes going to populist parties are 27 percentage points more likely to have a negative view of the economy, other things being equal.[1]

Figure S.3 Most Europeans belief that the inequality gap should be reduced



Source: Own estimates based on LiTS.

Figure S.4 Trust in governments and EU institutions is low



Source: Eurobarometer.

Notes

[1] Based on a Probit regression for the probability of voting for a populist candidate as a function of perceiving that the quality of life was better in past and dissatisfaction with economy given.

Chapter 2:

The "Future of Work" is now: Implications of technological change for workers and firms

Growing United argues that accelerating technological change is becoming a key driver of Europe's growing divides by providing ever richer opportunities for well-skilled workers and frontier firms, while low-skilled workers and less productive firms risk falling behind. First, jobs are becoming more intensive in nonroutine cognitive tasks and less intensive in routine cognitive and manual tasks. This is making jobs more intensive in skills that complement technology (cognitive and social-emotional skills). Workers well-equipped with these skills (high-skill workers) are benefiting from these changes, while low-skill workers are losing the most. Thus, low-income Europeans are being left behind in the labor market because of their low skills, at a time when technological change and globalization are making jobs more skill intensive. Second, technological change is contributing to large and increasing productivity dispersion between firms, as the most productive firms are pulling away and bottom firms are falling behind. This is closely associated with the increased wage dispersion between firms and the rise in overall wage inequality. At the country level, the impact of technological change on inclusive growth depends on the opportunities for workers and firms to benefit from it. As such, technological change is boosting inclusive growth in countries and regions with high opportunities for people and firms, but it is disrupting it in places where opportunities are low, generating divergence.

Technological change is nothing new, but it is accelerating and becoming the most important source of opportunity and disruption. Technological change is not the only megatrend generating divergence. The increasing offshoring of production processes and jobs is also a major source of opportunity and disruption, although some of that could be reversed in the future as the price of automation technology falls. Declining working age populations are making productivity gains the main driver of growth (Bussolo et al. 2015), and are inducing firms to adopt automation technology more intensively (Acemoglu and Restrepo 2017).

However, technological change is likely to stand out as the most important, and least predictable, driver of inclusive growth in the EU. Technological change is accelerating, as automation of previously unimagined tasks and the increasing use of artificial intelligence and 3D printing stand to revolutionize activities in all economic sectors. At the core, technological change is less about recurring employment and production shocks like in the past — remember the weaving machines that replaced the Luddites' handlooms in the 19th century or the robots that replaced assembly line workers in the 20th century but a continuous and accelerating process.

Technological change is not exogenous to national policies. Policies that shape opportunities for people and firms to thrive also influence the adoption of new technology by firms: competition and labor policies, support for firms' technology adoption, and the skills of the workforce. And by creating more opportunities for self-employment, technological change is blurring the lines between people and firms. This generates greater complementarity between opportunities for firms and opportunities for people. But it also creates new tensions as, for example, social insurance institutions are built on the standard employment relationship between firms and employees.

The impact of technological change on jobs has been the subject of intense debate. Economic and social research has gone deep in examining causes and likely effects of technological change on the labor market, and social media is rife with speculation about whether "the robots will take our jobs." While some work has identified types of jobs and task that are more prone to workplace automation, and attempted to quantify them, much of the discussion about the future impact remains, necessarily, speculative.[1] And several voices highlight evidence that automation may create as many new jobs as it destroys old ones (Autor 2015; Bessen 2016).

Technological change is to be embraced for the opportunities that it brings — policy needs to adjust to capture these opportunities and minimize the costs of disruption. This report is not speculative and neither takes a doomsday approach nor an optimistic view of the impact of technology on jobs and, in extension, on Europe's convergence machine. Rather, it is anchored in the analysis of changes in the nature of jobs and firm production processes, how those changes are linked to technological change (and other factors), and how they affect different types of workers and firms. Technological change creates new opportunities, but also carries a cost. The challenge for policy is to ensure that all workers and firms have the opportunity to benefit from it, while limiting its negative impact on workers that are left behind.

Implications for people

Technological change and globalization are making jobs more skill-intensive across all EU countries, increasing the relative demand for those skills that make workers more complementary to technology. High-skill workers are benefiting from these changes, while low-skill workers are losing the most. The impact of accelerating technological change and globalization on inequality and

growth over the long term will ultimately depend on the skill level of the workforce of tomorrow, and thus the extent to which opportunities are provided today to all young people to acquire relevant skills for the labor market (see chapter 3). It also depends on the extent to which labor and social protection policies offset some of the inequality-inducing effects of technological change and globalization. This section examines the evolution of the task content of jobs and its underlying drivers. It then looks at the implications of those changes for the skill intensity of jobs and the resulting changes in the labor market position of high-, medium-, and low-skill workers.

Jobs are becoming more cognitive- and less routine-task intensive

This study provides a comprehensive analysis of the evolution of the task content of jobs in EU countries. In order to construct a measure of task content of jobs in the EU, data on the task content of US occupations from the Occupational Information Network (O*NET 2003 2014) are matched with occupational data (at the 3-digit level) from the EU Labor Force Survey (LFS) for all EU countries between 1998 and 2014.[2] The results of using US-based task content data are very similar to those based on available country-specific skill surveys for European countries (Handel 2012), and deemed appropriate for analyzing the task content of occupations in the EU countries by the European Center for the Development of Vocational Training (CEDEFOP 2013). Following Acemoglu and Autor (2011), five measures of task content are constructed for each occupation, aggregated for each country and standardized over time: nonroutine cognitive analytical, nonroutine cognitive personal, routine cognitive, routine manual and nonroutine manual.[3] Table 2.1 provides information on the task items included under each task measure and examples of occupations that are intensive in these tasks.

Table 2.1. Construction of task contents measures

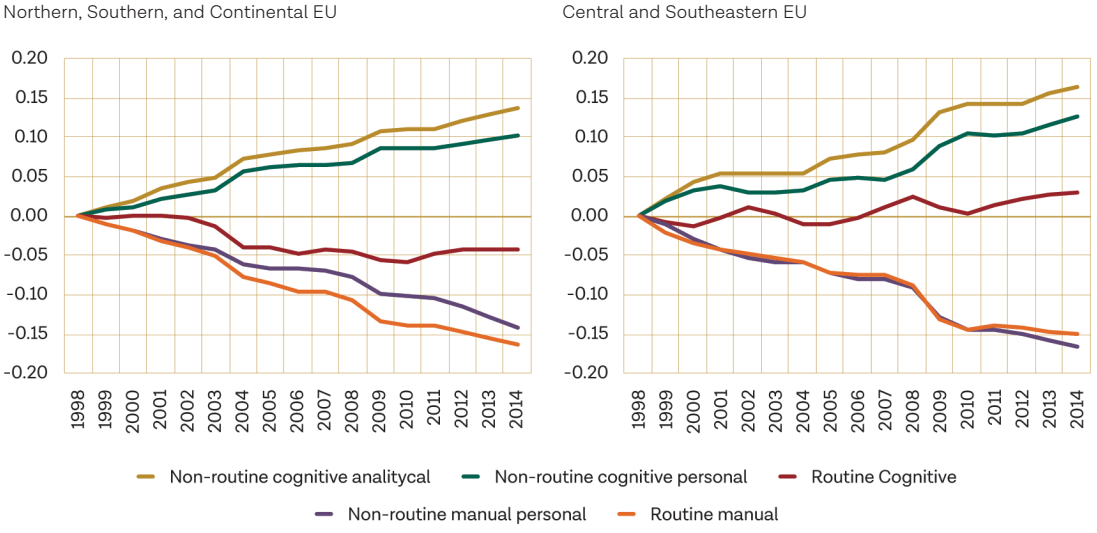
Task content measure *(T)*	Task items *(J)*	Examples of occupations
Nonroutine cognitive analytical	Analyzing data/information Thinking creatively Interpreting information for others	Managers, professionals — architects, engineers, lawyers, health professionals, technicians — IT specialists
Nonroutine cognitive interpersonal	Establishing and maintaining personal relationships Guiding, directing and motivating subordinates Coaching/developing others	
Routine cognitive	The importance of repeating the same tasks The importance of being exact and accurate Structured vs. unstructured work	Tellers, office clerks, salespersons, book-keepers
Routine manual	Pace determined by the speed of equipment Controlling machines and processes Spending time making repetitive motions	Assemblers, machine operators, agricultural workers
Nonroutine manual physical	Operating vehicles, mechanized devices, or equipment Spending time using hands and handle, control or feel objects, tools or controls Manual dexterity; Spatial orientation	Drivers, janitors, waiters

Source: Own elaboration based on Acemoglu and Autor (2011).

Across all EU countries, jobs are becoming more intensive in nonroutine cognitive tasks and less intensive in manual tasks. This is the same pattern observed for the US (Autor et al. 2003), except that in EU countries nonroutine manual tasks are also declining. The changes are more dramatic in older (and richer) member states than in CEE countries (figures 2.1, A2.1, and A2.2), and are least pronounced in Bulgaria and Romania.

Figure 2.1 Jobs are becoming more intensive in nonroutine cognitive tasks and less intensive in manual tasks

Occupation-specific task intensities, aggregated for each country and standardized over time, regional averages, 1998–2014



Source: Gorka et al. (2017a), commissioned for this report, based on EU-LFS data.

Note: Malta, Cyprus, and Luxemburg excluded because samples are too small. Results for country groups are presented in figures A2.1 and A2.2.

Routine cognitive tasks have been declining in the more advanced EU economies, but these tasks are still increasing in most emerging economies. As in the US, the routine cognitive task content of jobs has decreased in older member countries over time, although less so in the Southern European countries — it even increased slightly in Portugal and Greece. In contrast, the intensity of routine cognitive tasks has increased slightly in CEE countries. This increase is most pronounced in Baltic countries, but it also apparent in Poland, the Slovak Republic, Romania, and Bulgaria. The results also suggest that the global economic crisis had a disproportionate impact on routine cognitive and, particularly, manual jobs across the EU. Routine cognitive jobs have recovered somewhat since then, while manual jobs continue to lose ground.

But routine cognitive tasks will likely decline in CEE economies down the road. The analysis of the task content of jobs held by the unemployed suggests that routine cognitive tasks will eventually decline even in places where it is still increasing. Across all EU countries, jobs held by workers before they became unemployed are more intensive in manual and routine cognitive tasks than the average job, including in countries where routine cognitive tasks are still increasing. This would tend to decrease the routine task content of jobs (including routine cognitive tasks) over time.

Three main hypotheses have been put forward in the literature for explaining the observed changes in the task content of jobs: routine-biased technological change, offshoring and skills upgrading. The *routine-biased technological change* (RBTC) hypothesis (for example, Acemoglu and Autor 2011) posits that the adoption of technology leads to an increase in nonroutine cognitive tasks (complementary to technology), a decline in routine cognitive and manual tasks (replaced by machines) and a rise in nonroutine manual tasks (not amenable to automation and can be provided cheaply by workers). This translates into an increase in the demand for high-skill and low-skill at the expense of middle-skill workers, which results in job and wage polarization.

The RBTC hypothesis has been shown to be largely consistent with what has been happening in the US (for example, Autor and Dorn 2013). Also, there is evidence of a positive correlation between measures of technological change (for example, the use of ICT) and job deroutinization.[4] One fundamental prediction of the RBTC hypothesis does not hold for any EU country, namely the increase in nonroutine manual tasks.[5] While there are other potential explanations for that, RBTC hypothesis underestimates the impact of technology on tasks (and jobs). Manual tasks that were thought to be not amenable for automation, are being partly or fully automated. And the increasing adoption of technology in jobs that are intensive in "nonroutine" manual jobs is driving up the skill requirement for those jobs — take Uber as an example. So it is unclear a priori whether technological change leads to the type of polarization claimed by the proponents of the RBTC hypothesis. *Offshoring* is the other demand-side factor identified in the literature for explaining job de-routinization (Hummels et al. 2016).

Some authors have also stressed the role of the sheer increase in the supply of skilled workers (Hardy et al. 2016): the increasing number of skilled workers in the workforce are making jobs more cognitive and less routine-task intensive, and demanding (along with the increasing number of elderly people) more skill-intensive goods and services. These three hypotheses are interrelated and hard to disentangle empirically. The decision to offshore some jobs is partly influenced by the availability of technology to automate those jobs at home. And technology helps skilled workers make jobs more cognitive and less routine-task intensive.

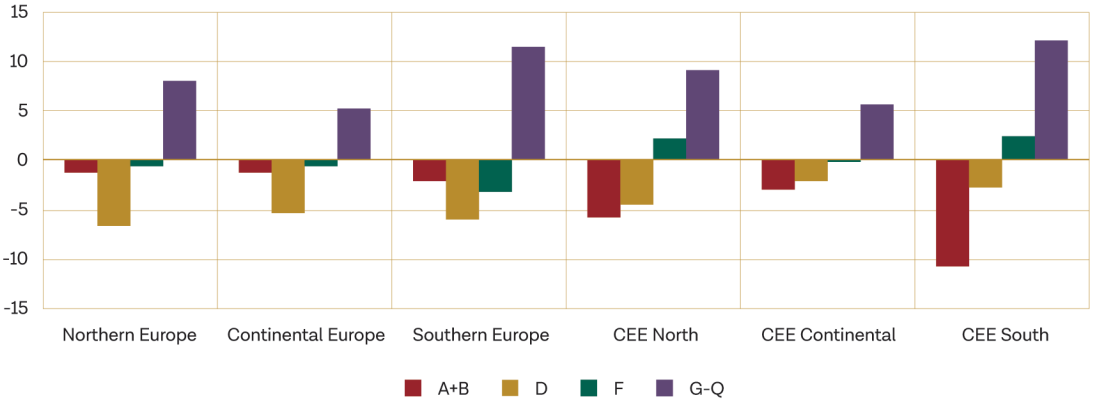
Technological change, offshoring, and the skills upgrading of the workforce are all likely to have contributed to the changes in the task content of jobs in EU countries. To investigate the role of demand- and supply-side factors, total changes in task intensities between 1998–2000 and 2012–14 are broken down into four factors: (i) changes in the sectoral structure (structural effect); (ii) changes in the educational structure within sectors (educational effect); (iii) changes in the occupational structure and within-occupational task content (occupational effect); and (iv) changes in the interactions between them. The structural and occupations effects are associated with demand-side factors, while the education effect is largely associated with changes in the relative supply of educated workers within sectors, although it can also reflect changes in the relative demand for skills. Structural and occupational changes are driven by technological change, offshoring and other demand-side factors. For example, part of the increase in routine cognitive tasks in CEE countries is due to the reallocation of labor out of agriculture, which has little to do with technology.

Changes in the sectoral structure of the economy and education explain most of the changes in the task content of jobs (box 2.1). This is not surprising given the large changes in the educational attainment of the working-age population and the sectoral structure of employment. The share of tertiary-educated people increased substantially between 2000 and 2015 across all EU countries (except Lithuania) (figure A2.3), fueled by the rapid growth of tertiary-educated graduates (expanding by 90 percent across the EU between 1998 and 2014). The structure of employment has shifted toward services and away from industry and agriculture, particularly in CEE countries. And the services that have grown the most tend to be more intensive in nonroutine cognitive tasks, such as transportation, information and communication, real estate, technical and professional services, and health services (figure 2.2).

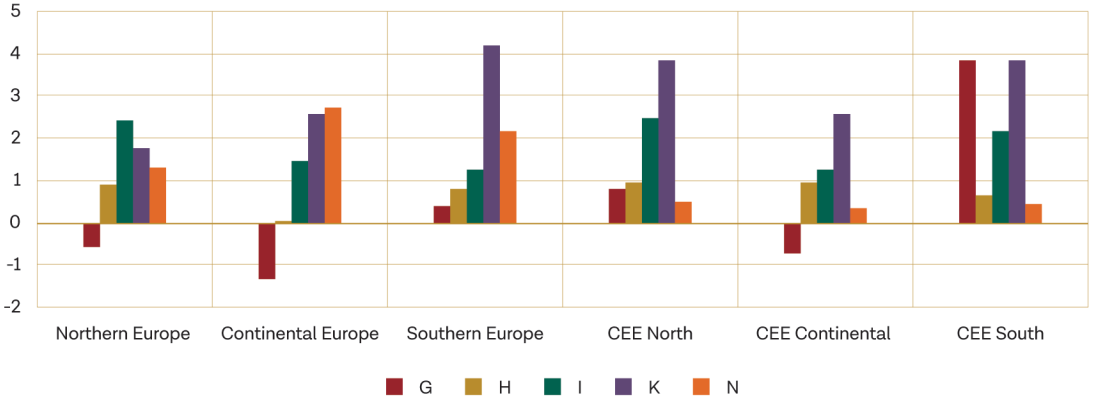
Summing up, jobs across the EU are becoming more intensive in nonroutine cognitive tasks and less intensive in routine cognitive and manual tasks. How much so in each country largely depends on the stage of structure change, which is partly driven by technological change, as well as by the 'skills readiness' of the workforce to accommodate and reinforce those changes.

Figure 2.2 The structure of employment is shifting toward services…

Change in employment shares, 2000–15



…that are more intensive in nonroutine cognitive tasks



Source: Eurostat.

Note: Letters refer to NACE Rev. 1.1 sector codes. A+B (agriculture and fishing), D (manufacturing), F (construction), G-Q (services), G (wholesale and retail trade), H (hotels and restaurants), I (transportation, storage, information and communication), K (real estate, professional/technical services, support services), N (health and social work).

Box 2.1. Structural and educational changes explain most of the changes in the task content of jobs

The increase in nonroutine cognitive tasks was mainly driven by sectoral and educational changes. The education effect is mainly attributed to the rising share of tertiary-educated workers in sectors that are intensive in nonroutine cognitive tasks. The between-sector effect is explained by (i) the decreasing shares of sectors where nonroutine cognitive tasks are rarely performed such as manufacturing, and, to a lesser extent, agriculture; and (ii) the rise of sectors rich in nonroutine cognitive tasks such as health care, education, transportation, storage and communication, financial intermediation, and real estate, and other business activities.

Changes in routine cognitive tasks were mainly explained by structural and occupational changes. In CEE countries, the rise of routine cognitive tasks was mainly due to the reallocation of labor out of agriculture. In Portugal and Greece, services sectors such as retail and trade, hotels and restaurants experienced a significant increase in the intensity of routine cognitive tasks. In countries where the intensity of routine cognitive tasks declined noticeably (the UK, Italy, France, and Finland, but also Slovenia and Iceland), it was mainly due to the relative decline of manufacturing.

The decline of manual tasks was mainly driven by sectoral changes — especially the decline in manufacturing, transportation, storage, and communication — and education changes. In all regions, the decline of routine manual tasks is mainly explained by the shrinking of manufacturing, while the fall of nonroutine manual tasks can be largely attributed to the declining share of the transportation, storage, and communication sector. The negative between-education effect stems from the growing number of better educated workers who are less likely to perform manual tasks.

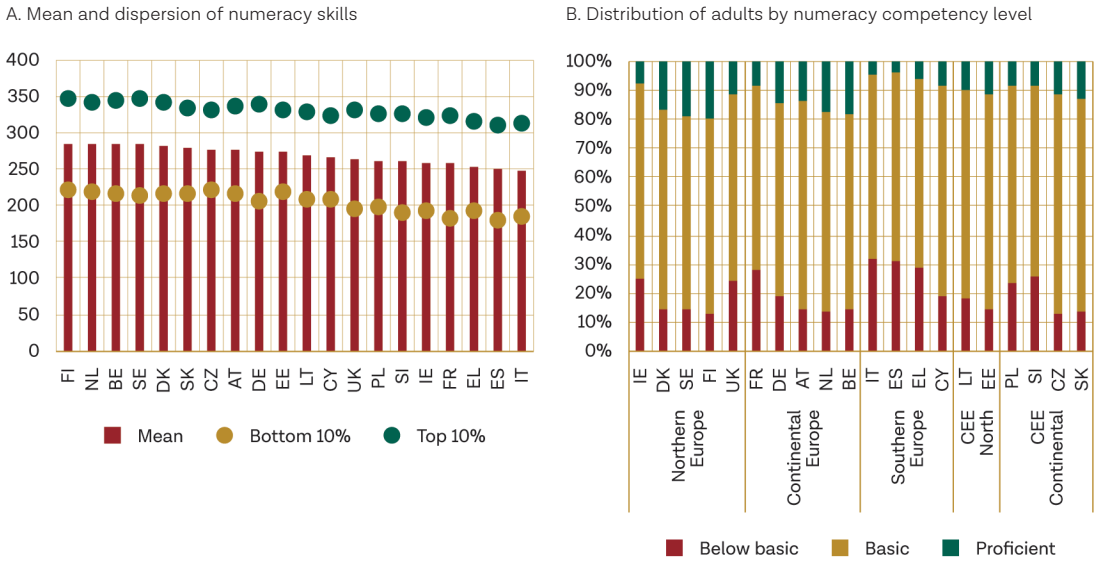
High-skill workers are benefiting from the changes in the task content of jobs, low-skill workers are losing the most

The impact of changes in the task content of jobs on inequality depends on the extent of the skill divide in the workforce of today and, more important, tomorrow**.** The skill divide in the workforce of tomorrow will be shaped by the extent to which opportunities are provided today to all young people to acquire relevant skills for the labor market (to be examined in chapter 3). Unequal opportunities to build relevant skills do not only make inequality persist over time, but also have a negative impact on long term growth. This section shows how the changes in the task content of jobs are making jobs more skill intensive. And the skills that are most rewarded are those that equip workers to perform nonroutine cognitive analytical and interpersonal tasks, making them more complementary to technology: cognitive skills (literacy and numeracy, but also more advanced skills like critical thinking and problem solving), socioemotional skills (for example, goal orientation and ability to work in teams).

The EU workforce is characterized by a large skill divide across all countries. Data from the Program for the International Assessment of Adult Competencies (PIAAC) shows that although differences in cognitive skills of the workforce are large across countries, all countries show a similarly large skill divide in the workforce between high- and low-skill workers (figure 2.3).[6] The ratio of the average level of numeracy skills of the top 10 percent of the skills distribution to the bottom 10 percent ranges from 51 percent in the Czech Republic to 79 percent in France, with most countries having a ratio of 60 percent or higher.[7] More importantly, there is a sizable share of workers that have cognitive skills below the basic competency level (low-skill workers) across all EU countries, ranging from 13 percent in Finland to 32 percent in Italy, with an average of 20 percent. Not surprisingly, skills are strongly correlated with the level of education (figure A2.4).

Jobs intensive in nonroutine cognitive tasks are held by high-skill workers, while jobs intensive in manual tasks are performed by low-skill workers. The intensity of each task is calculated for each job by applying O*NET data to the 3-digit level occupational data in PIAAC. Workers are mapped against jobs and divided into 10 skills groups. Workers are further grouped by education within each skill category as well as by level of education separately. The analysis of the relationship between the task intensity of jobs and the skills and education of workers shows, for the EU as a whole (figure 2.4)[8]: (i) a strong positive relationship between the intensity of nonroutine cognitive tasks and the level of skills; (ii) a strong negative relationship between the intensity of manual tasks and skills; (iii) a weak (inverted U-shaped) relationship between the intensity of routine cognitive tasks and skills; and (iv) a strong relationship between education and the intensity of nonroutine cognitive and manual tasks, both at each level of skills and separately from skills.

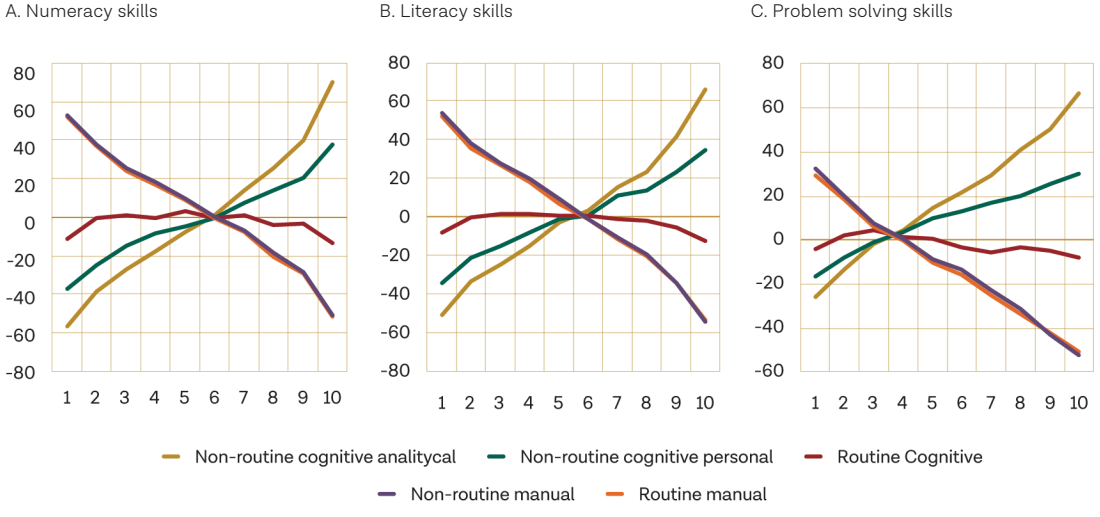
Figure 2.3 A large skill divide in the workforce of all EU countries



Source: Own estimates using PIAAC.

Note: All estimates refer to the working age population (16–65). Below basic competency (below level 2), basic competency (levels 2 and 3), proficiency (levels 4 and 5).

Figure 2.4 A strong relationship between the intensity of nonroutine cognitive and manual tasks and skills in the EU



Source: Gorka et al. (2017a), commissioned for this report, based on EU-LFS data.

Note: Values are EU averages.

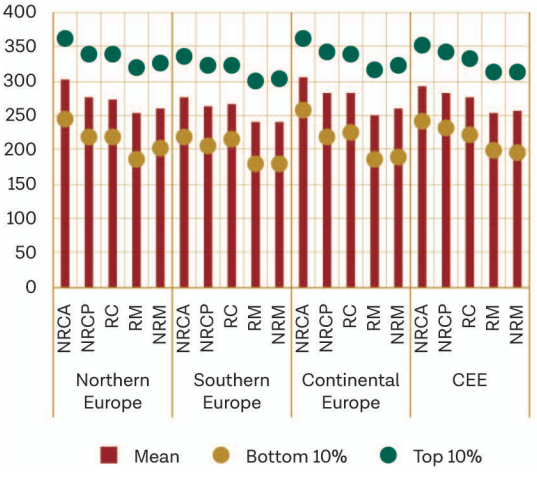
Classifying jobs by their most intensive task confirms the strong relationship between the task and skill intensity of jobs and reveals a clear typology of jobs. Jobs are classified by their most intensive task into nonroutine cognitive analytical (NRCA), nonroutine cognitive personal (NRCP), routine cognitive (RC), nonroutine manual (NRM) and routine manual (M). For all country groups, NRCA jobs have the most skilled workers, while manual jobs have the least skilled workers (figure 2.5). Workers in NRCP and RC jobs have similar levels of skills in EU15 countries, but are

more skilled in NRCP than RC jobs in CEE countries. However, workers in nonroutine cognitive jobs (the result of combining NRCA and NRCP jobs) are more skilled than workers in RC jobs. There is also a clear relationship between the task intensity of jobs and wages (figure A2.5): average wages of workers in NRCA are the highest, followed by NRCP, RC, NRM, and RM jobs. All these results indicate a strong relationship between the task and skill intensity of jobs and a clear typology of jobs:

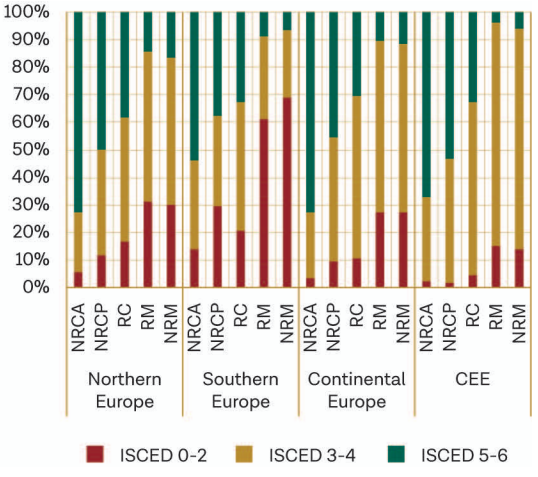
1. High-pay, nonroutine cognitive jobs (NRC), where high-skill, highly educated workers tend to be concentrated.
2. Medium-pay, routine cognitive jobs (RC), where middle-skill, middle-educated workers tend to be concentrated.
3. Low-pay, manual jobs (M), where low-skill, low-educated workers tend to be concentrated.

Figure 2.5 Nonroutine cognitive jobs are the most skill- and education-intensive, manual jobs are the least

A. Numeracy skills of workers, by type of job



B. Education profile of workers, by type of job



Source: Own estimates using PIAAC.

Note: ISCED 0-2: Primary and lower secondary education; ISCED 3-4: Upper secondary education, postsecondary nontertiary education; ISCED 5-6: Tertiary education and above.

A plausible hypothesis is then that the changes in the task content of jobs have resulted in increased inequality between high- and low-skill workers. It is possible to infer from the above findings that the observed changes in the task content of jobs have been accompanied by an increase in the skill intensity of jobs, resulting in rising labor market inequalities, particularly between high- and low-skill workers:

1. High-skill, highly educated workers are gaining
2. Middle-skill, middle-educated workers will eventually lose even if they are still gaining in some countries.
3. Low-skill, low-educated workers are losing the most.

Indeed, the evidence points to an increased employment share of high-skill workers and a reduced share of low-skill workers. In the absence of information on skills over time, the main approach used to test this hypothesis is to use the EU Labor Force Survey to look at changes over the period 1998–2014 in the employment shares of workers in NRC, RC and M jobs (as defined above). This

report argues that this methodology is more robust than the one typically used in the literature to look at job polarization, which is based on the classification of 1-digit level occupations by wage levels and task intensity for the US (box 2.2). This analysis shows that, across the EU, the share of workers in NRC jobs has increased, while the share of workers in M jobs has declined (figure 2.7). These changes are more pronounced in CEE and Southern European countries, reflecting in part their different job profiles in 1998 (figure 2.6). Workers in RC jobs have gained everywhere, although less than workers in NRC jobs except in Southern countries.[9, 10]

Box 2.2. Methodology for analyzing the implications of changes in the task content of jobs for the employment shares of workers with different skills

The standard methodology, which has been widely used in the literature, uses information on pay and task content of occupations as a proxy for skills, as information on the latter is not available over time. Following Autor (2014), the polarization literature (see Goos et al. 2014; World Bank 2016a; and OECD 2017b for analysis including EU countries) classifies occupations into three groups: high pay/high skill, medium pay/medium skill, and low pay/low skill. This classification is based on US data and is done by first sorting occupations at the one digit level by wage levels, and then use information on the routine and cognitive task intensity of occupations to classify occupations into: high pay (intensive in nonroutine cognitive tasks), medium pay (intensive in routine tasks); and low pay (intensive in nonroutine manual tasks) (see below). Using this methodology, the literature has found for different groups of EU countries an increasing share of workers in high-skill and low-skill occupations, and a decline in the share of workers in middle-skill occupations (that is, job polarization).

1. High skill occupations: ISCO 1 (Legislators, senior officials and managers), ISCO 2 (Professionals), ISCO 3 (Technicians and associate professionals).
2. Medium skill occupations: ISCO 4 (Clerical support workers), ISCO 5 (Services and sales workers), ISCO 6 (Skilled agricultural workers), ISCO 7 (Craft and related trade workers), ISCO 8 (Plant and machine operators and assemblers).
3. Low skill occupations: ISCO 9 (Elementary occupations).

Issues with the above methodology:

- Different ways of sorting occupations into three pay groups would give different trends in the share of employment of these groups, so the accuracy of the information on task content (as a proxy for skills) becomes very important.
- The classification is based on US data but applied to other countries.
- The classification is based on data on pay and task intensity of occupations at the 1 digit level — there is a lot of heterogeneity within that, which is why we look at occupations at the 3-digit level.
- There are also significant differences in the task content and pay of middle occupation and, more important, ISCO category 6 (skilled agricultural workers) is more similar to category 9 (elementary occupations) than any of the groups in the middle.
- Jobs intensive in routine manual tasks, such as category 6, are more similar in skill level to non-routine manual jobs than routine-cognitive jobs, at least for EU countries.

The methodology used in this study classifies occupations into categories that are more closely aligned with skills and education. Occupations are classified into jobs that are most intensive in nonroutine cognitive tasks (NRC), jobs most intensive in routine cognitive tasks (RC), and jobs most intensive in manual tasks (M). As shown in figure 2.5, this classification is closely aligned with the different levels of skill and education of the workforce in EU countries. As a robustness check, the study also looks at the shares of workers in occupations with different routine-task intensity (RTI) as well as the employment shares of workers with different levels of education. All results point to the same conclusion: an increase in the share of workers at the top, a decrease for workers at the bottom, and little change for workers in the middle.

Figure 2.6 In 1998, Manual jobs were more prominent in CEE and Southern European countries

Share of workers by job type in 1998 (percent)

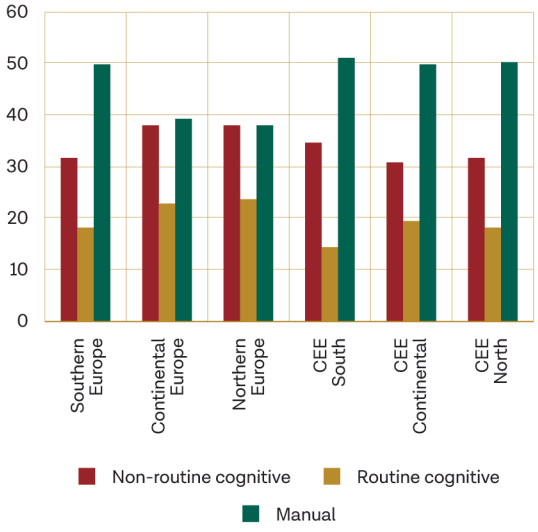
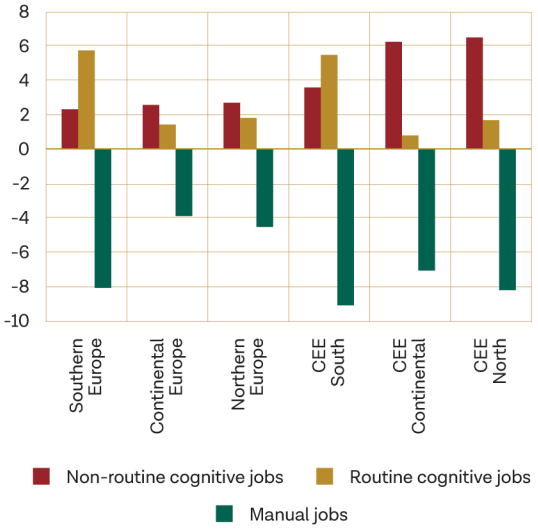


Figure 2.7 Workers in nonroutine cognitive jobs are gaining, while workers in manual jobs are losing everywhere

Percentage point changes in share of workers by job type, 1998–2014



Source: Gorka et al. (2017a), commissioned for this report, based on EU-LFS data.

The share of highly educated workers has also increased, mostly at the expense of low-educated workers. As noted earlier, there is a strong relationship between skills and education, on the one hand, and jobs and education, on the other. And education upgrading is an important contributor to the changes in the task content of jobs. All this makes the analysis of changes in the employment share of workers by level of education particularly relevant and complementary to the above analysis by type of job. The employment share of highly educated workers increased notably in all countries between 1998 and 2015, mostly at the expense of low-educated workers (figure 2.9): (i) the share of highly educated workers has increased in all country groups; (ii) middle-educated workers have either lost or maintained their representation in the workforce in all country groups except in Southern European countries; and (iii) the share of low-educated workers has declined in all country groups, and the decline is larger than that of middle-educated workers wherever the latter have lost representation, except in CEE-Continental countries.

Low-skill workers have more limited access to jobs and their jobs pay less. Evidence from PIAAC shows that, even after controlling for other factors, skills and education account for a significant share of the inequality in employment and wages. Hanusheck et al. (2015) show there are large returns to skills in EU countries, although not as large as in the US. These returns are reduced but remain significant after controlling for education, which also carries significant returns. Skills and education are also key determinants of the employment status of workers across EU countries. For example, low-skill workers are 20-percentage points less likely to be employed than high-skill workers in Northern and Southern European countries. The wage and employment gaps between the low- and middle-skill workers are larger than between middle- and high-skill workers.

Figure 2.8 Middle-educated workers dominated the workforce in 1998, except in Southern European countries

Share of workers by education level in 1998 (percent)

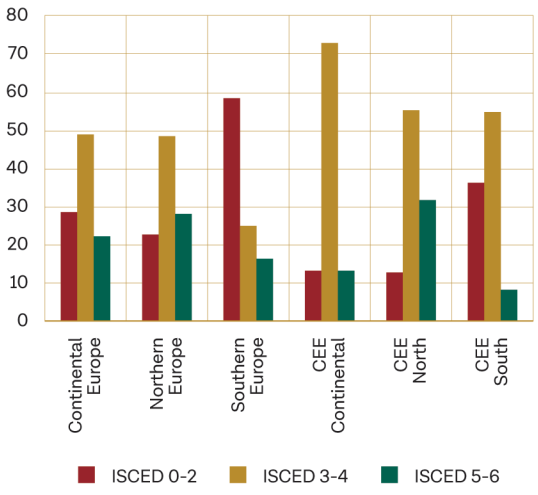
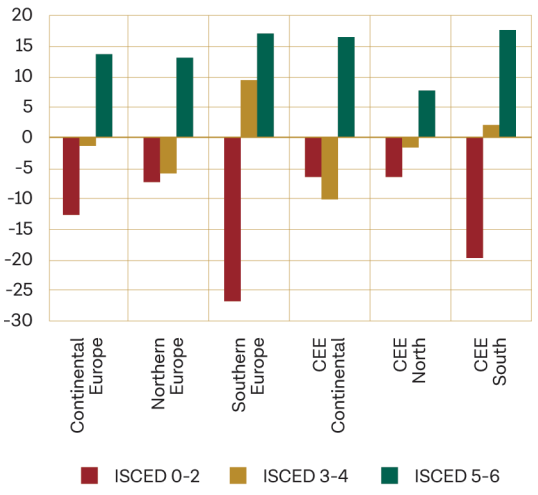


Figure 2.9 The share of highly educated workers is increasing, while the share of low-educated workers is declining

Percentage point changes in share of workers by level of education, 1998–2015



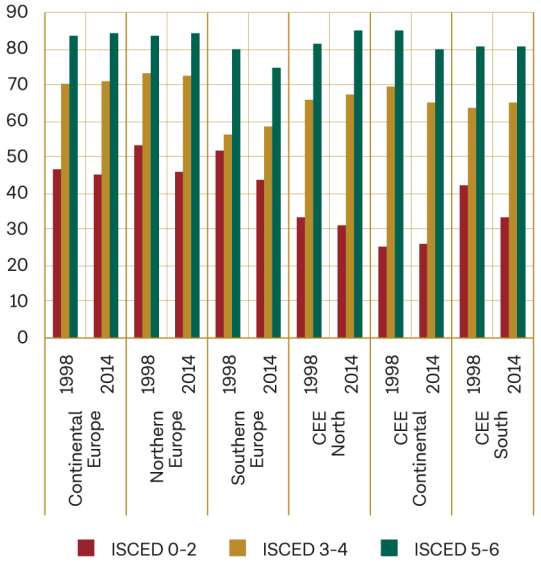
Source: Eurostat.

And it appears the labor market position of low-skill workers has deteriorated over time. The employment gap between highly and middle-educated workers has remained unchanged in most cases between 1998 and 2014. In contrast, low-educated workers have increasingly become less likely to be employed than other workers, which is consistent with their declining employment share. In most cases, the employment rate of middle- and highly educated workers did not change much between 1998 and 2014. But it declined everywhere for low-educated workers (panel A, figure 2.10), particularly in Northern European countries — it declined by 11 percentage points in Ireland, reflecting in part the disproportionate impact of the crisis on these workers. The declining employment rate of low-educated workers relative to others remains even after controlling for other factors (panel B, figure 2.10). The unemployment rate of low-educated workers has also increased over the period, both in absolute terms and relative to other workers.

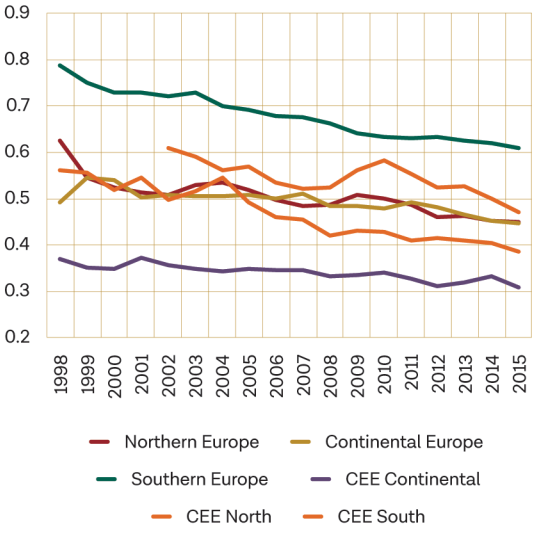
And the jobs that low-educated workers hold are becoming of lower quality and pay**.** Temporary employment has increased everywhere except in Northern European countries (panel A, figure 2.11). The increase is particularly large in CEE Continental countries, driven by the rapid growth of temporary jobs in Poland, which has become the EU country with the highest incidence of temporary employment today. However, the incidence of temporary employment has increased everywhere for low-educated workers, both in absolute terms and relative to other workers. Historical data on wages by level of education is only available for a few EU countries from the harmonized Luxemburg Income Study Database (LIS). Returns to tertiary relative to primary education have mostly increased since the 1990s for countries for which data is available (panel B, figure 2.11). But returns changed little in more recent times, and they even declined in CEE countries for which data are available.

Figure 2.10 The employment rate of low-educated workers has declined

A. Employment rates by education and region, 1998–2014 (percent)



B. Estimated relative employment probability, low versus middle educated

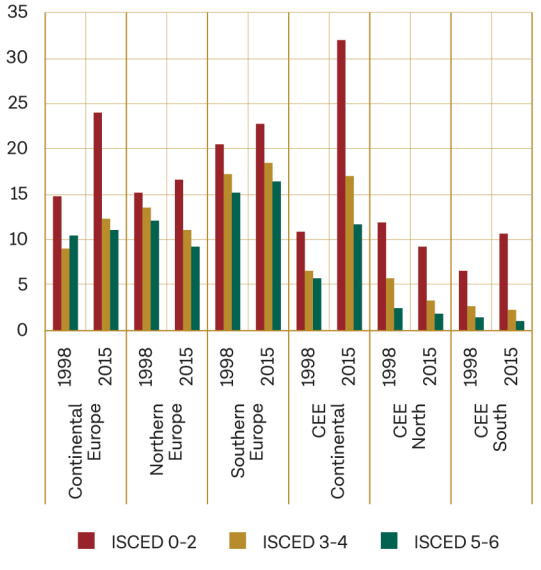


Source: Gorka et al. (2017a), commissioned for this report, based on EU-LFS data.

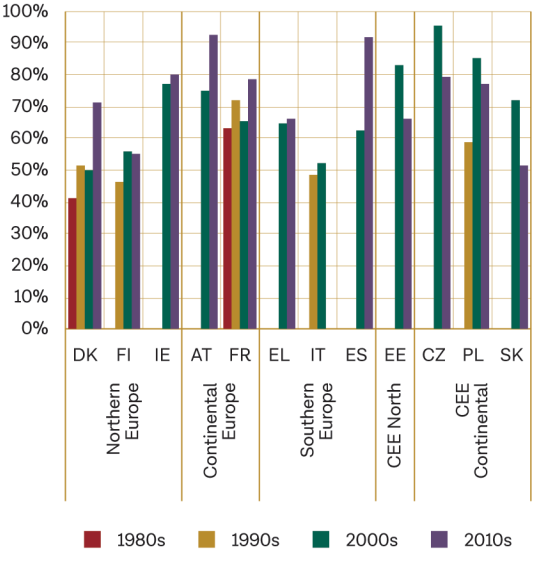
Note: Estimated probability ratios are odd ratios from logistic regressions of employment status as a function of education (3 levels), age, gender, year, and country effects.

Figure 2.11 Low-educated workers increasingly have poorer quality and lower pay jobs

A. Incidence of temporary employment by education and region, 1998–2015 (percent)



B. Estimated returns to tertiary relative primary education, 1980s–2010s



Source: Eurostat (Figure 44A), Luxemburg Income Study (Figure 44B).

Note: Estimated returns are based on standard Mincer regressions of log wages on education levels, age and age squared, gender, marital status and urban/rural location.

The decline in the labor market position of low-skill workers is not only explained by the decrease in the relative demand for low-skill workers — and there are offsetting factors, but it is real and will likely intensify in the future. Demand-side factors like technological change and globalization are making jobs more cognitive- and less routine-task intensive and increasing the relative demand for high skill workers. But the substantial upskilling of the working age population is not only explained by the increase in the relative demand for high-skill workers. Skills upgrading is also contributing to making jobs more cognitive- and less routine-task intensive. And education has a strong and independent — from skills — relationship with the task intensity of jobs. Also, there are factors affecting the inequality in wages and employment, like labor market institutions (see chapter 3). But the decline in the labor market position of low-skill workers is real, and will only intensify in the future with the acceleration of technological change.

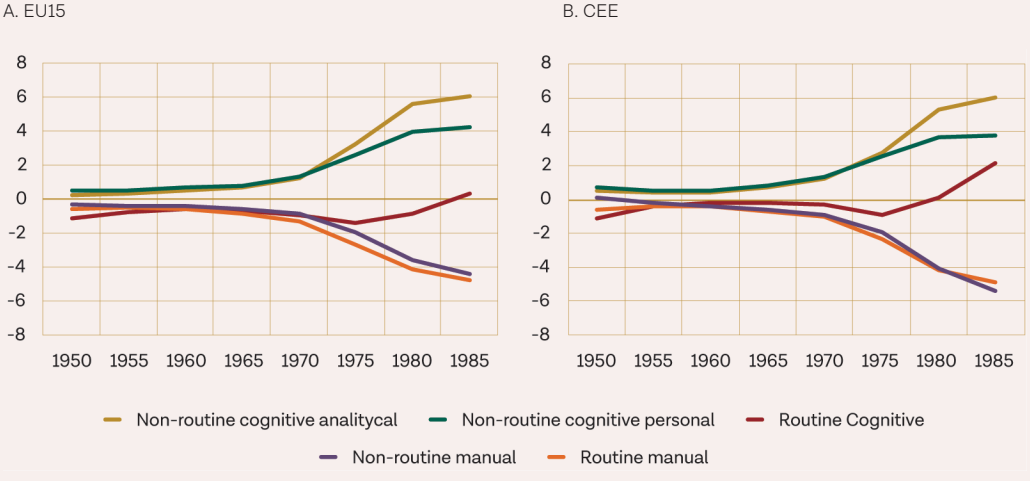
The growing skill divide in the labor market also has an intergenerational dimension. There is evidence suggesting that changes in the task content of jobs are helping high-skill youth to leapfrog relative to older generations, but making low-skill youth fall behind (box 2.3).

Box 2.3. The intergenerational dimension of changes in the task content of jobs

Between 1998 and 2014, older workers became relatively more concentrated in high routine-task intensive jobs, while younger workers generally became more concentrated in less routine-task intensive jobs. Routine-task intensive jobs are aging faster than less routine-task intensive jobs. Jobs held by people born before 1970 were more intensive in routine tasks, while jobs held by people born between 1970 and 1989 were more intensive in nonroutine cognitive tasks and less intensive in manual tasks (figure 2.12). This is partly explained by the higher education levels of younger generations: the correlation between changes in the share of highly educated workers and changes in the intensity of nonroutine cognitive analytical tasks within the same cohorts exceeds 75 percent in all country groups. Thus, as jobs become more skill intensive, younger cohorts are likely to benefit relative to older cohorts. But this benefit is likely to be reaped by high-skill youth only. Low-skill youth are likely to lose relative to low-skill older workers. They both compete for jobs that are declining and young workers have less experience to show for.

Figure 2.12 Younger cohorts are benefiting more from the changes in the task content of jobs

Changes in the task of jobs held by different age cohorts, 1989–2014



Source: Gorka et al. (2017b), commissioned for this report, based on EU-LFS data.

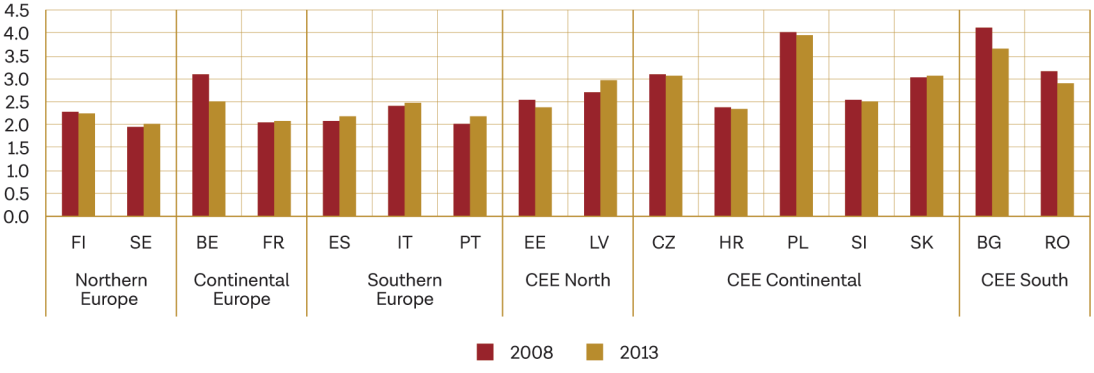
Note: Values are linear time-trend coefficients from fixed-effects panel regressions on task intensities within cohorts. Higher values indicate faster change of a particular task content in a given cohort.

Implications for firms

Productivity dispersion between firms is large and rising, as top firms are pulling away and bottom firms are falling behind. There are large productivity gaps between top and bottom firms within broad sectors (agriculture, mining, manufacturing, and services) across all EU countries, particularly in Germany (figure 2.13). There were no big changes in productivity dispersion between 2008 and 2013. Berlingieri et al. (2017) look at longer term trends of productivity gaps, more narrowly defined within two-digit sectors, for a sample of OECD countries, including some EU countries (figure 2.14). In all four EU countries, except for manufacturing firms in Italy, the gaps are larger in 2012 than in 2001. The increased divergence is explained by both top firms pulling away from the median firm (from 2005) and, particularly, by bottom firms falling behind the median firm (throughout the period).

Figure 2.13 Large productivity gaps between top and bottom firms

Log productivity differences between top 10 percent and bottom 10 percent of firms

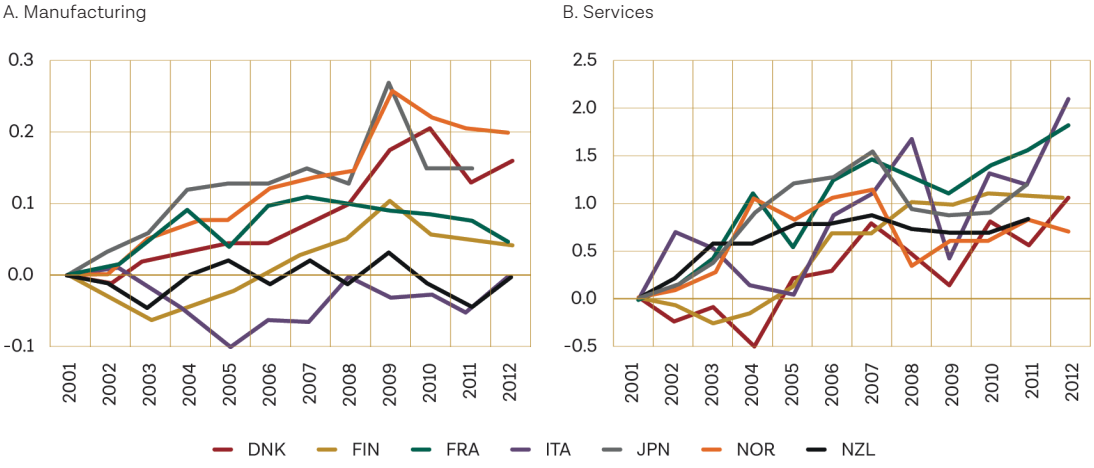


Source: Own calculations, based on Orbis.

Note: TFP is "revenue total factor productivity" and estimated as the residual from estimating production function of deflated sales on labor, capital, and materials. Productivity differences are calculated for each sector (agriculture, mining, manufacturing, and services), and averaged across sectors using employment shares as weights.

Figure 2.14 The productivity gaps between top and top performers has increased over time

Log productivity differences between top 10 percent and bottom 10 percent of firms over time



Source: Berlingieri et al (2017).

Note: Productivity is measured by multifactor productivity (MFR). Productivity gaps are calculated within 2-digit sectors and averaged using log value added as weights.

This is closely associated with the increased wage dispersion between firms and the rise in overall wage inequality. Berlingieri et al find a strong correlation between productivity and wage dispersion in each country, as well as between average within country-sector dispersion in productivity and wages over time (figure 2.15). As they pull away from other firms, top productivity firms are paying higher wages than other firms, driving overall wage inequality up.

Figure 2.15 The increasing productivity gap between firms is driving wage inequality up

Source: Berlingieri et al. (2017).

Note: Productivity is measured by multi-factor productivity (MFR). Dispersion values are the average (across countries) within country-sector dispersion in productivity and wages (between top 10 percent and bottom 10 percent of firms) for each year. Countries included in the analysis: AU, AT, BE, CL, DK, FI, FR, HU, IT, JP, NL, NO, NZ, SE.

Technological change and globalization are contributing to the increased divergence in productivity and wages between firms. Berlingieri et al. use measures of technology adoption and globalization at the sector level over time to show that they both have a strong association with increased wage dispersion, both directly as well as by making the correlation between wage and productivity dispersion stronger.[11] This is of course fully consistent with the earlier finding about the important role of technological change and globalization in making jobs more skill intensive and the resulting rise in inequality between high- and low-skill workers. That top firms are benefiting the most from technological change and globalization is not surprising. Frontier firms are typically larger, more profitable, have better access to financial leverage, are more likely to apply for patents. They are often better-placed to rapidly diffuse and replicate cutting-edge ideas, technologies and business models, and they commonly operate across different countries. Lagging firms, on the other hand, are often smaller, and less globally engaged.

The impact of technological change and globalization on productivity growth at the country level depends on the opportunities for firms to benefit from these changes. It comes down to whether the policy environment in the country supports the creation of many frontier firms or instead generates many lagging firms. As discussed in chapter 4, a more burdensome and less competitive business environment tends to generate less efficient production structures, with a larger share of small, low-productivity, firms. These firms are less able to benefit from new technologies and globalization, and have less incentives to adopt new technologies. And, together with the lack of policies that support innovation and technology adoption at the firm level, it makes it for a less fertile environment for frontier firms to blossom. The business environment and policies to support

the upgrading of firms' capabilities have always been important for growth. Technological change and globalization are making them even more binding.

Labor policies reduce wage dispersion and tend to weaken the link between wage and productivity dispersion. Berlingieri et al. find that a higher minimum wage, stricter employment protection legislation (EPL), higher union density, and more centralized bargaining all lead to lower wage dispersion between firms. This is consistent with other findings showing the strong link between wage compression policies and wage inequality.[12] And more centralized bargaining and stricter EPL weaken the link between wage and productivity dispersion. Increases in the minimum wage over time, however, are associated with a stronger correlation between wage and productivity dispersion, as low productivity firms and low-skill workers are driven out of the market.

These results are consistent with other findings showing that high minimum wages tend to encourage the adoption of labor-saving technology — leading to higher wages and increased productivity, while strict EPL typically deters firms' technology adoption (for example, Packard and Montenegro 2017). Alesina et al. (2015) show for OECD countries that the overall negative relationship between EPL and technology adoption masks some sectoral differences: strict EPL reduces technology adoption and productivity in high-skill sectors, while it encourages the adoption of labor-saving technology in low-skill sectors.

Notes

1 See, for example, Frey and Osborne (2017), McKinsey (2017), and Arntz et al. (2016).
2 Malta, Cyprus and Luxembourg are excluded from the analysis because of data limitations. Other studies have used the same approach for a subset of EU countries: Goos et al. (2014) for Western European countries and Hardy et al. (2016) for CEE countries.
3 A detailed description of the methodology can be found in Gorka et al. (2017a).
4 See, for example, De La Rica and Gortazar (2016) for OECD countries, and Spitz-Oener (2006) for Germany.
5 Moreover, as shown in the next section, low-skill workers are losing the most in terms of employment.
6 PIAAC is regarded as the most comprehensive cross-country assessment of the cognitive skills of the workforce. It covers 24 countries and includes measures of literacy, numeracy, and problem solving skills on a 500-point scale. This report uses the OECD and EU samples of PIAAC from the August 2011–March 2012 and April 2014–March 2015 rounds.
7 Results are similar for literacy and problem-solving skills.
8 The results are similar for all country groups and countries.
9 The increase in the share of workers in RC jobs in Northern and Continental European countries is somewhat surprising, given the clear decline in the intensity of RC tasks in those countries. The most likely reason is that jobs are defined here by their most intensive task, while the analysis of changes in the task content of jobs looks at the changes in the relative intensity of different tasks for each job.
10 The polarization between the top and the bottom of the skills distribution is also observed when looking at workers in jobs with different routine task intensity (RTI): an increase in the share of workers in highly routine jobs (except in CEE North countries), a decline in the share of workers in low routine intensity jobs, and little change in the middle. RTI is calculated as the difference between the natural log of the sum of routine cognitive and manual task intensities and the natural log of the sum of nonroutine cognitive task intensities.
11 Sectors' globalization is measured by the sum of imports and exports of goods. Technology adoption is measured by the share of ICT in gross non-residential fixed assets in each sector.
12 See Broecke et a. (2017) for OECD countries and Dreger et al. (2014) for EU countries.

Chapter 3:

Opportunities for People

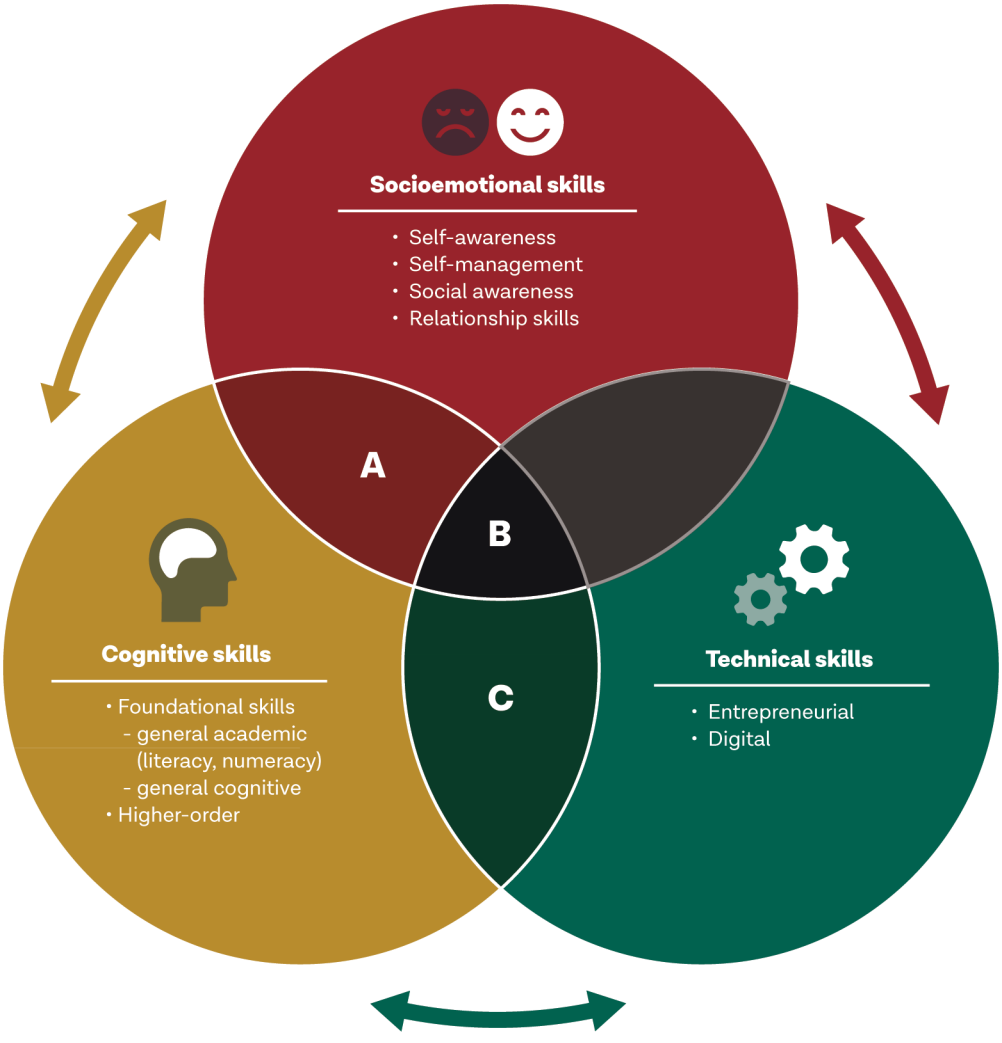
Europe's labor markets are undergoing fundamental change, and education, labor and social protection policies need to adjust to this new reality. In the past, Europe's economy produced significant employment opportunities for low-skilled people. With a decline in routine manual and cognitive jobs, this is no longer the case, and will be even less so in the future. At the same time, the skills demanded in Europe's labor market are increasingly sophisticated in nature, emphasizing strong cognitive and social-emotional foundation skills and constantly upgraded technical skills, raising the question of how to ensure that Europe's workers are well equipped for the "future of work." The increasing prominence of nonstandard employment relationships, like temporary and part-time jobs, especially among young and low-skill workers, challenges the traditional system of social protection funded through social contributions based on lifelong, full-time employment.

This chapter examines how well the EU does in providing equal opportunities for people. It argues that many countries in the EU are suffering from skills, labor, and social protection divides that undermine the potential of people to thrive. Most strikingly, too many future EU labor market entrants fail to acquire basic cognitive skills that would enable them to succeed in jobs increasingly rich in nonroutine cognitive and interpersonal tasks and to become effective lifelong learners. And the skill divide has a strong social dimension, as much of the poor proficiency is concentrated among youth from socially disadvantaged background, indicating that education in many parts of Europe does not act as an engine of social mobility, by not only failing to make up for social disadvantage but often by allowing social segregation in schools to deepen the divides. In view of the enormity of changes in the world of work, the EU needs to take a fresh look at the central tenets of its education, labor, and social protection policies, and develop a policy approach built around enabling workers to exploit their full potential while providing adequate protection for those who are left behind.

The skill divide: Education policies are not providing equal opportunities to build relevant skills

As machines increasingly take over routine tasks previously performed by humans, tomorrow's jobs will become ever more about nonroutine, cognitive analytical, and interpersonal tasks. Success in this fast-changing labor market requires advanced cognitive skills (such as critical thinking and problem-solving), social-emotional skills (such conscientiousness, goal orientation, and ability to work in teams) and up to date job-specific technical skills (figure 3.1). Strong cognitive and social-emotional skills make workers more resilient to the possible adverse effects of routine-

Figure 3.1 Three dimensions of skills



A: Decision making, communication, grit, self-control
B: Problem-solving, organizational skills
C: Mid-level technical, high-level technical

Source: World Development Report 2018b.

biased technological change, including workplace automation, by equipping them with a greater ability to learn, adjust and deliver nonroutine cognitive and interpersonal tasks.

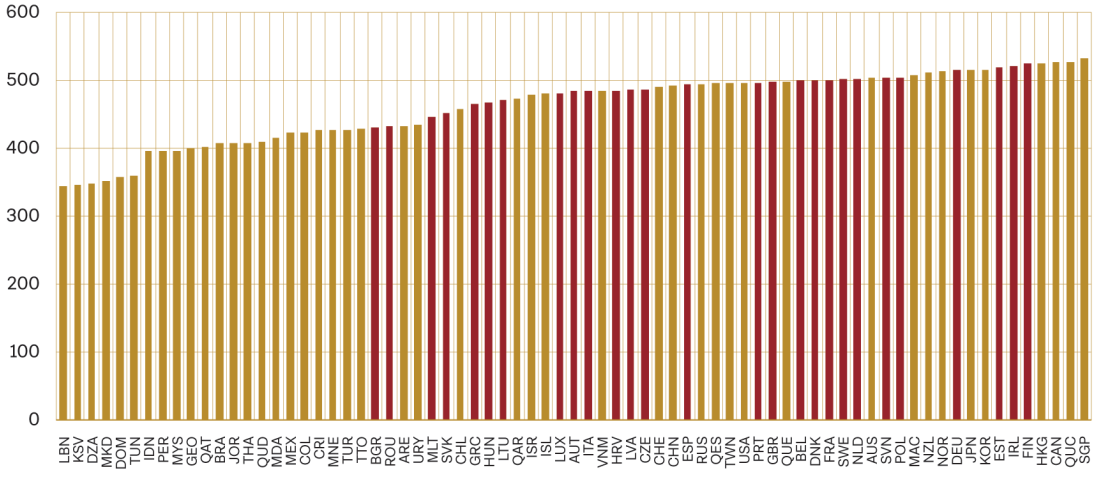
Given the centrality of cognitive and social-emotional skills in the future labor market, preschool, primary and secondary schools need to be at the center of the discussion about the future of work. Cognitive and social-emotional skills are formed from a very early age, which means that early childhood education, primary and secondary education provide the critical foundation for the subsequent acquisition of job-specific technical skills trough vocational education and training as well as higher education. Moreover, while technical skills are likely to become obsolete at an ever-faster rate, owing to accelerating technological change, sound cognitive and social-emotional foundation skills make workers resilient to change and allow them to continuously adapt and upgrade their technical skills. This is why this report focuses mostly on cognitive foundation skills, especially literacy and numeracy. So how prepared is Europe for this new labor market?

Europe has witnessed significant increases in education attainment in the last decades, providing increased opportunities for people. Education attainment has translated into jobs and returns to education are high. For long, increased attainment has been the key driver of increased opportunities of people to thrive. However, with changing labor demand on the back of skill-biased technological change, increased attainment needs to translate into sound cognitive and social-emotional skills for these opportunities to be upheld. And here, Europe faces a challenge: disadvantaged children and youth in many countries are increasingly left behind, both in terms of attainment and skills acquired, thus wasting their untapped potential.

EU countries are among the top performers in international student assessments globally, but mean scores mask broad differences between students and some EU countries are severely lagging behind. Attainment has not translated into universal basic cognitive skills across the current and future workforce, and too many children and youths still drop out too soon. Many EU member states can be found among the global top performers in the Program for International Student Assessment (PISA) in 2015, which measures cognitive skills including reading, mathematics, science, and problem-solving (figure 3.2). While countries like Finland, Ireland and Estonia

Figure 3.2 EU countries are among the top performers in PISA

Average 2015 PISA scores for reading



Source: World Bank staff calculations based on PISA 2000–2015 database.

are almost on par with the leading countries in East Asia, several EU countries lag significantly in a global comparison. More important, many EU countries show significant inequities which are hidden below countries' aggregate performance. With populations projected to shrink across much of the EU, it is imperative that all students in declining youth cohorts have a chance to acquire foundational cognitive and social-emotional skills to their full potential.

Europe's skill divide

Europe suffers from a "skill divide" which is at the heart of the increasing inequality in labor incomes and raises concerns about inclusiveness of future growth. Among the current EU workforce, cognitive skills vary significantly across age, income and employment status. And the gap is not narrowing, with significant skills gaps among the pipeline of future workers: at age 15, students from relatively poorer household backgrounds perform significantly worse in mathematics, reading and science tests in PISA than their more affluent peers. Unequal opportunities in education systems across much of the EU prevent disadvantaged children and youth from acquiring strong cognitive and social-emotional foundation skills. Thus, the skill divide is not only a challenge for the stock of existing workers as discussed earlier, but also, for the flow of future cohorts of workers, and with greater cost. There are three key dimensions of the "skill divide."

Early school leaving and functional illiteracy and innumeracy as a lasting legacy

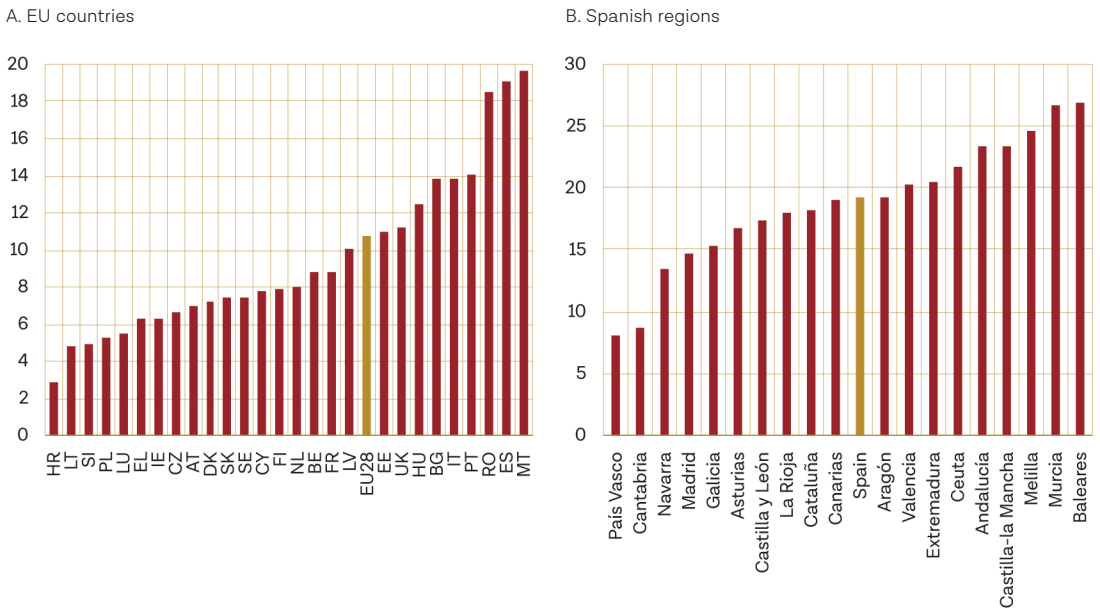
First, too many children and youth still drop out early. Early school leaving in Europe is defined as the share of 18- to 24-year-olds who have graduated, at most, from lower secondary education and are no longer part of the education system. Early school leaving is close to 20 percent in Malta, Spain, and Romania (figure 3.3, left). Leaving school early is often strongly driven by household social background (Gortazar et al. 2018), and the probability of dropping out early varies considerably between regions in one country (see data from Spain in figure 3.3).

Box 3.1. Digging deeper: Dimensions and drivers of early school leaving in Spain

Early school drop-out in Spain, as measured by the EU early school leaving indicator, is among the highest in the EU and strongly associated with household income. But digging deeper shows that the picture may be even more dramatic. Since early school leaving measures those 18- to 24-year-olds with at most a lower secondary degree, it shows the share of the population that drops out without a basic education degree. According to UNESCO data, in 2013/14 the dropout rate in basic education in Spain was 9 percent — compared to 1.4 percent in Italy, 0.6 percent in France and 0.3 percent in Finland (Medina 2017). Many early school leavers in Spain drop out before completing lower secondary, rather than in the transition to upper secondary. High early school leaving in Spain has been explained by a combination of three key factors: the business cycle and the availability of relatively well-paid jobs in construction during the boom years before the economic and financial crisis, individual and family characteristics of dropouts (reflecting a wider pattern across much of Europe), and the educational environment involving, in particular, high rates of repetition (Medina 2017).

Figure 3.3 Too many youth are dropping out of education early

Share of 18- to 24-year-olds who have graduated, at most, from lower secondary education and are no longer part of the education system, 2016 (percent)



Source: Own calculations, based on Eurostat.

Second, many European education systems churn out an unsustainably large number of graduates with cognitive skills that makes them unprepared for the changing labor market. In half of the EU, more than 20 percent of 15-year-olds perform below the basic proficiency level in reading and mathematics in PISA — considered as functionally illiterate and innumerate (figure 3.4). This does not necessarily mean they cannot read and write, but they do struggle with absorbing text, and with basic mathematical manipulations. They are poorly prepared for the labor market and lifelong learning, more so in a context of increasingly skill-intensive jobs. The share of low performers is particularly high in newer member states in Central and Southeastern Europe as well as in Greece — countries that are among those in Europe with the fastest projected population declines over the coming decades. In Romania and Bulgaria, four out of ten students age 15 years are functionally innumerate.

Social status as a glass ceiling

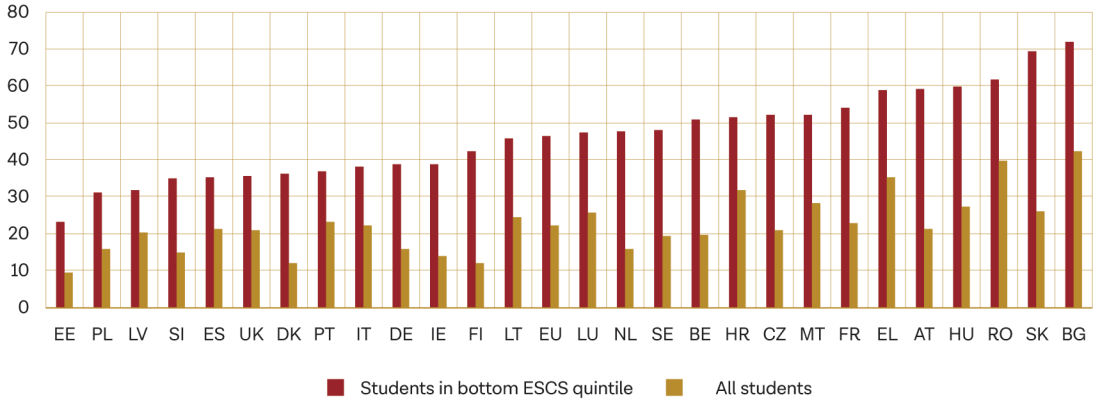
Third, as with early school leaving, much of the skill divide is down to whether students are rich or poor. It is fair to say that, across much of the EU, education is not acting as an engine of social mobility — children from poor backgrounds often fail to acquire basic cognitive skills. The share of students below basic cognitive skills is significantly higher among 15-year-olds who belong to the poorest socioeconomic strata (figure 3.4).[1] More than half of the bottom quintile students in Belgium and more than 60 percent in Romania, the Slovak Republic, and Bulgaria fail to acquire basic proficiency.

The skill divide between richest and poorest students across the EU is the equivalent of what students learn in several years of schooling. Another way to look at the socioeconomic dimension of the skill divide is the performance gap between students from households in the top and bottom socioeconomic quintiles (figure A3.1). In 2015, the countries with the highest difference in score

between top and bottom socioeconomic quintile students were the Slovak Republic (149 points), Austria (139 points), France (138 points), and the Czech Republic (137 points). In PISA 2015, about 30 points is the equivalent to one year of schooling, suggesting that the poorest 15-year-olds in Latvia lag behind their richest peers in cognitive ability by the equivalent of two years of schooling. In the Slovak Republic, this gap amounts to the equivalent of five years — one of the highest in the world. And while many EU countries rightly pride themselves with high shares of students with high levels of proficiency, students from the poorest socioeconomic for quintile hardly ever reach the top level of performance. Their social status simply acts as a glass ceiling.

Figure 3.4 Too many low-performing students, mostly from poorer socioeconomic backgrounds

Share of low performers by socioeconomic status, PISA 2015 mathematics (percent)



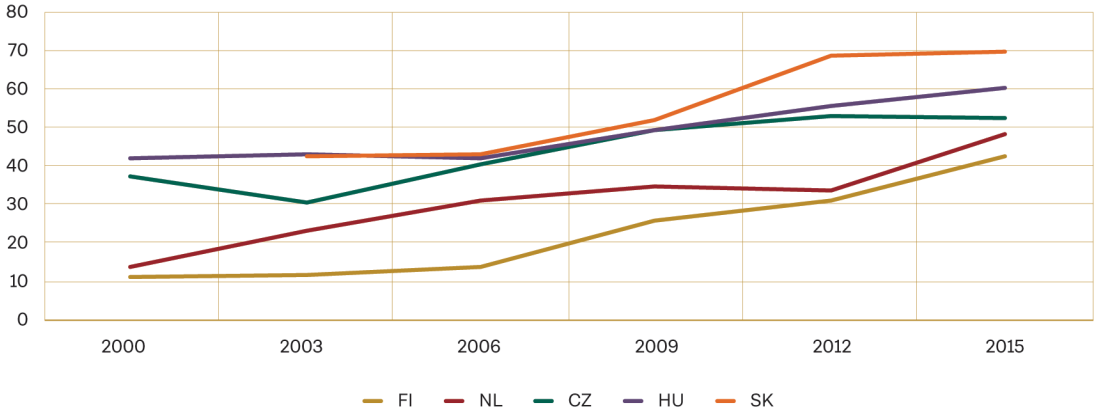
Source: World Bank staff calculations based on PISA 2000–2015 database.

Note: ESCS refers to PISA's index of economic, social, and cultural status.

Europe's skill divide has not narrowed much over the last 15 years on aggregate, but there have been significant movements across countries. There have been improvements in equity in several countries, including Germany, Bulgaria, the UK, and Greece. Germany is one of a handful of countries that managed to simultaneously increase PISA mathematics scores since 2000 and reduce its skill divide. On the other hand, France, Austria, and Finland have seen a significant deterioration in equity. The skill divide in Germany and Finland between rich and poor students in the PISA 2015 mathematics assessment was equally large — about three and a half years of schooling. However, Germany's gap declined since 2000, while Finland's increased. Following the PISA shock of 2000 when Germany's performance was below expectations, Germany's Länder have adopted a series of reforms which, inter alia, attempted to raise performance among the weakest and socially disadvantaged students. These included the integration of education tracks between the vocational Hauptschule and Realschule, and increased use of comprehensive schools in some Länder, extensions of the school day from half to full day, the introduction of national educational standards and comparative tests, and measures to support learning among the weakest students. In Finland, on the other hand, the increase in the performance gap has mostly been driven by a relative worsening in performance among the poorest students (figure 3.5).

Figure 3.5 The skill divide has increased in some EU countries

Share of low performers among bottom ESCS students, select EU member states (percent)



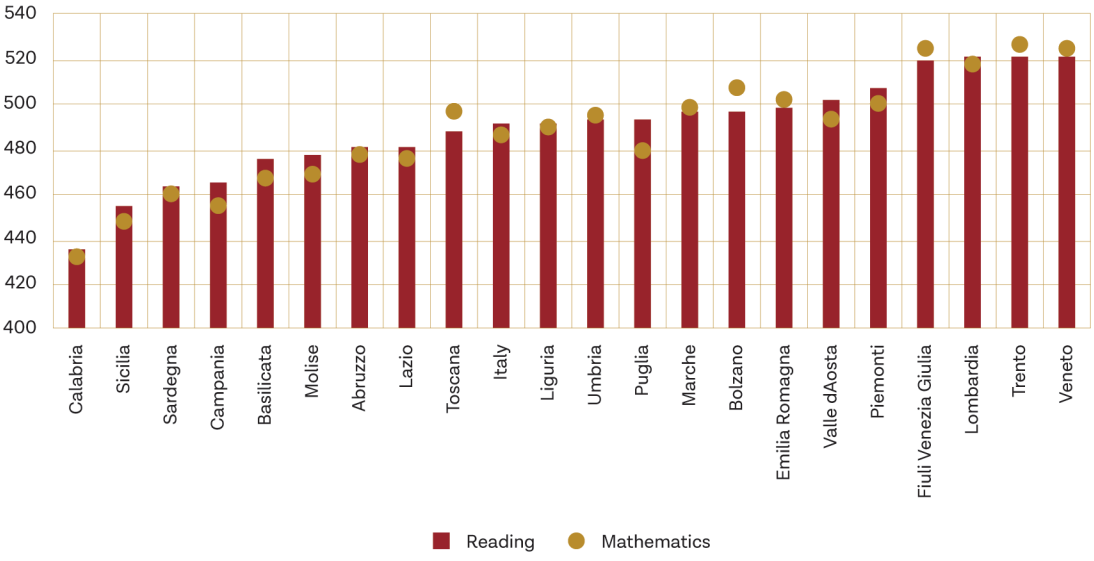
Source: World Bank staff calculations based on PISA 2000–2015 database.

Finland has long combined excellence with inclusion in education, but has seen a growing skill divide in recent years. Finland introduced its comprehensive school in the 1970s to eliminate the impact of socioeconomic background and place of residence on learning outcomes. Until PISA 2006, Finland's skill divide was among the smallest in the world and the impact of the students' socio-economic status was lower than in other countries. But since 2006, Finland has seen a growing skill divide and today Finland perhaps serves as the best illustration of how countries need to run to stand still in the face of technological and societal change. While its education system served as an example to many other countries over the past two decades, societal shifts like increased social disparities and declining interest in reading among youth have contributed to a relative decline in PISA performance among the poorest students (Välijärvi and Alasuutari 2017). While Finland's 15-year-olds still outperform their peers across much of the rest of Europe, such early warning signs are being heeded, with an effort under way to adapt the comprehensive school to the changing circumstances.

There is also a regional dimension to Europe's skill divide, as national mean scores can hide significant subnational variations in students' cognitive skills. Not all EU countries have PISA samples that are large enough to be representative at regional levels. However, some do, like Italy in 2012. While the mean reading score in PISA 2015 was 490 points in 2012, the scores at regional levels varied between 521 in Veneto and 434 in Sicilia (figure 3.6). In PISA 2012, this represented the equivalent of more than two years of schooling.

Figure 3.6 A subnational skill divide

Italy: PISA 2012 scores by regions



Source: World Bank staff calculations based on PISA 2000–2015 database.

What drives the skill divide?

Students' individual characteristics and school segregation are important factors that explain the skill divide between students from the top and bottom socioeconomic quintiles. Figure 3.7 displays a decomposition of the performance gap in PISA 2015 mathematics scores between students from the top and bottom socioeconomic quintile.[2] The difference between the two groups is explained by the difference in the factors listed. Two stand out: first, the size of the light red component indicates that individual characteristics explain an important share of the difference in performance between top and bottom socioeconomic quintiles for most countries; second, the size of the light green component indicates that school segregation also explains a large part of the difference in scores between top and bottom socioeconomic quintile students.

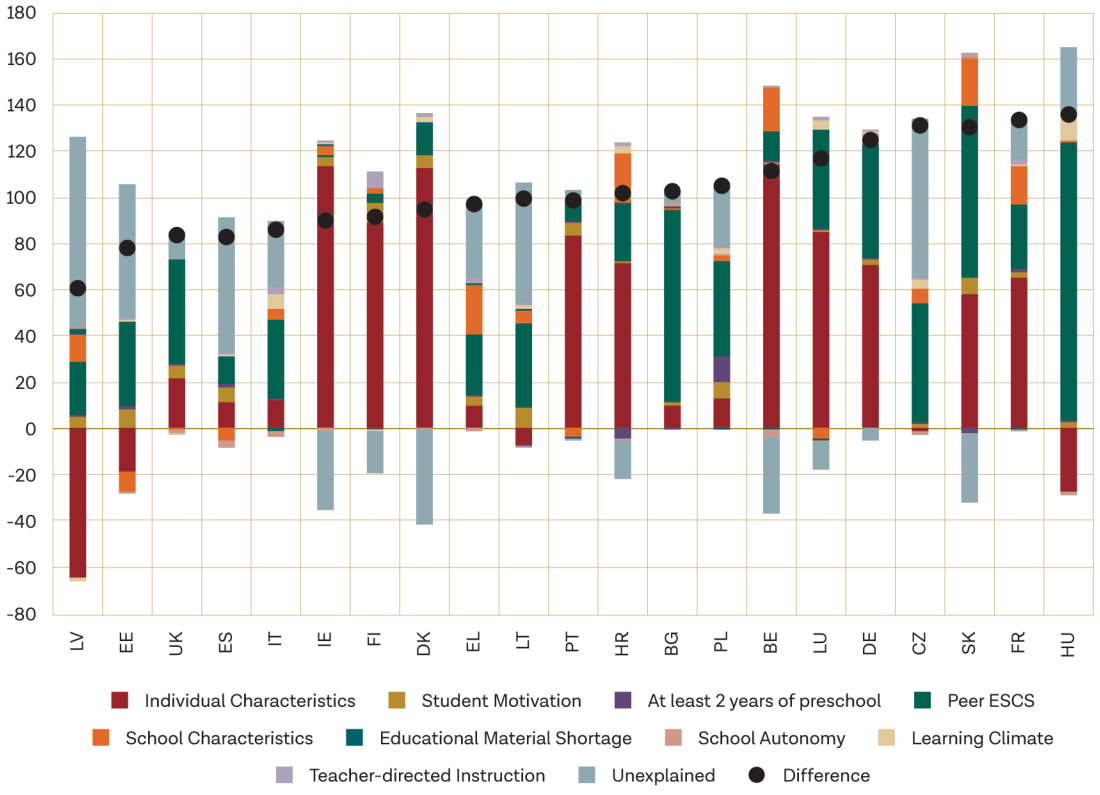
Individual student characteristics

Students' individual characteristics matter a lot in explaining the skill divide, especially household income and parental education. In the decomposition in figure 3.7, student characteristics include age and gender, student household's socioeconomic and cultural status, whether a foreign language is spoken at home (also reflecting immigration), as well as education-specific indicators, such as relative grade and whether a student is a repeater, and science learning time per week. Among those, between 50 and 80 percent of the differences in achieving proficiency among students in mathematics, reading and science can be explained by family wealth and parental education.

Poverty can undermine student achievement in multiple ways. Resources for books and parents' attention to their children's learning may be limited, as they struggle to make ends meet. Behavioral science research has shown how the struggle of people in poverty to make ends meet crowds out their attention to other things, such as monitoring the learning progress of their children (Mullainathan and Shafir 2013). Poor people suffer from limited attention bandwidth like

Figure 3.7 Student characteristics and school segregation are important factors explaining the skill divide

Variation in performance between top and bottom socioeconomic quintiles explained by different factors



Source: World Bank staff calculations based on PISA 2000–2015 database.

Note: Oaxaca decomposition of performance in PISA 2015 science scores between students from the top and bottom socioeconomic quintile by EU member country.

everyone else, except that a disproportionate share of their attention and preoccupation is simply taken up by making it through to the end of the month. This is made worse when parents themselves have had limited or unsuccessful exposure to education, which limits their ability to provide effective support to their children. While these characteristics are a given for schools and not a result of education policy choices (with the exception of retention policy), policy can be designed so as to minimize their negative effect on the skill divide.

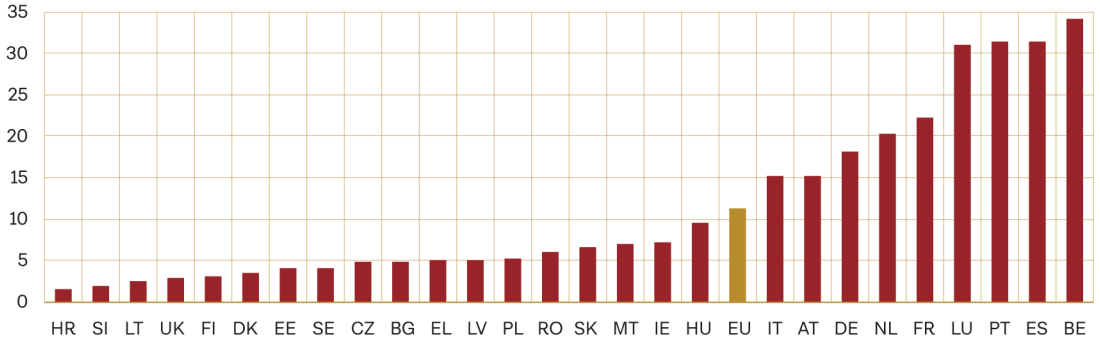
The skill divide starts early and has long-term effects. Evidence from PISA shows this in very simple terms: while students across the EU who attended preschool in their early years perform better in mathematics, reading and science at age 15, children from poorer socioeconomic backgrounds are significantly less likely to have attended preschool. Prior preschool enrollment of students in the PISA 2012 sample was 86 percent among the top socioeconomic quintile students, but it was only 66 percent among the bottom. This matters: early childhood education has been shown worldwide to be a key tool to improve opportunities for disadvantaged children in their education and throughout life. Extensive education research over recent decades show convincing evidence that investing in young children (0–5 years old) through early childhood development (ECD) programs — ensuring they have the right stimulation, nurturing, and nutrition — reduces early school leaving, raises cognitive skills and sets important social-emotional foundations for later in life.

Repetition is a key factor in the skill divide in a few countries, where it reinforces the effect of socioeconomic disadvantage on skills acquisition. While repetition is particularly prevalent in a Belgium, Spain, Portugal, Luxemburg, France, and the Netherlands, the likelihood of repetition has a lot to do with student socioeconomic background across all of Europe (figure 3.8). At the same time, repetition appears to be failing as an education policy to improve performance of disadvantaged students: on average, 60 percent of 15-year-olds in the EU who had repeated an academic year were below a basic level of proficiency. That share rises above 80 in Bulgaria, the Slovak Republic, Greece, and Croatia.

Immigrants are struggling in many, though not all, EU countries, with evidence of a skill divide between native students and first and second generation immigrants. Figure 3.9 shows that the performance gap in PISA 2015 mathematics is significant in countries with large immigrant shares. The performance gap is typically lower for second generation immigrants but the skill divides remain a significant challenge in many countries, even for second generation immigrant children.

Figure 3.8 Repetition is significant in Belgium, Spain, Portugal, and Luxembourg

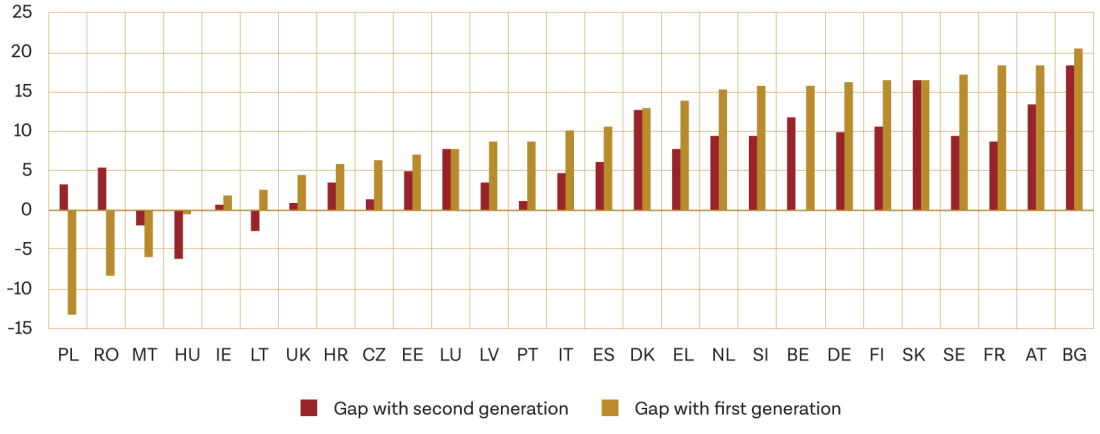
Share of students who have repeated a year, 2015 (percent)



Source: World Bank staff calculations based on PISA 2000–2015 database.

Figure 3.9 There are large learning gaps between native and immigrant students

PISA 2015 mathematics gap between native and immigrant students



Source: World Bank staff calculations based on PISA 2000–2015 database.

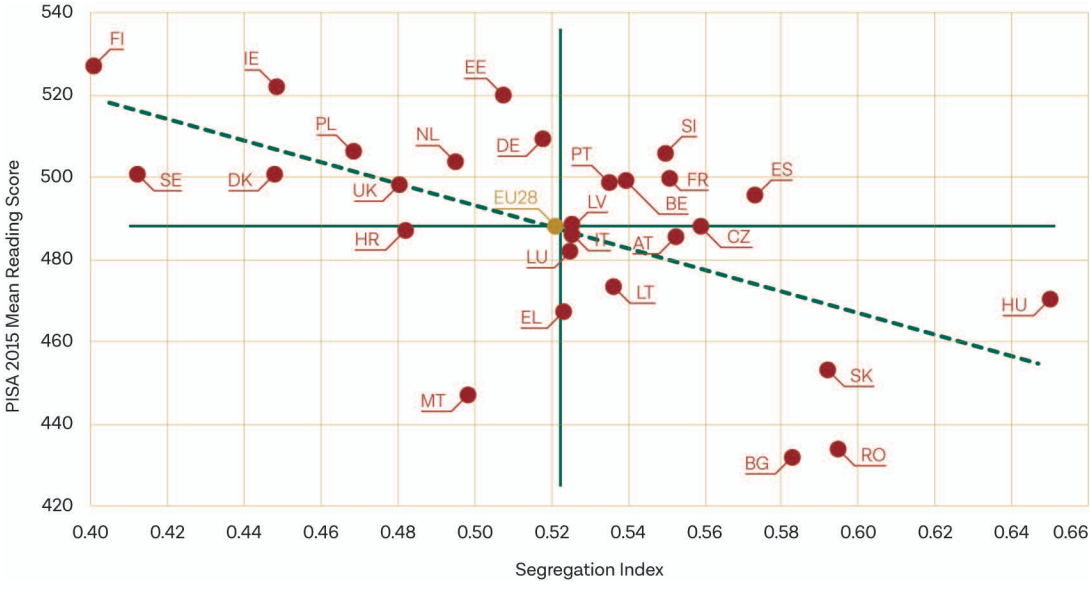
Social segregation in schools

Students from similar socioeconomic backgrounds often end up in the same schools. School social segregation is generated when households from similar socioeconomic background sort themselves in similar schools, effectively separating richer and poorer students and affecting, among other things, the peer composition of the classroom and school. It can be measured as the correlation between the socioeconomic level of each student with the average socioeconomic level of his or her school. If there is a lot of segregation by schools, the value of this correlation will be closer to one. Alternatively, if students are randomly allocated in schools regardless of their socioeconomic level, then segregation correlation will be closer to zero. Social segregation varies significantly across Europe between least-segregating Finland and most-segregating Hungary at the extremes (figure 3.10).

Students in more equal, less segregated education systems in Europe tend to perform better on aggregate. Figure 3.10 shows that low segregation goes hand in hand with an overall high student performance. It also shows that there is no evidence of an equity-excellence trade-off: countries with high aggregate PISA scores tend to have lower degrees of school segregation. Research has shown that top students do not suffer from presence of weaker students, while weaker students benefit from the presence of top students. Hanushek and Woessmann (2006) used previous PISA data to show how early tracking systems lead to a systematic increase in inequality of student performance without affecting average performance levels. At the national level, similar evidence has been found in Poland (see Jakubowski et al. 2010) and Germany (Piopiunik 2014). These findings suggest there are no efficiency gains from early selection — in fact, delayed tracking can promote better performance for all students.

Figure 3.10 Less segregated education systems tend to perform better

PISA 2015 mathematics scores and segregation scores across the EU



Source: World Bank staff calculations based on PISA 2000–2015 database.

Note: Perpendicular lines represent EU averages.

Social segregation in schools is problematic because it can affect student performance as well as a range of other dimensions of opportunity. While the socioeconomic status of students explains a significant share of variations in PISA scores among countries, its effect is reduced significantly when student peer effects or, in other words, the average socioeconomic status of the school are considered. In other words, the social context of schools matters for its students' performance — which is why school social segregation matters. Segregation can generate inequalities in different ways, with schools serving mostly lower-income students often organized and operated differently than those serving more affluent students. School average socioeconomic composition often affects the quality of teachers and teacher expectations, as evidence suggests that teachers prefer working in lower-poverty environments. Students from disadvantaged backgrounds benefit from interaction with more advantaged students, for example in terms of attitudes and outlook on life and learning which eventually affect student performance. But social segregation also matters beyond student performance: school is a medium that affects young people in multiple ways by opening their eyes to the world, helping build character and form aspirations — all of which translate into opportunities in adult life.

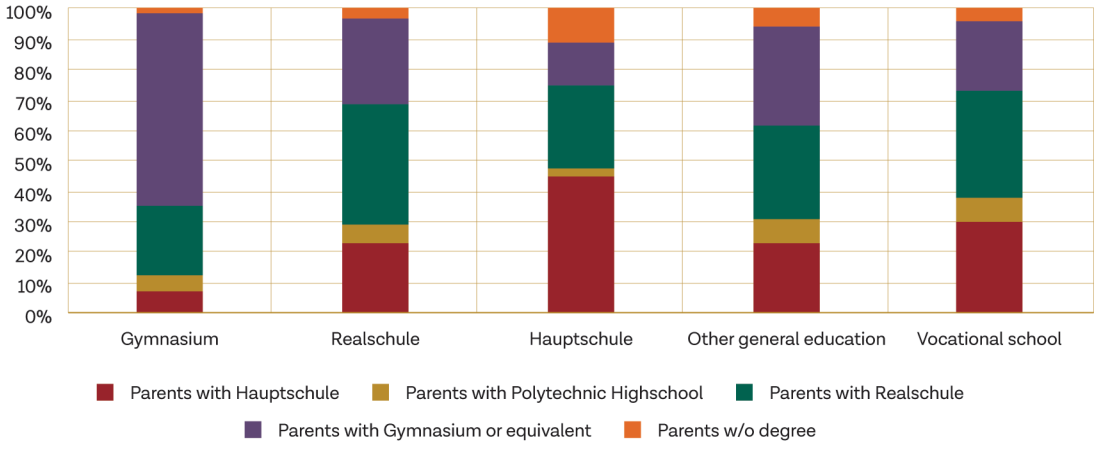
Social segregation is a consequence of the interplay of residential patterns, educational policies and parental choice. Residential patterns are a given, except when parents choose to live in neighborhoods based on a school district. In contrast, school zoning and school assignment policies for students, the nature and extent of school choice, information on school performance (for example, through rankings) and public subsidies to private schools are all matters of education policy. These policies interact with parental choices in affecting social school segregation, starting as early as in preschool and primary education and often, at a later stage, being reinforced by policies that separate students by ability in vocational education and training (VET) or academic profiles (called "tracking"). For example, in the Netherlands, tracking policies have become more rigid over time and have gone hand in hand with "cream skimming" by certain types of schools as well as free school choice and ample information for parents on school performance through rankings in driving increasing segregation: an overrepresentation of disadvantaged students in vocational tracks and an overrepresentation of higher socioeconomic status students in academic tracks (De Wolf 2017).

Less well educated, poorer and socially less connected parents are less likely to navigate the system of education policies and use information for their children's advantage. As a result, parental education is an important predictor of children's schooling patterns. For example, in Germany, more than 60 percent of students attending academic secondary schools (Gymnasium) have parents who completed Gymnasium or equivalent. Close to 45 percent of students in the vocational Hauptschule have parents who graduated from that type of school (figure 3.11).

The earlier the selection between vocational and academic tracks takes place, the bigger the risk to social mobility. The age of selection between educational tracks varies significantly across the EU between age 10 (mostly in Central Europe, German-speaking countries, the Flemish part of Belgium and the Netherlands) and 16. The international evidence on tracking is ambiguous, with some studies showing a negative and some showing a neutral effect on student learning outcomes (OECD 2016). However, the impact of tracking on student learning will depend on other variables related to the quality of provision. In other words, early selection can harm students from disadvantaged socioeconomic background if they disproportionately end up in vocational tracks where quality is poorer and cognitive skill acquisition is not emphasized. Evidence from Hungary illustrates this risk, showing how students from different socioeconomic strata distribute into different educational tracks and achieve widely differing levels of cognitive skills as measured by PISA (figure 3.12).

Figure 3.11 Parent's educational attainment is a strong predictor of student education choices

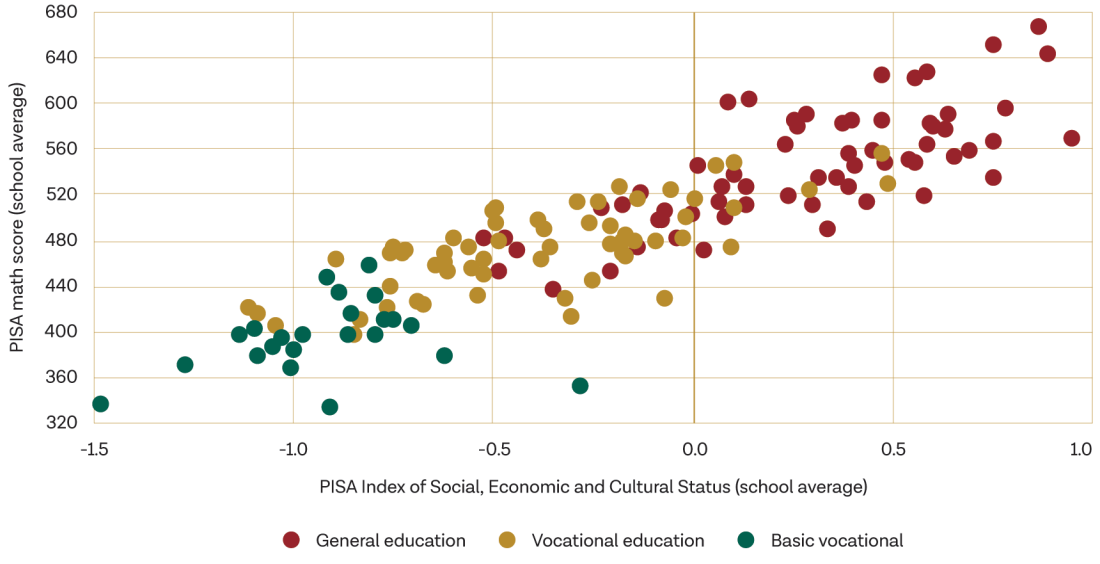
School enrollment according to parents' education background, Germany, 2015



Source: German Federal Statistical Office, *Statistic Yearbook 2016.*

Figure 3.12 Early tracking can undermine social mobility

PISA 2012 mathematics scores by socioeconomic status and school type, Hungary



Source: World Bank Staff estimates. using PISA 2012 data for Hungary.

Poorer students are often not only clustered together, but they also have access to poorer quality schools. School quality can be measured with the PISA index of disciplinary climate[3], shortage of educational material, and teacher shortage. Overall, in almost all the EU member states, students from poorer socioeconomic backgrounds suffer from worse school quality. Regarding disciplinary climate, some EU countries, for example Estonia, display smaller differences between students from the top and bottom socioeconomic quintile. Education staff shortages are more prevalent among students from the poorest socioeconomic quintile than among their peers from the richest ESCS quintile across much of Europe, except in Poland and Latvia (Gortazar et al. 2018).

Europe has some of the best education systems in the world — systems that provide opportunities to the vast majority of their students by equipping them with strong cognitive foundation skills. Countries with such education systems Estonia, Finland, Denmark, Ireland, the Netherlands, or Poland — are well prepared to ensure that future workforces can take advantage of accelerating technological change. But Europe is also home to countries that face a skill divide — Bulgaria, Romania, Greece, Croatia, Latvia, Malta, or France. These countries may have many very good schools, but many students leave education with poor cognitive skills and are thus deprived of opportunities. Moreover, even successful countries need to constantly adapt to changing labor demand as technology reshapes the world of work and to the changing needs of their student population. Finland is a case in point; traditionally a global education leader, it has recently witnessed a growing skill divide with disadvantaged students falling behind. Finland is acting to respond to these signs of new equity challenges to upgrade its school system.

Labor and social policies fall short of addressing the needs of workers left behind

Labor and social policies are key tools to reduce inequality of opportunity. First, labor policy can promote *flexibility* to facilitate access to jobs for new labor market entrants and low-skill workers and to avoid sustained and entrenched duality. This can be done through eased hiring and separation regulations covering permanent contracts, paired with appropriate use of temporary and (voluntary) part-time employment opportunities. Second, social policy can provide adequate *security* through income protection to Europe's poor and the newly poor who fall behind in the changing labor market, paired with measures to support their reemployment. These principles are embedded in the "flexicurity" principle spearheaded by Denmark, which are becoming increasingly relevant in response to the opportunities and disruptions emanating from technological change. Third, social assistance through adequate and well-targeted cash transfers and social work is an important investment to address social disadvantage of children and youth, a key determinant of Europe's social skill divide.

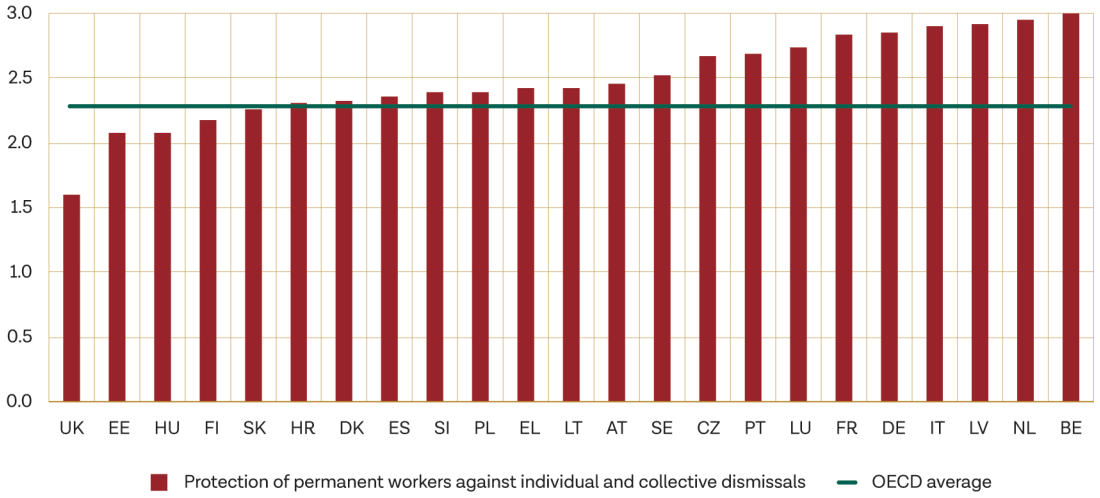
However, a closer look at Europe's labor and social protection systems today reveals significant variations in countries' ability to deliver on those ambitions. "Flexicurity" is not yet a reality in many parts of Europe.

Flexibility and security are not always in balance

Technological change accentuates the challenge of striking the right balance between job security and wage protection and greater flexibility to facilitate access to jobs for new entrants and low-skill workers. Today, this balance varies significantly across the EU. While employment protection legislation (EPL) and wage-setting institutions have been successful at reducing wage inequality, there is also evidence that too much of it can hurt firm productivity and job creation performance. Evidence further shows that more restrictive EPL provides incentives to firms to adopt labor-saving technology in low-skill sectors (Alesina et al. 2015; Packard and Montenegro 2017). Although EPL have become less stringent since the 1990s, the strictness of EPL for permanent contracts remains high (relative to the OECD) in much of the EU (figure 3.13). In countries with high degrees of protection for permanent workers, employers face a lower incentive to create new jobs, resulting in worse employment prospects of low-skill workers at a time when technological change is reducing the demand for these workers.

Figure 3.13 Employment protection regulations for workers on permanent contracts are above the OECD average for most EU countries

Protection of permanent workers against individual and collective dismissals, latest year available



Source: World Bank staff calculations based on the OECD Employment Protection Database. Protection is measured on a scale from 0 (least restrictions) to 6 (most restrictions).

While the extent of nonstandard employment varies significantly across the EU, temporary employment (especially among younger workers) and part-time work have increased in many countries. Temporary employment as a percentage of overall employment has reached significant levels in some EU countries over time: EU countries with temporary employment greater than 15 percent of overall employment in 2015 include Croatia, Netherlands, Portugal, Slovenia, Spain, and Sweden. This is particularly prevelant for younger workers between the ages of 15 and 24, with a majority working on temporary contracts in France, Germany, and Sweden, and over 60 percent in Poland, Portugal, Slovenia, and Spain (figure 3.14). Moreover, the duration of temporary employment among younger workers is increasing, while the transition from temporary to permanent employment (where temporary employment acts as a "stepping stone") remains limited to less than one in five workers in most countries (European Commission 2017). In short, temporary employment is increasingly the "new normal" of employment for younger workers. The trend toward increased temporary employment have gone hand in hand with rising efficiency and equity concerns associated with growing duality between contract types (well-protected and open-ended versus less protected and temporary) and increases in part-time work (OECD 2013), especially involuntary.[4] Moreover, increased nonstandard employment, associated with more frequent unemployment spells, risks resulting in lower pension contribution records and lower social protection coverage over the long-term.

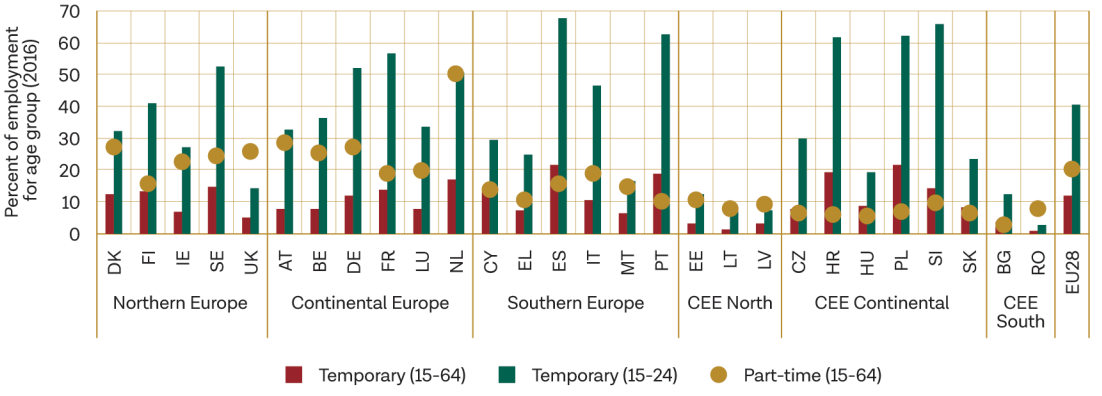
Labor market policy is often more passive than active

Labor market policy across Europe is not sufficiently geared toward active measures to help workers retain their jobs or quickly return to employment after job loss. Central to the "flexicurity" principle, these policies are becoming more important with the new realities in the labor market, particularly job-search assistance and skills upgrading. Countries across Europe vary significantly in the way they leverage labor market policies. First, spending varies significantly between more than 3 percent in Denmark and less than 0.5 percent in Romania (figure 3.15). While spending

is arguably an imperfect indicator of effective use of labor market policy, the fiscal envelope for such programs defines room to maneuver and reflects their importance in a national policy mix. Second, beyond aggregate spending, passive measures (such as income support and early retirement) dominate active measures across most of the EU.

Figure 3.14 Temporary employment is high among younger workers in many countries

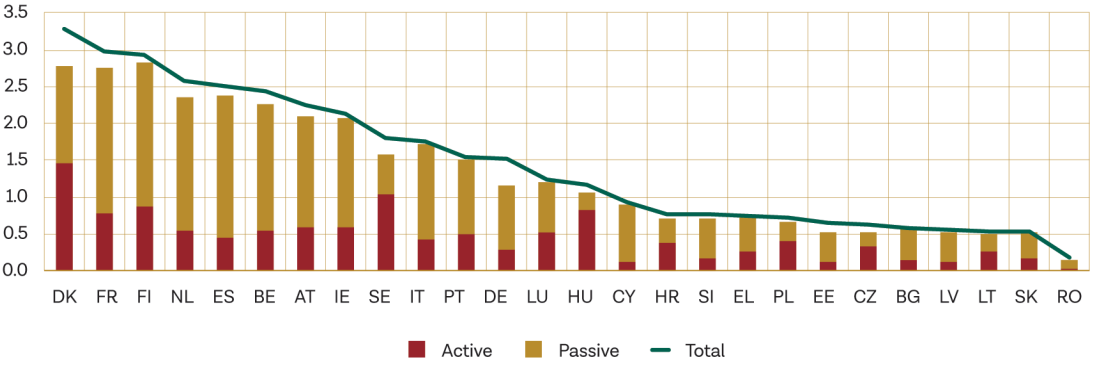
Percent of employment for age group, 2016



Source: Eurostat.

Figure 3.15 Expenditures on labor market policies vary significantly across the EU

Spending on labor market policies as share of GDP, 2015 (percent)



Source: World Bank staff calculations based on Eurostat.

Note: Active includes training, employment incentives, supported employment and rehabilitation, direct job creation, and start-up incentives. Passive includes income support and early retirement. Total also includes labor market services.

Looking ahead, labor market policy needs to expand its focus toward enhancing opportunities for the newly unemployed to return to work, including through better targeting and tailoring of employment support programs to needs as well as better monitoring and evaluation. "Flexicure" Denmark stands out both in terms of aggregate spending, and the share that goes to active measures: hiring and separation rates in Denmark are high, but so is the importance of an activating labor market policy as part of the flexicurity framework.

Cross-border labor mobility in the EU is limited

EU-wide labor mobility is an important dimension of opportunity for people and firms. In principle, Europe's single market for goods, services, capital, and labor encourages cross-border labor mobility and people and firms stand to gain. Labor mobility enhances opportunities for people to find employment across a larger labor market than just the home country. Likewise, firms can source from among a larger pool of workers. Overall, labor mobility is good for the EU's single market by helping to allocate labor to where returns are highest. However, the idea of labor mobility has raised concerns across the EU. For example, "sending" countries in Central and Eastern and Southern Europe have lamented brain drain, as many, often younger and more skilled, workers have started to look for better employment opportunities in Central and Northern Europe. This matters: emigration, in addition to low fertility, has had a profound effect on fast population aging in Central and Southeastern Europe, unlike in Western Europe, where aging is predominantly driven by increased longevity (World Bank 2015). On the side of "receiving" countries, meanwhile, the arrival of nonnative workers has raised concerns among native workers about the effect on jobs. The temporary posting of workers, in particular, has created political waves across Europe.

Put in an international perspective, however, the integration of labor markets in the EU remains limited and labor mobility low. As such, it does not serve as a major adjustment channel for labor reallocation and opportunities for low-skilled workers. Only a small share of the total EU28 population is mobile *across* EU borders — and labor mobility is much less than across United States or Australian states. EU mobility is similar to Canadian mobility between Quebec and other provinces — that is, it is similar to situations where language barriers apply (figure 3.16). Labor mobility between regions *within* EU countries is higher than between countries (but still short of mobility between US states). However, EU labor mobility has been growing in recent years in terms of permanent emigration, the temporary posting of workers in another member state and cross-border commuting. (European Commission, 2016).

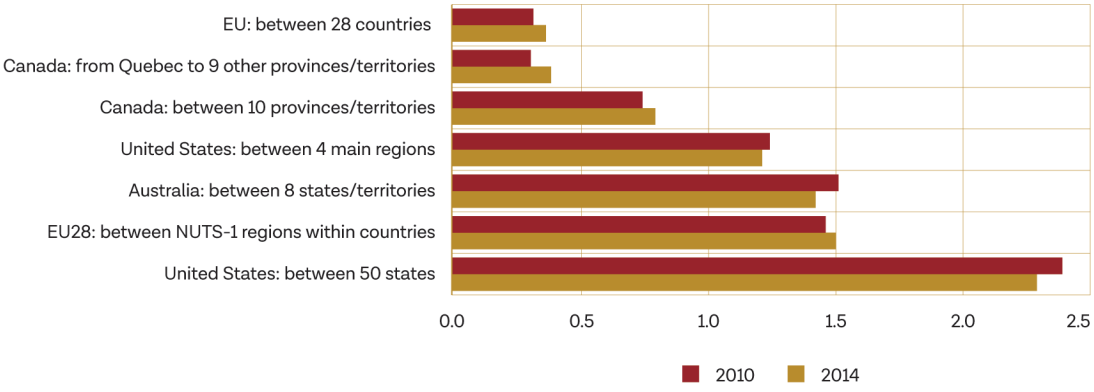
Social protection systems are increasingly out of sync with needs

Because they emphasize benefits linked to jobs and based on contributions, Europe's social protection systems are increasingly out of sync with a labor market with growing nonstandard employment relationships. Contribution-based social insurance schemes have been designed for standard employment relationships between firms and workers, where full-time and open-ended contracts are the norm and benefits grow with seniority. For example, unemployment benefits and pensions in the EU are mostly contributory and linked to work history, with larger benefit rights resulting from longer job tenure. Under this system, the firm plays an important role in making contributions on workers' behalf and holding and delivering information that the state needs to manage social protection. This system is not well placed to keep up with changing realities in the labor market where temporary and self-employment are increasingly prominent, particularly among the young. At the core, there is a concern about how to protect people who cannot work long enough, or whose disrupted careers make it difficult to contribute enough, to qualify for these benefits. As a result, current systems need change toward a greater emphasis on noncontributory schemes and individual accounts which are linked to the worker and not the job he or she holds.

Social spending is high in most EU countries, but most of it goes to old age and health-related programs and relatively little to poverty-focused programs. Looking ahead, a growing need for protection of those left behind by a changing labor market will compete with increasing aging related claims on often already large social protection systems. While welfare state spending in parts of

Figure 3.16 Cross-border labor mobility in the EU is low

Annual cross-border mobility, percentage of total population



Source: OECD Survey of the European Union; Australian Bureau of Statistic; Statistics Canada; US Census Bureau.

Note: Population mobility for Australia, Canada, and the United States; labor mobility for the European Union.

Europe is among the highest in the world, it varies significantly across countries — between around 15 percent of GDP in Lithuania, Romania, and Estonia and above 30 percent in Finland, Denmark, and France. Moreover, across all countries, the lion's share of spending is geared toward social insurance for old age and health — with benefits linked to jobs and based on a contributory principle. In comparison, spending on social safety nets and income support for those not (or no longer) covered by contributory benefits is very low in most countries, varying between 0.1 percent of GDP in Latvia, Estonia, Poland, and Hungary and 1.3 and 1.4 percent in Denmark and the Netherlands, respectively. This section examines how well social protection systems do in protecting the poor and addressing inequality, including by looking at the progressiveness and redistributive impact of social benefits.

The combination of direct tax and social protection transfer policies is reducing poverty in most EU member states, however there are some notable exceptions. While income and property taxes as well as labor taxes place a burden on all households irrespective of their place along the income distribution, direct taxes in much of the EU are progressive (that is, they are higher for higher income earners, see box 3.2). Moreover, to the extent that those at the bottom of the distribution also receive social transfers, they may be net beneficiaries of the system. As such, the taxes and benefit system in its entirety can be poverty-reducing. However, this is not the case for Latvia, Hungary, Bulgaria, and Romania (the last two countries have the highest absolute poverty rates in the EU), where the social transfers received are not large enough to mitigate the impact of direct taxes on absolute levels of poverty (figure 3.17). Overall, the poverty reduction impact of direct taxes and social benefits is highest in countries in Northern and Continental Europe.

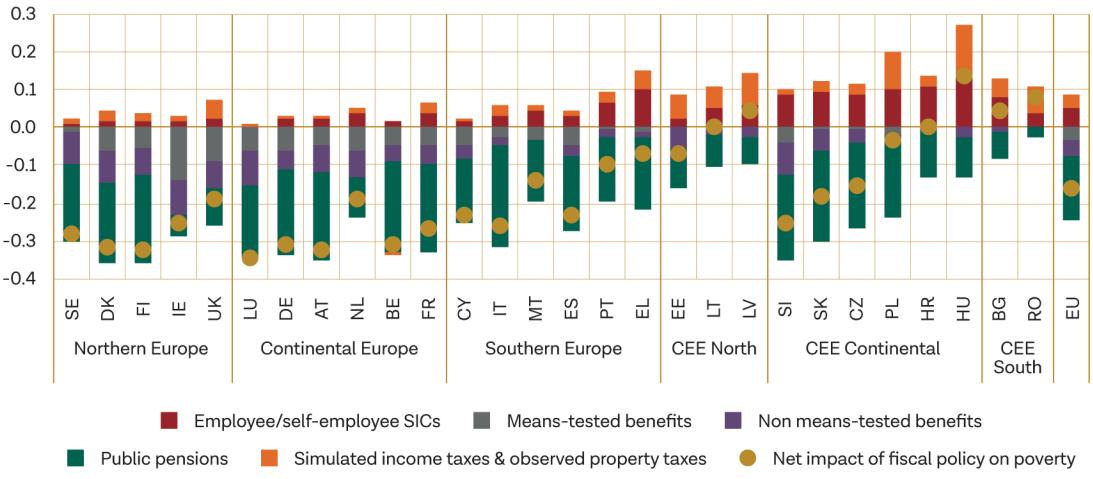
Box 3.2. Taxes are a powerful redistributive tool — the tax composition, progressivity, and base matter

After pensions, the most effective redistributive fiscal instrument in the EU is direct taxes — progressivity of direct taxes matters. Direct taxes are progressive in nearly all EU countries (figure A3.2). This is mainly due to tax rates rising with income. In countries with flat personal income tax (Czech Republic, Estonia, Latvia, Lithuania, Hungary, Bulgaria, and Romania) direct taxes tend to be less progressive, although in some cases this is offset by personal allowances. And multiple rates do not guarantee progressivity: progressivity is low in countries like Denmark, the Slovak Republic, and Poland, as they have too few rates and the tax threshold is too low (so that effectively everyone pays taxes).

The tax base also matters, and so does the composition of taxes. The redistributive impact of progressive direct taxes is more limited when too little tax is collected, as in CEE countries (figure A3.3). The argument also works the other way around: in countries like Ireland and Portugal, taxes have a larger redistributive impact than other countries with similar tax collection thanks to their more progressive taxation. Also, if indirect taxes are considered, the redistributive impact of taxes can be reversed in some cases. Indirect taxes tend to be regressive (O'Donoghue et al. 2004; OECD 2014; Decoster et al. 2010). Thus, tax systems that rely heavily on VAT or other indirect taxes may increase inequality. In Croatia, recent work shows that the redistributive impact of direct taxes and transfers is largely reversed when indirect taxes are factored in (Inchauste and Rubil 2017).

Figure 3.17 Direct taxes and social benefits do not always reduce poverty

Change in US$21.7 PPP poverty rate resulting from each fiscal instrument



Source: World Bank calculations based on Euromod.

Note: Welfare distribution ranked by market income and pensions. Estimates use 2012 EU-SILC uprated to 2016, and policy simulations for 2016. The poverty line is set at an absolute threshold of US$21.7 PPP per day.

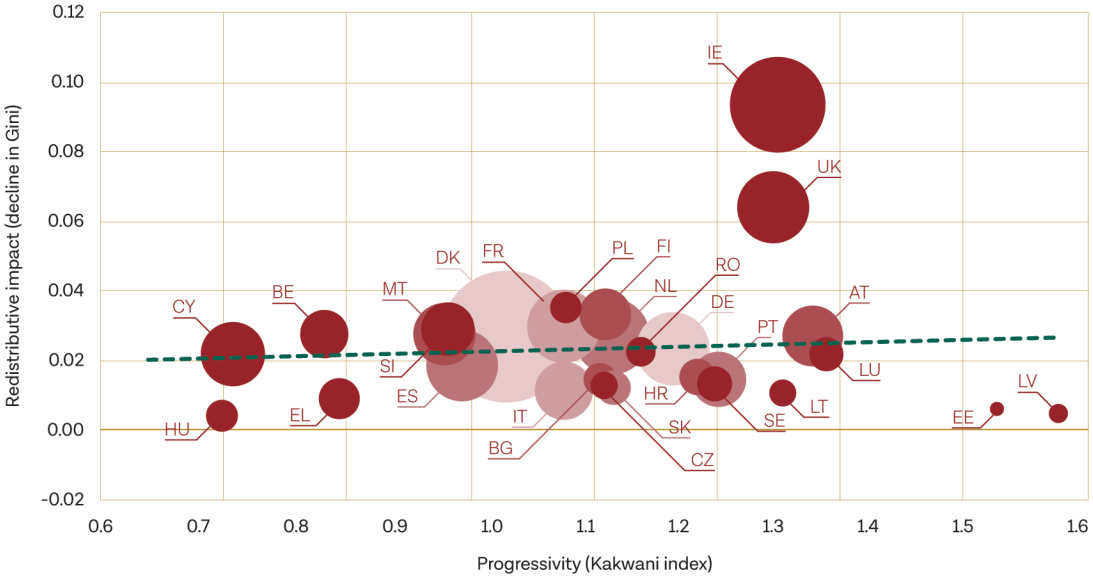
Social benefits are progressive across the EU, particularly those that are means-tested, with the largest share of means-tested benefits accruing to the bottom 40 percent of the income distribution. Social benefits are progressive in all EU countries (figure 3.18, horizontal axis). Means-tested benefits are generally more progressive, although there are a few exceptions. For instance, in Denmark the level of progressivity between means-tested and non-means-tested programs is similar, either because the categorical targeting used is highly correlated with income (such as unemployment) or because non-means-tested benefits, such as disability benefits, are phased out with income and wealth (Petersen et al. 2017).

The contribution of social benefit programs to poverty reduction depends on whether they reach the poor, but also on whether they are large enough to make a difference. Figure 3.18 brings together the redistribution, progressivity, and size dimensions of means-tested programs and show their significant variations significantly across countries. Even when programs are well designed to cover a larger share of the bottom 10 percent of the population, the small size of such programs undermines their protective and redistributive power. For instance, means-tested programs in Estonia are highly progressive, with 95 percent of benefits going to the poorest 10 percent of the distribution. However, only 0.1 percent of GDP was spent on these programs in 2014, thus diminishing their redistributive power. Means-tested benefits in Ireland and the UK stand out as combining high redistributive impact and progressivity which translates into significant poverty reduction (see box 3.3, which gives more detail on Ireland).

Social protection and labor systems in the European Union are diverse, but they face a common challenge: the need to adjust to changing needs as technological change disrupts labor markets. The direction of change is to emphasize opportunity: leveraging poverty-focused social assistance as an investment into the opportunities of the next generation while enhancing protection of those left behind; balancing increased labor market flexibility with protection; and adapting social protection to the increased prevalence of nonstandard employment.

Figure 3.18 The redistributive impact of social protection varies significantly across the EU

Redistributive impact of means-tested benefits, 2015



Source: World Bank staff calculations based on Euromod, EU SILC and ESSPROSS.

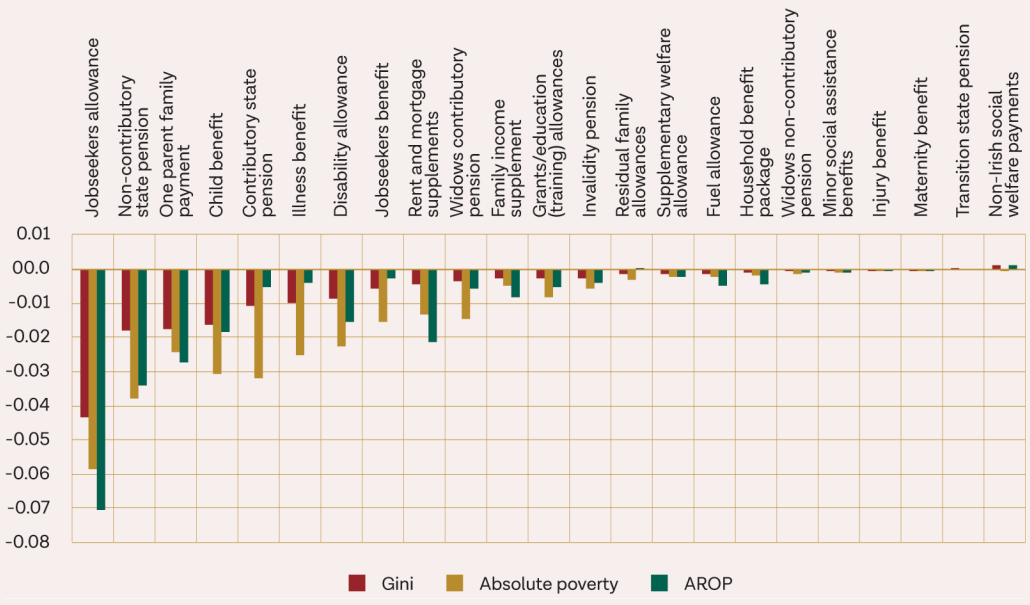
Note: Larger bubbles indicate higher spending as a share of GDP. Estimates calculated using 2012 EU-SILC (2011 income year) uprated to 2016, and policy simulations for 2016.

Box 3.3. Social benefits do make a difference in Ireland

The most impactful means-tested programs in Ireland are directed to vulnerable families, the unemployed, and the elderly who have no access to contributory benefits. The jobseekers allowance and the noncontributory state pension seems to make the most difference. The jobseekers allowance is a means-tested noncontributory weekly payment made to unemployed people who do not have (or have used up) unemployment insurance. This benefit is reduced for people with reduced days at work or if their employment is only part-time or temporary. The means-tested noncontributory state pension is paid to people age 66 or above, who do not qualify for the contributory State Pension and habitually reside in Ireland (O'Donoghue 2017). The means-tested one-parent family payment and the universal child benefit payment are also among the top redistributive and poverty-reducing social benefit programs (figure 3.19). However, the resources spent on the universal child benefit is substantially higher than on the means-tested programs.

Figure 3.19 Social benefits do make a difference in Ireland

Change in Gini, absolute poverty and AROP resulting from each program



Source: World Bank calculations based on EUROMOD.

Note: Welfare distribution ranked by market income and pensions. Estimates calculated using 2012 EU-SILC (2011 income year) uprated to 2016, and policy simulations for 2016. AROP: At-risk of poverty.

Notes

[1] PISA captures the socioeconomic background of students through its Index of Economic, Social, and Cultural Status (ESCS), a multidimensional measurement scale that considers information reported by students on their family's wealth, occupational, educational, and cultural background. It is derived from a combination of three other indexes: (i) an index of the highest occupational status of parents, indicating not only labor market status, but also the type of job held by parents; (ii) an index based on the highest level of parental education in years of schooling; and (iii) an index of family home possessions, which itself consists of a combination of the family's possessions (such as cars, bathrooms, or technological devices), educational resources (such as desks, computers, textbooks, the number of other books), as well as the type of cultural possessions (such as the type and genre of books or works of art). The ESCS Index is the most important determinant of student achievement and is therefore crucial for analysis of the quality of education.

[2] Oaxaca decomposition variable grouping. Individual characteristics: age, gender, relative grade, retention, foreign language at home, ESCS index, and science learning time per week. School Segregation: Mean ESCS at the school level, standard deviation of ESCS at the school. School characteristics: Class size, School size, school type (by government funding), vocational (school). School Autonomy: School autonomy index, teacher responsibility in the school's decision process (vis-à-vis government or national education authorities), school responsibility for resource allocation, school responsibility for curriculum and assessment. Climate: Both student and teacher related aspects of school climate.

[3] Disciplinary Climate is an index built using student answers to "how often do these things happen in your class?": Students do not listen to what the teacher says; there is noise and disorder; the teacher has to wait a long time for students to quiet down; students cannot work well; students do not start working for a long time after the lesson begins; and at the start of class, more than five minutes are spent doing nothing.

[4] Close to a third of all part-time work is involuntary across the EU, and as high as 60 percent in crisis-hit economies in Southern Europe (European Commission 2017).

Chapter 4:

Opportunities for Firms

Productivity is slowing down everywhere, but while Central and Southeastern European countries are catching up and productivity is still growing in Northern and Continental Europe, productivity has reached a standstill in Southern Europe. This chapter looks at why firms do better in some parts of Europe than others, focusing on the role of policies that define the business and innovation environment, and thus the opportunities for firms to thrive across countries and regions. It argues that these policies play a big role in explaining productivity growth differences across countries and regions in the EU. It also argues their role has gained, and will continue to gain, prominence as a result of technological change. Productivity growth in Southern Europe is lagging behind Northern Europe's because burdensome business regulations in the South are generating an inadequate entrepreneurial profile for a global market. Central and Southeastern European economies have been successful at attracting foreign investments, but business regulations and infrastructure remain a challenge in some countries and lagging regions. Northern European economies are productivity leaders because they provide more economic freedom and a better supporting environment for innovation to their firms. The low quality of the business environment and local institutions limits the opportunities of firms in lagging regions.

Why firms do better in some countries than others?

Productivity gains come from improvements in allocative efficiency and the upgrading of firms' capabilities. TFP growth can be broken down into two components: within firms and between firms (Melitz and Polanec 2015). The within firm component measures the degree to which incumbent firms are becoming more productive, which is related to the upgrading of their internal capabilities to innovate, adopt new technologies and apply best managerial practices. The between firm component measures the extent to which resources and economic activity move from less to more productive firms (that is, allocative efficiency increases), through the upsizing of more productive incumbent firms, downsizing of less productive incumbent firms, entry of new productivity firms and exit of less productive firms. Policies can affect both processes, but have a particularly important role in shaping allocative efficiency by setting the business environment, hence the focus of this chapter on those policies. Indeed, *Golden Growth* shows that country-level factors and policies account for a large share of the productivity performance of EU firms between 2002 and 2008.[1]

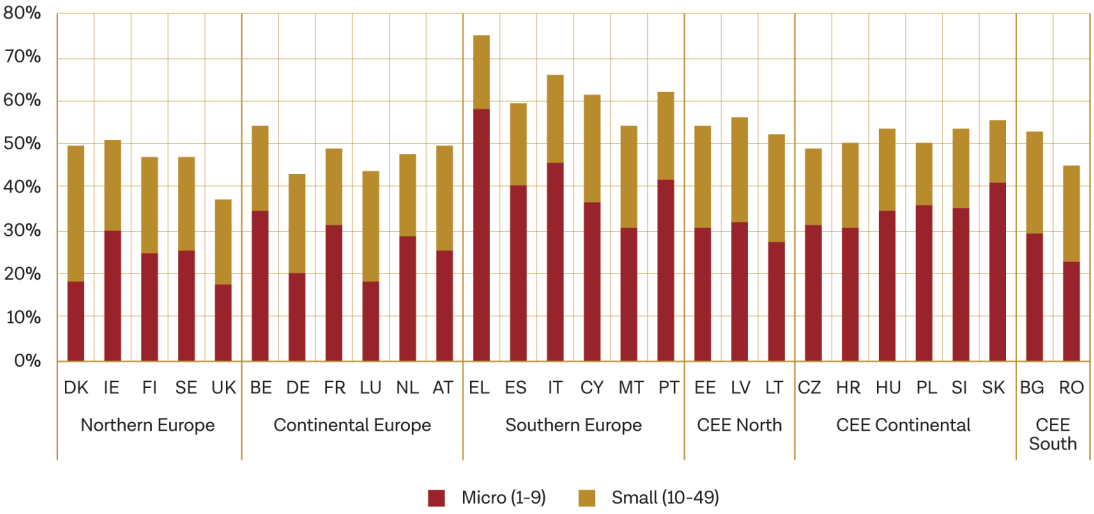
Southern European countries are lagging because burdensome business regulations generate an inadequate entrepreneurial profile for a global market

A clear gap in allocative efficiency between Southern and Northern European countries emerges when with from comparing their entrepreneurial profiles

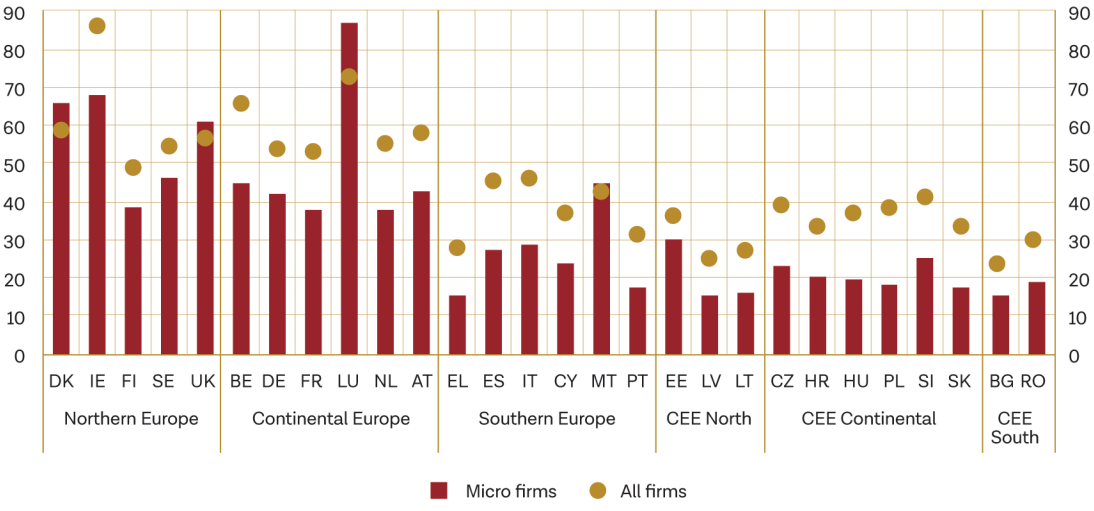
Firms in Southern European countries are smaller. Microenterprises (that is, firms with fewer than 10 workers) are the most prominent type of firm in every EU country, but more so in Southern European and CEE Continental countries (figure A4.1). And microenterprises account for a larger share of employment and value added in Southern countries than in other EU countries (figure 4.1 and figure A4.1). This is important because small firms are less productive than larger firms. Small is not necessarily bad, but there is a minimum scale below which size becomes a constraint to growth. Larger firms benefit from economies of scale and are more likely to engage in international operations (through exports and FDI). And not all small firms are equal: microenterprises in Southern European countries are less productive — microenterprises in Northern European countries are as productive as medium-size firms. *Golden Growth* showed that if the South had the size-mix of other EU15 countries, and its microenterprises had the productivity level of other EU15 countries, its productivity gap with the rest of EU15 would be reduced by 40 percent.

Figure 4.1 Microenterprises in Southern European countries account for a larger share of employment and they are less productive than in their Northern neighbors

Employment share of microenterprises and small firms, 2014



Labor productivity, all firms and microenterprises, 2014



Source: Own calculations, using Eurostat.

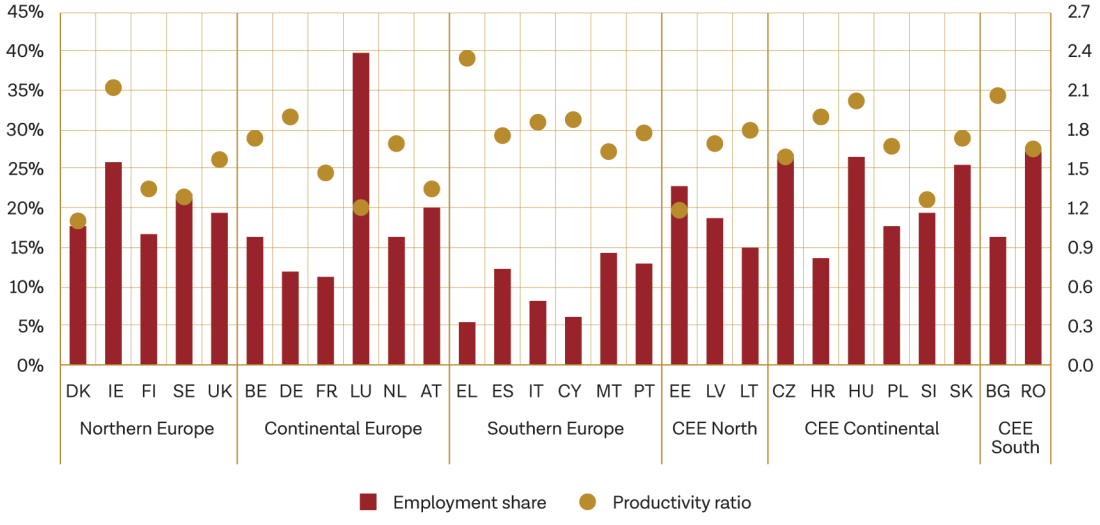
Note: Labor productivity is gross value added per person employed, adjusted for price differences across EU countries relative to the EU average (EU28 = 100).

Southern European countries have fewer foreign-owned firms and domestic firms with international presence. Southern European countries have the lowest share of foreign-owned firms in the EU, and so is their contribution to total employment and value added (figure 4.2). At the other end, foreign-owned firms contribute the most to employment and value added in CEE countries. While the share of FDI inflows going to CEE countries increased with the expansion of the single market, the share going to Southern European countries declined. Foreign-owned firms are more productive than domestic firms everywhere, particularly in Southern European countries. Firms in Continental and Northern European countries are not only more successful than those in Southern countries in attracting foreign capital, but they are also more global. About 10 percent

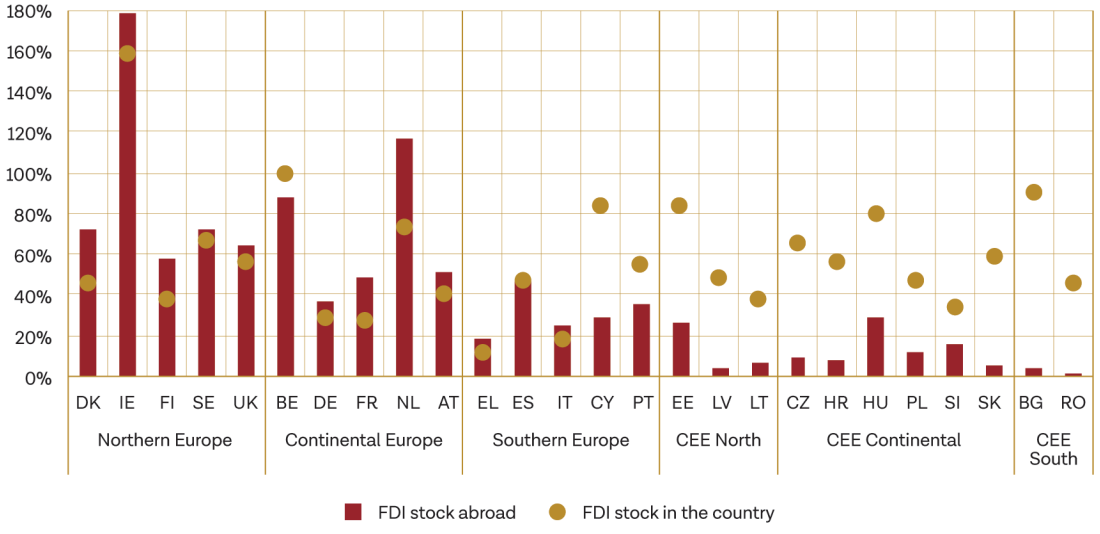
of Swedish firms belong to Sweden-based enterprise groups with presence in Europe, while fewer than three percent of Italian or Spanish firms do (*Golden Growth*). Such offshoring has substantial benefits: FDI-providing firms in tradable sectors leverage vertical FDI to establish production facilities in foreign markets, reducing labor costs and maintaining a competitive advantage.

Figure 4.2 Firms in Southern European countries are less likely to be foreign-owned and be global

Employment shares of foreign firms and their productivity premium, 2014



FDI stocks in the country and abroad as a percentage of GDP, 2012



Source: Own calculations, using Eurostat.

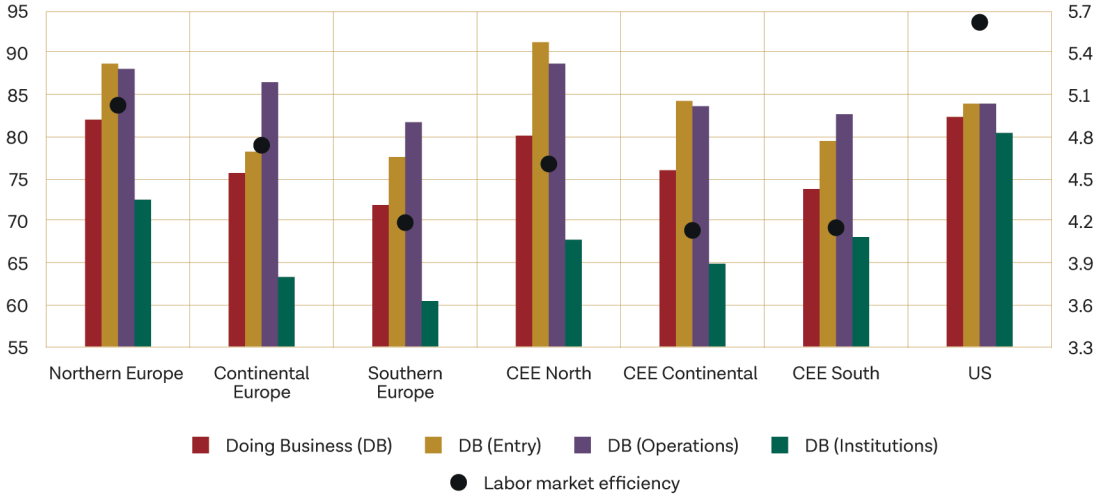
Note: Labor productivity ratio is the gross value added per person employed of foreign firms to all firms in the countries. The right axis on the top figure measures productivity ratios.

Burdensome business regulations make firms in Southern Europe smaller and less global, and thus less productive than in Northern Europe

Southern European countries tend to have more burdensome business regulations. This report uses Doing Business indicators to measure the quality of business regulations, as they measure the quality of regulations on paper as well as how well they are implemented (based on the experience of actual users). In addition to the main Doing Business (DB) indicator, the report also presents indices for three components: (1) business entry: starting a business and registering property; (2) business operations: paying taxes, trading across borders and obtaining construction permits; (3) institutional environment: protecting investors, acquiring credit and enforcing contracts. All indicators measure distance to be best-performing country (Distance to Frontier), on a scale of with from 0 to 100. Since the DB operations indicator does not include labor regulations, we complement it with the indicator of labor market efficiency developed by the World Economic Forum. In all dimensions of the business environment, Southern European countries tend to do worse than their Northern neighbors (figures 4.3 and A4.2).

Figure 4.3 Business regulations are more burdensome in Southern Europe

Doing Business indicators and labor market efficiency, 2017

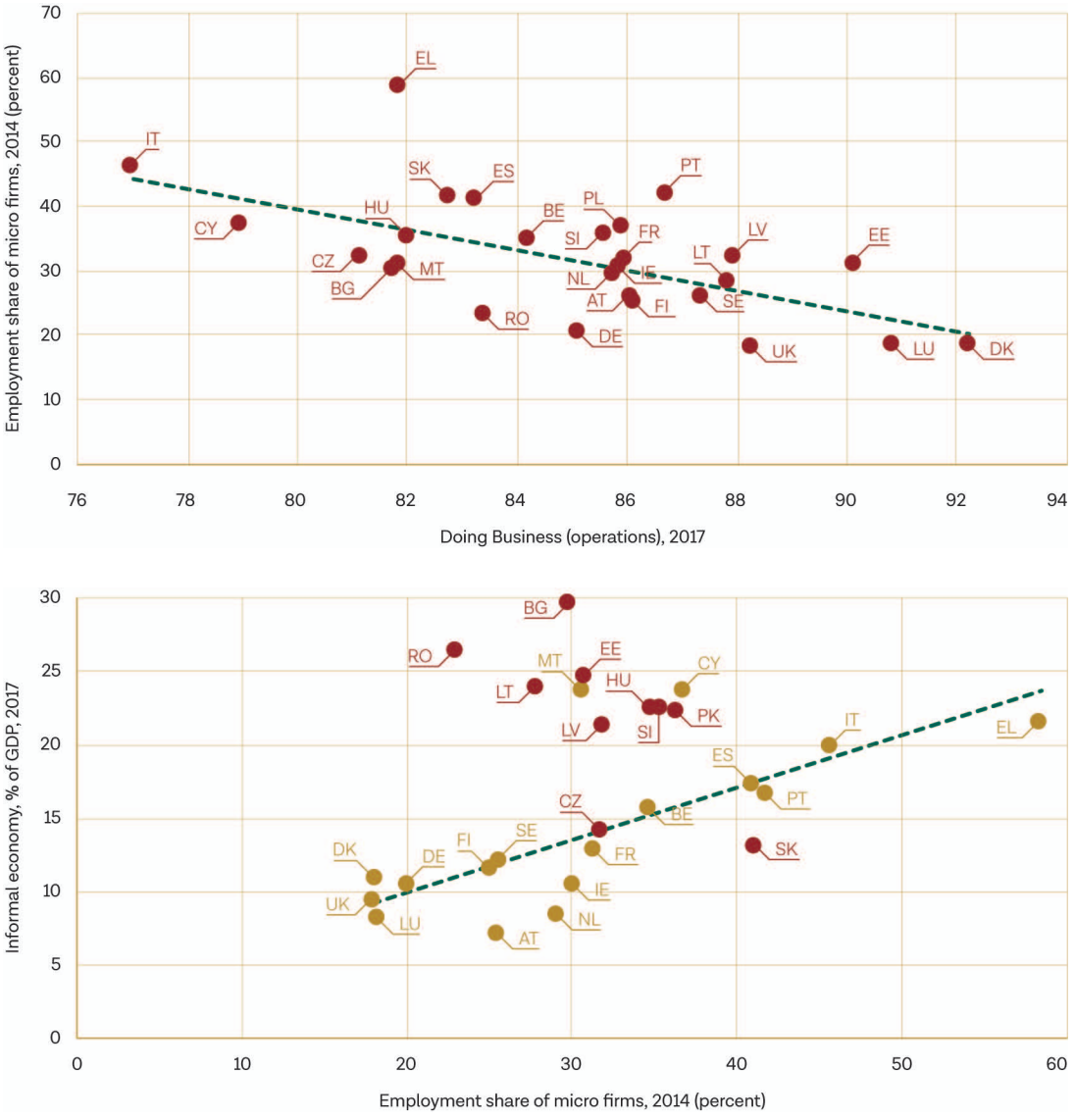


Source: Doing Business and World Economic Forum.

Note: Doing Business Indicators measure distance to best performer (best performer = 100). Labor market efficiency is measured in a scale from 1 to 7 (best) (right y-axis).

Excessive business regulations make firms in Southern Europe smaller and less global. A simple and efficient regulatory framework is needed to balance the social responsibility of firms with a vibrant enterprise sector. Excessive regulations, however, constrain the ability of firms to reach the minimum size required to be competitive, to become more productive, as well as to be international (through exports or offshoring) and attract foreign investment. The strong correlation between business regulations and the employment share of micro-firms, on the one hand, and between the latter and the size of the informal economy (at least for EU15 countries) (figure 4.4), on the other hand, suggests that small firms in the South may prefer to stay small and, in some cases, informal to avoid more complex regulations. And by affecting the cost structure of firms, business regulations, such as tax administration and labor regulations, can limit the graduation of small and medium enterprises to larger firms. A better business environment helps firms in Continental and, particularly, Northern Europe grow larger than firms in Southern Europe.

Figure 4.4 In a difficult business environment, firms stay small and operate informally



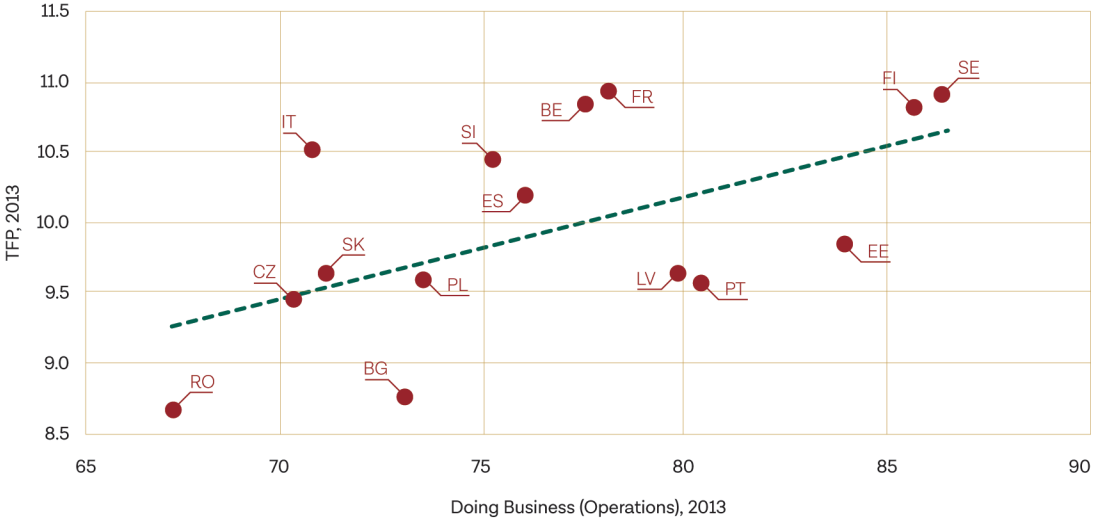
Source: Own calculations, based on data from Doing Business, Eurostat, and Schneider 2017.
Note: CEE countries are in burgundy; the rest are in gold.

Although business regulations may not be the main drivers of foreign investment decisions, they can tip the balance in favor of one economy over another. Better regulations of FDI are associated with higher share of foreign firms in total employment (figure A4.3). A better business environment makes firms in Continental and, particularly, Northern Europe more likely to invest in foreign markets and to benefit from offshoring than firms in Southern Europe.

Burdensome regulations make firms in Southern Europe underperform relative to firms in Northern Europe. Across EU countries, better business regulations are associated with higher productivity (figure 4.5). A large part of the differences in firm productivity growth over the period 2002–08 between Southern European countries and their Northern neighbors is explained by

differences in business regulations, particularly those related to firm entry and employment in services (figure A4.4). Differences in FDI inflows and outflows, which are partly influenced by business regulations, also played an important role, particularly in manufacturing. A central channel through which business regulations affect productivity in Southern Europe is the entrepreneurial profile: productivity growth in these countries is lagging behind because burdensome business regulations generate an inadequate entrepreneurial profile for a global market.

Figure 4.5 Better business regulations are associated with higher productivity



Source: Own calculations, based on Orbis and Doing Business.

Central and Eastern European countries have done well by attracting foreign investments, but the quality of business regulations and infrastructure remain a challenge in some places

Business regulations, the quality of infrastructure, and FDI flows are strongly associated with firm productivity performance in CEE countries. Country-level factors and policies were the most important determinants of firm productivity growth in CEE countries during 2002–2008 (*Golden Growth*). Locating in Slovenia versus Romania could mean more than 14 percentage points of productivity variation. The country effects are strongly correlated with national policies. Business regulations, the quality of infrastructure, FDI inflows and outflows, and access to credit are strongly associated with performance in both manufacturing and services at the country level (figure A4.5). For both manufacturing and services, productivity gains in CEE countries are linked to increases in inward FDI and, relatedly, to better business regulations, especially those related to taxes, foreign trade, and employment.

CEE countries have done well attracting foreign investments, but business regulations and infrastructure remain a challenge in some countries. CEE countries have been successful at attracting foreign investments. Today, foreign-owned firms contribute more to total employment and value added in CEE countries than anywhere else in the Union (figure 4.2). And FDI inflows have been a key determinant of firm productivity growth in these countries. All this attests to the key role of FDI inflows in helping CEE countries catch up with more advanced economies in the EU. However,

the quality of public infrastructure remains relatively low in many of these countries (figure A4.6), where it is a key binding constraint to firm productivity growth. And the quality of business regulations remains an important challenge in Bulgaria and Romania (figure 4.3).

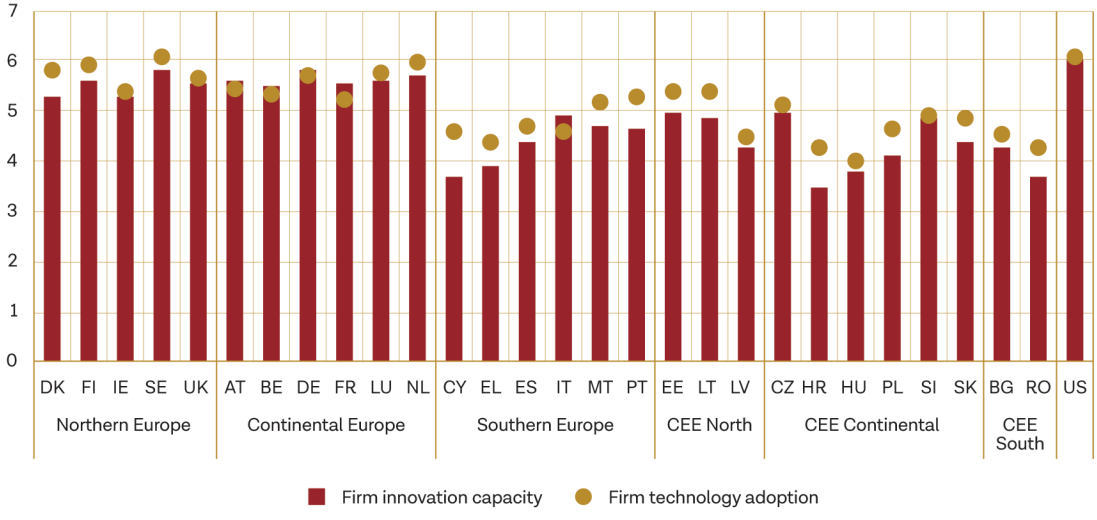
Northern European economies are productivity leaders because they innovate

Not only do firms in Northern Europe enjoy considerable economic freedom, but they also innovate more and adopt technology more intensively. Northern economies are among the top 15 countries of the Doing Business rankings. Their firms enjoy considerable economic freedom, but it is really their superior innovation capacity that makes them productivity leaders. Business executives in Northern and Continental European countries rate firm innovation capacity and technology high, not much different from the assessment of American executives (figure 4.6). These countries also stand out, and are similar to the US, in terms of business R&D.

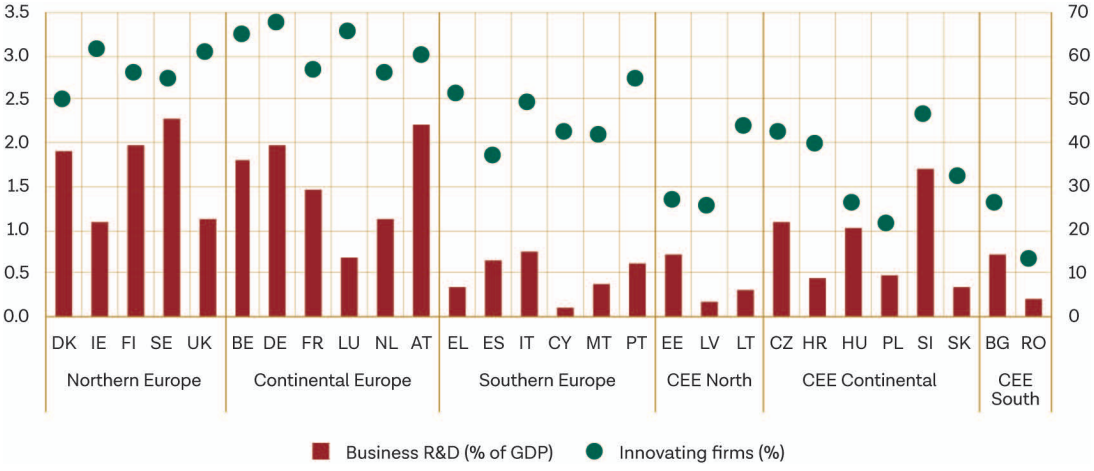
Not all innovations require R&D or involve new knowledge. Firms can also innovate by adopting existing technologies, using FDI and trade links as conduits, and innovation can happen through changes in processes. Using a broad definition of innovation to include new or significantly improved products and processes (for example, marketing, organization of business practices and workplace, external relations), firms in Northern and Continental Europe stand out as the most innovative (figure 4.6). These firms also sell more online and use more sophisticated cloud computing services than firms elsewhere in the EU (figure 4.6). Greater firm innovation and technology adoption make these economies productivity leaders in Europe (figure 4.7).

Figure 4.6 Northern economies innovate more and adopt new technology more intensively, making them productivity leaders

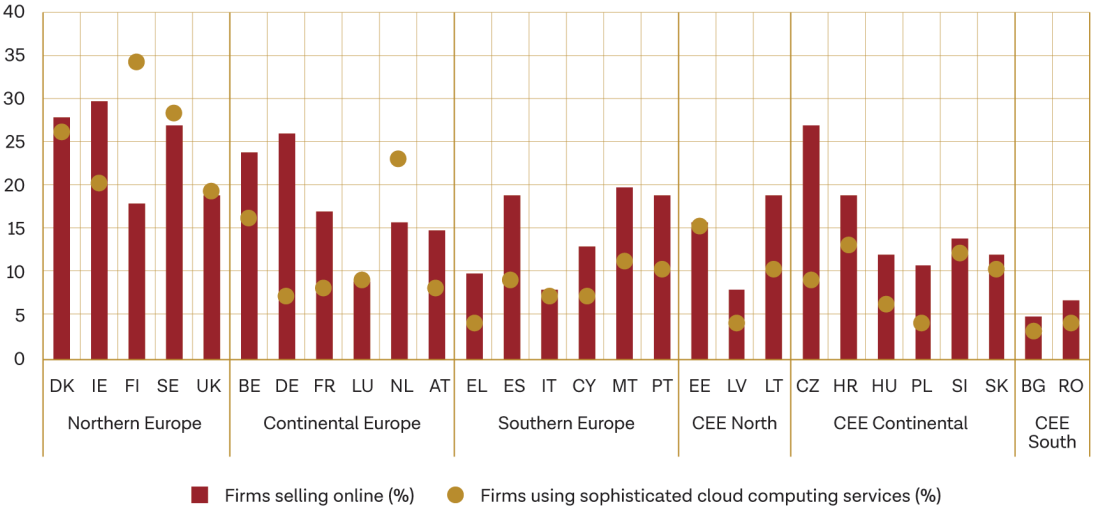
Business executives in the North rate firm innovation capacity and technology high



Firms in the North innovate more…



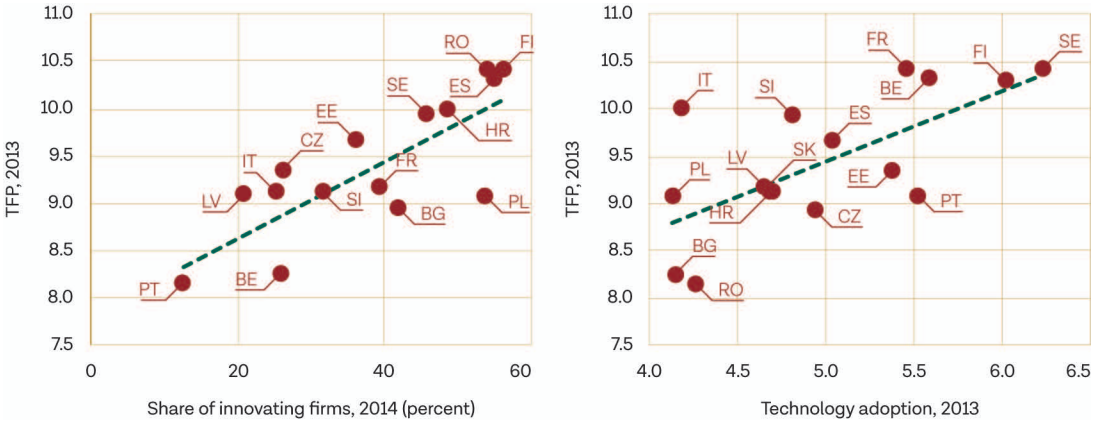
…and use new digital technologies more intensively



Source: WEF, Eurostat and 2014 Community Innovation Survey.

Note: WEF indicators of innovation capacity and technology adoption is as assessed by business executives in each country in a scale from 1 to 7. A firm is considered innovating if it has implemented a new or significantly improved product (good or service), process, new marketing method, or new organizational method in business practices, workplace organization or external relations. Sophisticated cloud computing services include accounting software applications, CRM software, computing power. Right axis on the middle figure measures the percentage of innovating firms in each country.

Figure 4.7 Greater innovation and technology adoption make Northern economies leaders



Source: Own calculations, based on Community Innovation Survey, Orbis, and WEF.

What are governments in the North doing to support firm innovation and technology adoption? Good business climate, quality ICT infrastructure and dedicated policies. Competition spurs firms, particularly those close to the frontier (Aghion et al. 2009), to innovate and adopt technology (figure 4.8). Less restrictive employment protection legislation typically leads to more technology adoption. Good quality ICT infrastructure helps firms adopt ICT for their business. But governments in Northern economies are doing a lot more to support innovation and technology adoption: better incentives for enterprise-sponsored R&D, public funding mechanisms and intellectual property regimes that foster profitable relations between universities and firms, and a steady supply of high-skill workers and managers (*Golden Growth*) (box 4.1). Through its impact on ICT use, the quality of firm management (as measured by the degree of meritocratic management) is an important driver of the differences in TFP growth between countries like Italy and some of its Northern neighbors (Pellegrino and ZIngales 2017).

Box 4.1 How Finland became a top innovator

Finland is a top innovator in Europe. It makes one of the largest investments in R&D relative to GDP, it has one the highest registration of patents per euro of GDP in Europe, and has one the largest shares of innovating companies cooperating with firms outside Europe. Not surprisingly, it is one of the top productivity performers among EU15 economies.

Finland's innovation success is the result of conscious national policy. At the heart of this policy is public support for commercially targeted R&D through the National Technology Agency of Finland. This organization provides matching grants and subsidized and convertible loans geared to early-stage technological development. And, administering around a third of the public sector's R&D spending, it is complemented by a publicly owned venture capital fund (SITRA). SITRA provides funding for preseed start-ups; a public applied research institute that, while publicly owned, obtains a third of its revenues from sales to the private sector; and basic research through the Academy of Sciences and universities. Political leadership is an important factor: the prime minister chairs a national research and innovation council. Yet, policy instruments have generally gone with the market by leveraging market incentives, rather than substituting for business decisions.

Figure 4.8 Greater competition makes firms innovate more, and better ICT infrastructure helps firms adopt ICT

More competition makes firms innovate more

Better ICT infrastructure helps firms adopt ICT

Source: WEF and Community Innovation Survey.

Across the EU: Restrictions on services are holding back productivity growth

Services account for a large and growing share of GDP and employment in the EU, but contribute relatively little to productivity growth and trade. As noted in chapter 2, the structure of employment has shifted toward services and away from industry and agriculture, particularly in CEE countries (figure 2.2). Today, services make up more than three-fourths of the EU's GDP and almost

the same share of its employment. Yet services contribute relatively little productivity growth and trade. The productivity growth of services in the EU averaged 0.7 percent per year between 2008 and 2014, significantly less than in the US and below productivity growth of the industrial sector (figure 4.9). In 2014, services represented about 23 percent of total intra-EU trade (figure 4.10). Europeans still buy eight-tenths of their services from firms established in their home countries. Some of this is to be expected. Certain services are very location-specific in terms of the customer information and feedback needed to respond to demand. However, many others are simply constrained by borders that the Single Market aims to remove.

Figure 4.9 EU productivity growth in services lags behind the US

Services Productivity in the EU and the US

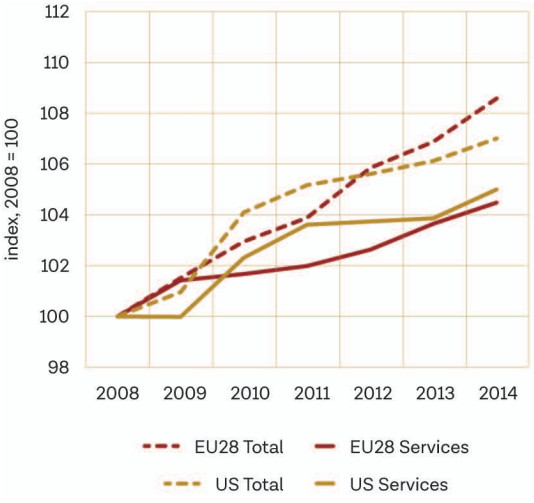
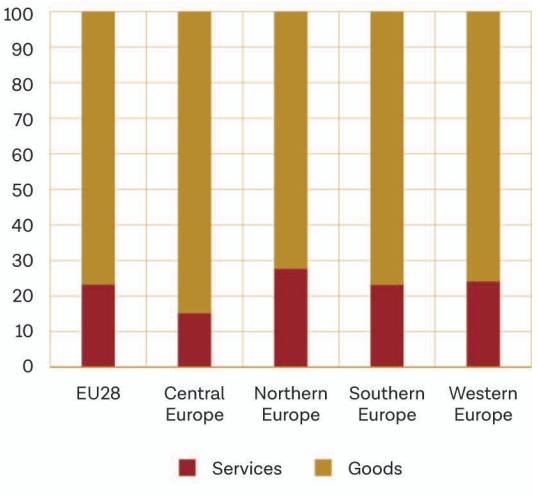


Figure 4.10 Intra-EU trade in services remains low

Share of services in intra-EU trade in goods and services, 2014 (percent)



Source: Services to the Rescue (World Bank 2016b), based on US Bureau of Economic Analysis and EUROSTAT.

Many barriers to the exchange of services persist in stark contrast to the free mobility of goods across EU borders. Providers of services face many hurdles to offer their services in another EU member state: they may have to change their residency or even nationality, adopt a different ownership structure, reorganize their insurance, find workers with different specific diplomas, become members of specific professional associations, or struggle with advertising restrictions. A survey of its members conducted by the Architects' Council of Europe in 2012 showed that only 3 percent of architects worked in other EU member states. With the exception of Northern European countries, service sector restrictions are much higher in the EU than in the US, particularly for professional services (figure 4.11).

Services reforms have advanced slowly, partly driven by a complex political economy environment. Only a few countries have made significant progress in reducing specific service sector restrictions. The EU's Services Directive was adopted in 2006 with the aim of creating a Single Market for services, but progress with its implementation has been slow. By 2015, the EC was notified of 374 nondiscriminatory barriers for professional services, of which only 53 have been fully abolished. The lack of progress with service sector reforms is partly due to a complex political economy environment. In many countries, the regulatory environment for services is very complex and highly decentralized. Reforms are often implemented by regulatory bodies themselves, who are inevitably biased against reforms. Many professions and industries thrive on the rents that

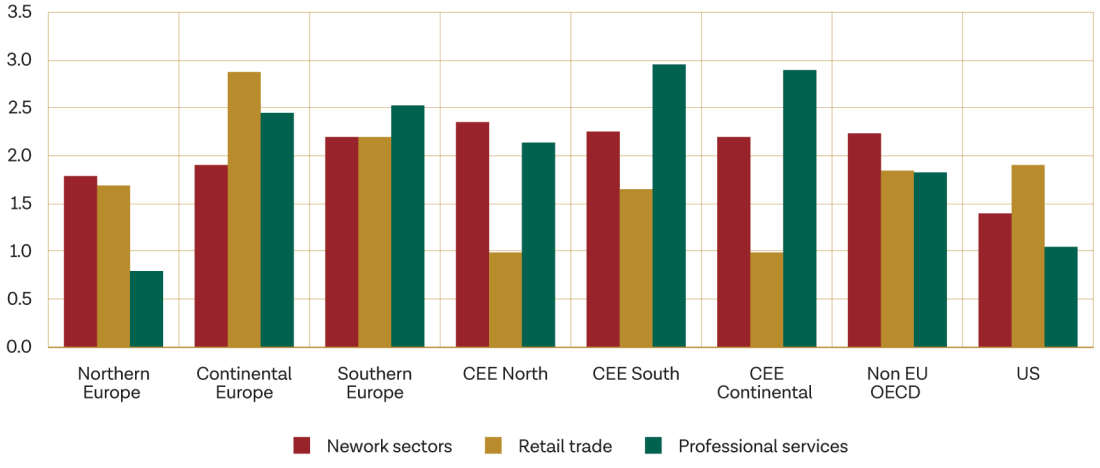
regulatory constraints generate and consumers are rarely aware of the costs these regulations impose on them.

Service sector reforms can boost productivity growth across the Union, even in the short run. Services do not only generate economic output, they also provide critical inputs to other economic sectors, notably manufacturing. They are also a key source of growth for lagging regions that are in the periphery. Reducing service sector restrictions to the level of the three least regulated EU member states (the UK, Denmark, and Sweden) would increase productivity of firms operating in other services and manufacturing by up to 5.3 percent within two years of implementation (figure A4.7). Productivity gains from removing conduct barriers are larger than gains from removing entry barriers. Conduct regulations, which determine how service firms operate, have the most negative effect on the economy and constitute a big deterrent to foreign direct investment. Reducing barriers to the provision of professional services has a particularly large impact on productivity. This is important because professional services are the most dynamic part of the entire service sector. In every country, the biggest gains come from reducing those regulations that are most restrictive.

Countries with weaker institutions would benefit more from service sector reforms. Countries with strong institutions, like Germany and France, tend to have stronger regulators and a more efficient judicial system, which may make it easier to navigate the large set of regulations.[2] Service sector restrictions, and entry barriers in particular, are significantly more damaging in countries with weaker institutions. Entry regulations and institutional quality combined predict around 50 percent of TFP in downstream manufacturing sectors. CEE and Southern European countries, which tend to have relatively weaker institutions and higher barriers, would benefit the most from both entry and professional services reforms (World Bank 2016b).

Figure 4.11 EU countries have restrictive service sector regulations

Product Market Regulation index, 2013



Source: OECD.

Note: Network sectors include energy, transportation, and communications. A higher index indicates more regulatory restrictions.

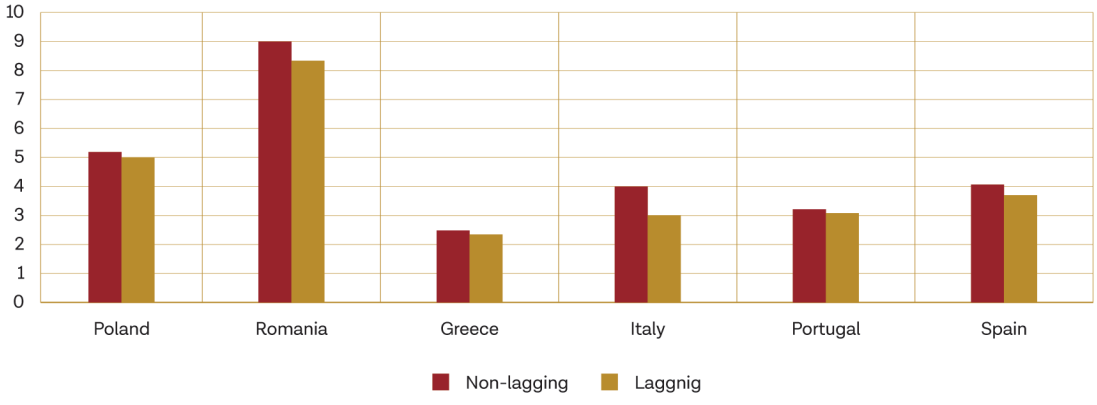
The low quality of the business environment and local institutions limits the opportunities of firms in lagging regions

Countries are not homogenous, some regions are doing better, while others are lagging. Lagging regions have low economic potential as determined by their economic structure, institutions, skills and access to markets (chapter 1). Chapter 3 documents the skills gaps between lagging and non-lagging regions. This section focuses on differences in the economic structure and firm profile, and how those differences are explained by the business and innovation environment, urbanization, connective infrastructure and institutions.

Lagging regions rely more on agriculture and have firms that are smaller and less productive. The 20 percent of regions with the lowest Economic Potential Index (EPI) are highly dependent on the agricultural sector — their score in this dimension is nearly four times higher than the EU average. Firms in lagging regions are smaller than firms in nonlagging regions of the same country (figure 4.12), including in the agricultural sector (World Bank, 2018a). The enterprise structure of "low-growth" regions in Southern Europe is domi-nated by self-employment and family run enterprises specialized in local nontradable activities, while there is a substantial involvement of state-owned enterprises in "low-income" regions (World Bank, forthcoming). These structures generate low private sector job creation: private sector firms in lagging regions employ a substantially lower proportion of the working age popula-tion than firms in lagging regions (from 25 percent in Portugal to over 40 percent in Romania and Italy). Firms in low-growth regions of Italy and Spain also have significantly lower productivity growth than firms in other regions (figure 4.13).

Figure 4.12 Firms in lagging regions are smaller

Average firm size, 2013

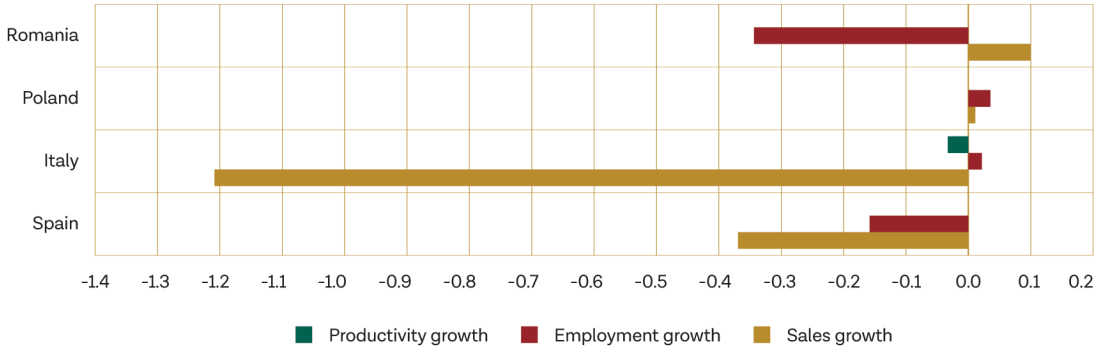


Source: Rethinking Lagging Regions in the EU (World Bank, forthcoming) based on Eurostat and Orbis.

Note: Estimates reported in figure 4.13 control for firm, sector, and regional controls. No data are available for Hungary and Bulgaria.

Figure 4.13 Low-growth lagging regions are less productive

Performance of incumbent firms in lagging regions relative to non-lagging regions (3-year average)



Source: Rethinking Lagging Regions in the EU (World Bank, forthcoming) based on Eurostat and Orbis.

Note: Estimates reported in figure 4.13 control for firm, sector, and regional controls. No data are available for Hungary and Bulgaria.

The economic structure and firm profile of lagging regions is partly driven by economic geography. The periphery (that is, low proximity to markets) is a defining feature of lagging regions (World Bank, forthcoming), constraining the access of firms in those regions to markets — a key factor explaining the low EPI of lagging regions (chapter 1). And the periphery is compounded by restrictions on services and limited broadband connectivity, as barriers of physical distance to market are less binding for trade in high-value services, but broadband connectivity is a must. Some regions are both peripheral and sparsely populated (mainly in low-growth regions). Firms in low-density lagging regions are less able to exploit sources of agglomeration for productivity growth. Lack of market scale and economic density makes the competitive environment weaker, undermining the incentive of firms to upgrade their capabilities.

But there are untapped opportunities for agglomeration, and periphery is compounded by poor connective infrastructure. There are many lagging regions (mostly low-income) that are peripheral but more densely populated than the European average, indicating untapped opportunities for further economic agglomeration around high-potential secondary cities. Lagging regions, particularly in the CEE countries, have poor connective infrastructure: transportation infrastructure connecting towns and rural areas to regional growth poles, urban infrastructure, and broadband connectivity (box 4.2).

Box 4.2 Connectivity challenges in peripheral, lagging regions of CEE countries

Eastern Poland. In the regions of eastern Poland, the opening of western borders challenged Podkarpackie and Świętokrzyskie because they are a significant distance from the large market of neighboring Germany. Additionally, relatively poor road and rail infrastructure made travel to major urban centers within Poland slow, while significant trade links with proximate neighbors, Ukraine and the Slovak Republic, never developed. In recent years, major road and rail investment projects have substantially improved connectivity of the regions. Podkarpackie has significantly benefited from construction of the national motorway A4 that established an improved east-west connection to the major urban centers of Krakow and Katowice, and from the modernized railway line E-30 from Cracow to Lviv. Likewise, there is a significant improvement in connectivity following the construction of the new bridge over Vistula, linking Podkarpackie and Świętokrzyskie, in Połaniec. These projects benefited from EU funding. However, even after these improvements, Podkarpackie and Świętokrzyskie are still unable to match other regions of Poland in terms of access to large internal markets or the most important foreign market (Germany) due to their geographic location.

North-East Romania. Counties in North East Romania are located at a large distance (about 2,000 kilometers) away from the center of Europe and 375 kilometers, on average, from Bucharest. While these distances are large, the biggest problem in the region is the underdeveloped road infrastructure. There is no motorway between the Northeast region and Bucharest, nor between the region and Transylvania or neighboring countries. The main road that links Bucharest to the Northeast county capitals, E85 (European road) as well as the national road DN2 (the same with E85 in a vast proportion) is in poor shape. The road only has two lanes and is heavily used by trucks and long vehicles. This makes people and goods transportation a very challenging endeavor. It might take up to one day to reach Botosani (from Bucharest) for instance, which is the northernmost county capital.

Source: Rethinking Lagging Regions in the EU (World Bank, forthcoming).

Opportunities for firms in lagging regions are also limited by the low quality of the business environment. While many of the business regulations are — from a de jure perspective — nationally determined and standard across the country, their implementation varies significantly across regions. Results from the World Bank Group's *Subnational Doing Business* program highlights that there are, in fact, important differences in the business climate across regions within countries (box 4.3). Lagging regions of Spain and, particularly, Italy, have significantly more burdensome business regulations than nonlagging regions in those countries (World Bank, forthcoming). Another measure of the quality of the business environment, firm competition, is significantly lower in nonlagging regions.[3] Firms in regions with more burdensome regulations and lower firm competition have lower performance, as measured by sales, employment, and productivity growth, as well as investment. The impact on firm performance is particularly large for firms in Italian lagging regions, where the differences in the business environment are the largest.

Box 4.3 Differences in Doing Business across regions in Italy, Poland, and Spain

Registering a business: It takes just 9 days to register a business in Italy on average, versus 16 in Spain and 29 in Poland. But the within-country variation is significant: in Italy, from a low six days in Lazio, Lombardy, and Veneto (all nonlagging) to a high of 16 in Campania (lagging); in Poland, it takes just 8 days to register a business in Wielkopolskie (nonlagging), but 42 in Zachodniopomorskie (nonlagging), and 37 and 36, respectively, in Podkarpackie and Swietokrzyskie (both lagging).

For obtaining a construction permit: On average, it takes 173 and 176 days in Spain and Poland, respectively, to obtain a construction permit, while Italy averages 231 days. The internal variation is even larger: in Italy, from 151 days in Lombardy (nonlagging) to 316 days in Sicily (lagging); and in Spain from 114 days in Asturias (nonlagging) to 297 days in Galicia (nonlagging).

For enforcing a contract: It takes on average 518 days in Polish regions versus 1,400 days in Italian regions. But within Italian regions, it takes just 855 days in Piedmont (nonlagging) versus more than 2,000 days in Puglia (lagging).

Source: Subnational Doing Business (Italy, 2013; Poland, 2015; Spain, 2015).

Firms in lagging regions lack support for innovation and technology adoption. Firms in lagging regions lack access to technology, have deficits in management skills and capacity as well as more limited access to finance. And they benefit little from export participation and export promotion programs. Lack of access to high-quality business development services, particularly to provide information and expertise to identify and exploit new market opportunities, is one of the most binding constraints (World Bank, forthcoming).

Lagging regions also have low quality institutions. Firm competition is lower in lagging regions for structural reasons, but poor governance also plays an important role. Also, burdensome business regulations are often underpinned by poor governance. In fact, the quality of local institutions, as measured by the European Quality of Government Index (EQI), is the single most important determinant of the EPI gap between lagging and nonlagging regions (chapter 1). Local governments in lagging regions often lack the incentives and capacity to design and deliver appropriate interventions.

Notes

1 This analysis is based on the panel of continuing firms with at least 10 employees from the Amadeus data set. A regression model is applied to explain firm productivity growth between 2002 and 2008 in EU15 and 12 CEE countries, separately, as a function of the firms' initial productivity level, characteristics (size, age, ownership, and sector), and country dummies with indicators.

2 World Bank (2016b). The strength of institutions is measured using World Governance Indicators: Rule of Law, Level of Corruption, Regulatory Quality and a Principal Factor Component of the three.

3 This is measured by the Herfindahl-Hirschman Index (HHI), a commonly accepted measure of market competition. It is calculated by squaring the market share of each firm competing in a market, and then summing up the resulting numbers, and can range from close to zero (high competition) to 10,000 (low competition).

Chapter 5:

Growing United: Upgrading Europe's convergence machine

Europe's convergence machine is due for upgrading to seize the benefits of technological change for all Europeans. *Growing United* argues that the convergence machine, version 2.0, should focus on the convergence of opportunities for people and firms across the Union and involves policy upgrading at the regional, national, and EU levels.

First, to equalize opportunities for people, Europe's convergence machine 2.0 would boost the skills of all Europeans to take advantage of the opportunities of the "future of work," provide a level playing field with flexible and secure labor markets, and support those who fall behind. While Europeans need to become lifelong learners to continuously adapt to technological change, they can only do so based on strong cognitive and social-emotional skills. Therefore, the goal is to ensure universal basic cognitive skills and to adapt education and training policies to overcome the skill divide and boost opportunities for disadvantaged students. As technology disrupts labor markets, labor regulations and social policies also need to adapt. And increased intra-EU labor mobility would enhance opportunities for workers.

Second, to equalize opportunities for firms, Europe's convergence machine 2.0 would emphasize an enabling business environment and support for upgrading firms' capabilities through innovation and technology adoption. Countries in Southern and Central Europe have more business environment reform homework to complete than their neighbors in Northern and Continental Europe but all countries face a shared challenge: with the acceleration of technological change a conducive business environment is necessary but not sufficient to sustain productivity growth — more support for firm innovation is needed.

This chapter brings together opportunities for people and firms across EU countries and lays out a policy agenda to upgrade the convergence machine. Chapters 3 and 4 examined the key drivers of equality of opportunity for people and firms — education policies, labor and social policies, business environment policies, and innovation policies — and their fitness to deliver inclusive growth across the EU in the face of accelerating technological change. This chapter makes use of the conceptual framework introduced in chapter 1 to bring together opportunities for people and firms across the EU's member countries into a single picture. It argues that with the acceleration of technological change, the divergence of opportunities for people and firms across the EU risks generating divergence in living standards. It then lays out a policy agenda to upgrade the convergence machine centered around the equalization of opportunities.

The divergence of opportunities for people and firms across the EU risks generating divergence in living standards

This report brings together opportunities for people and firms across EU countries into a single picture. Figure 5.1 offers a comparison of opportunities for people and firms across countries across the EU. It focuses on core and widely accepted measures of opportunities for firms and people: the business environment and skills. The quality of the business environment is measured by the Doing Business 2017 Distance to Frontier index.[1] Opportunities for people is measured by the percentage of students with basic competencies in the Program for International Student Assessment (PISA) reading in 2015, corrected for inequality of opportunities (variation in student basic reading competency explained by socioeconomic status) and the proportion of early school leavers (people age 18–24 who have only lower secondary education or less and are no longer in education or training).

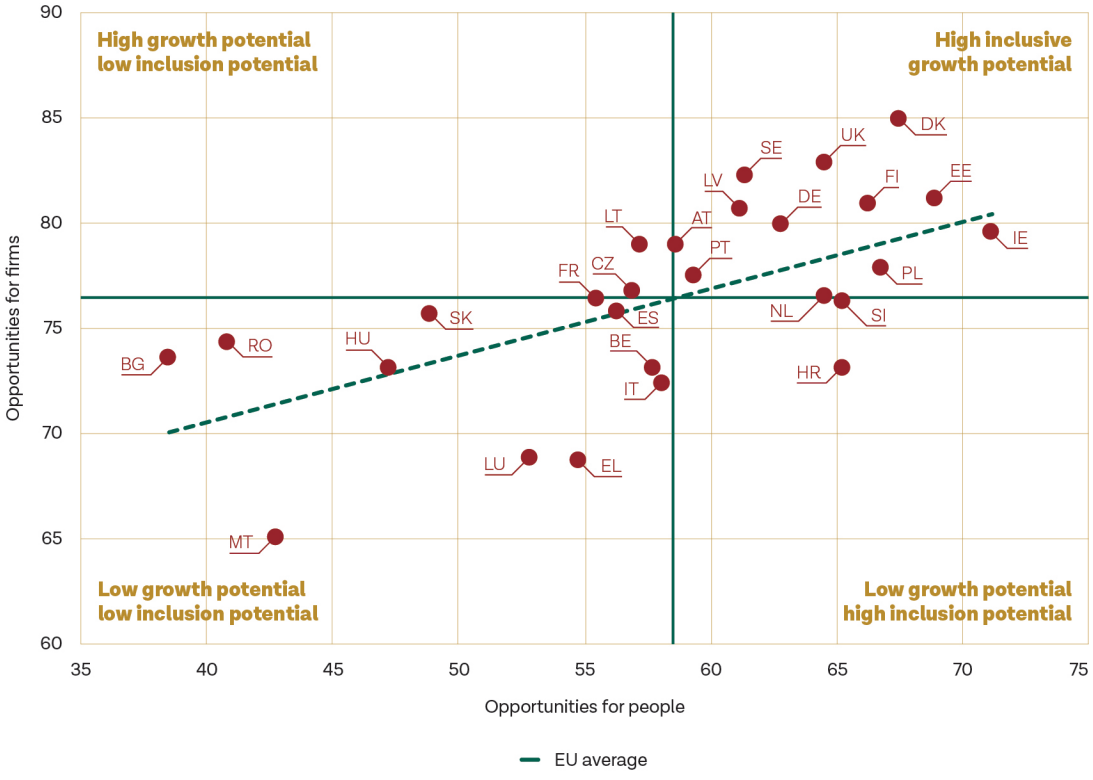
Opportunities for people and firms across EU countries are complementary. First, there are more complementarities than trade-offs between opportunities for people and firms, as most countries are along the bottom left (low growth and low inclusion potential) or top right space (high growth and high inclusion potential) of the chart. Second, it is notable that the top left space is virtually empty. This suggests that countries in the EU do not emphasize opportunities for firms over opportunities for people. Third, only Croatia stands out as a country where good opportunities for youth to acquire foundational cognitive skills are not matched by good opportunities for firms.

Most Northern European countries, Germany, Estonia, Latvia, and Poland are among the top opportunity performers. The vast majority of their youth — including those from disadvantaged backgrounds — attain basic competency in PISA reading, and their firms enjoy considerable economic freedom. Firms in Northern European countries and Germany also enjoy a supportive environment for innovation, making these economies productivity leaders.[2] These countries are characterized by a high share of technological frontier firms.

At the other extreme, many Southern and Central European countries are below the EU opportunity average. This group includes many countries which are also striving to converge in per capita income with their more advanced neighbors — for example, Bulgaria, Romania, Malta, Hungary, the Slovak Republic, and Greece. They are characterized by a high share of students below basic competency in reading, mostly from low socioeconomic backgrounds. They also tend to be charac-

terized by more burdensome regulations and less support for firm innovation, which generate too few top-performing firms and too many lagging firms. There are also large differences in opportunities within these countries (box 5.1)

Figure 5.1 The opportunities for firms and people to thrive jointly determine the potential of countries to grow inclusively: the North does well on opportunities, the South less so



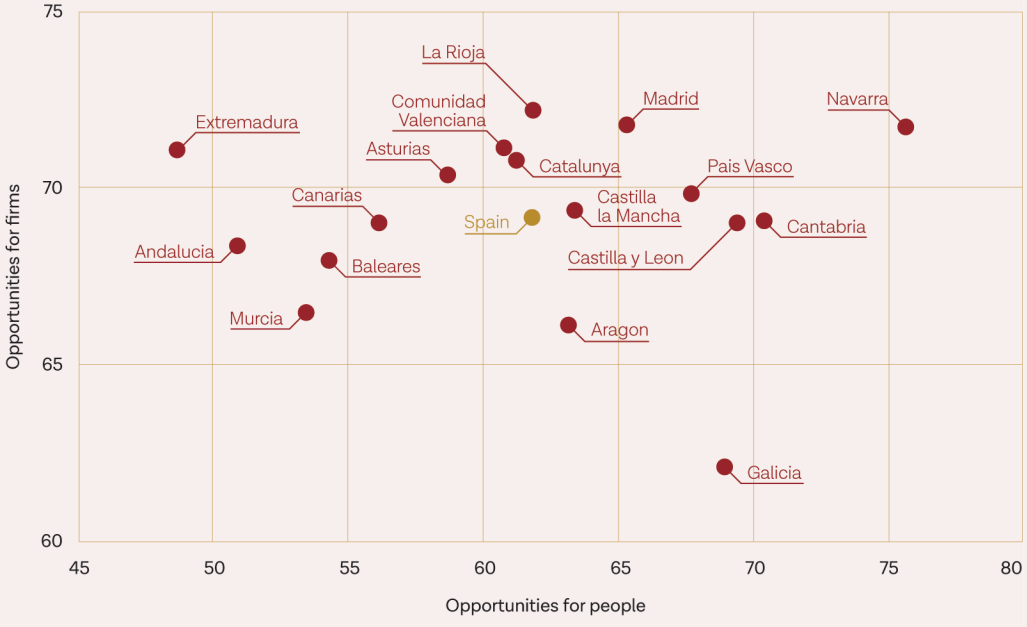
Source: Own calculations, based on PISA and Doing Business data.

Note: Cross-lines are EU averages. OP is measured by PISA reading scores in 2015, corrected for inequality of opportunities (variation in PISA scores explained by socioeconomic status of students) and the proportion of young people that leave school with at most lower secondary. OF is measures by the 2017 Doing Business distance to frontier index. Cyprus is not included as some key data were not available.

Box 5.1 Large differences in opportunities for people and firms across Spanish regions

There are large differences in opportunities for people and firms across regions in Spain. Figure 5.2 draws on subnational and regional data for Doing Business, PISA and early school leaving. Opportunities for people vary widely between the top-performing Navarra and bottom Extremadura, while Extremadura's business environment is among the best in Spain. La Rioja stands out as being at the level of the top 25 percent performers globally when it comes to dealing with construction permits. Except for construction permits all regions of Spain perform below the EU average and none perform within the top 25 percent economies globally (World Bank 2015).

Figure 5.2 Large differences in opportunities across Spanish regions

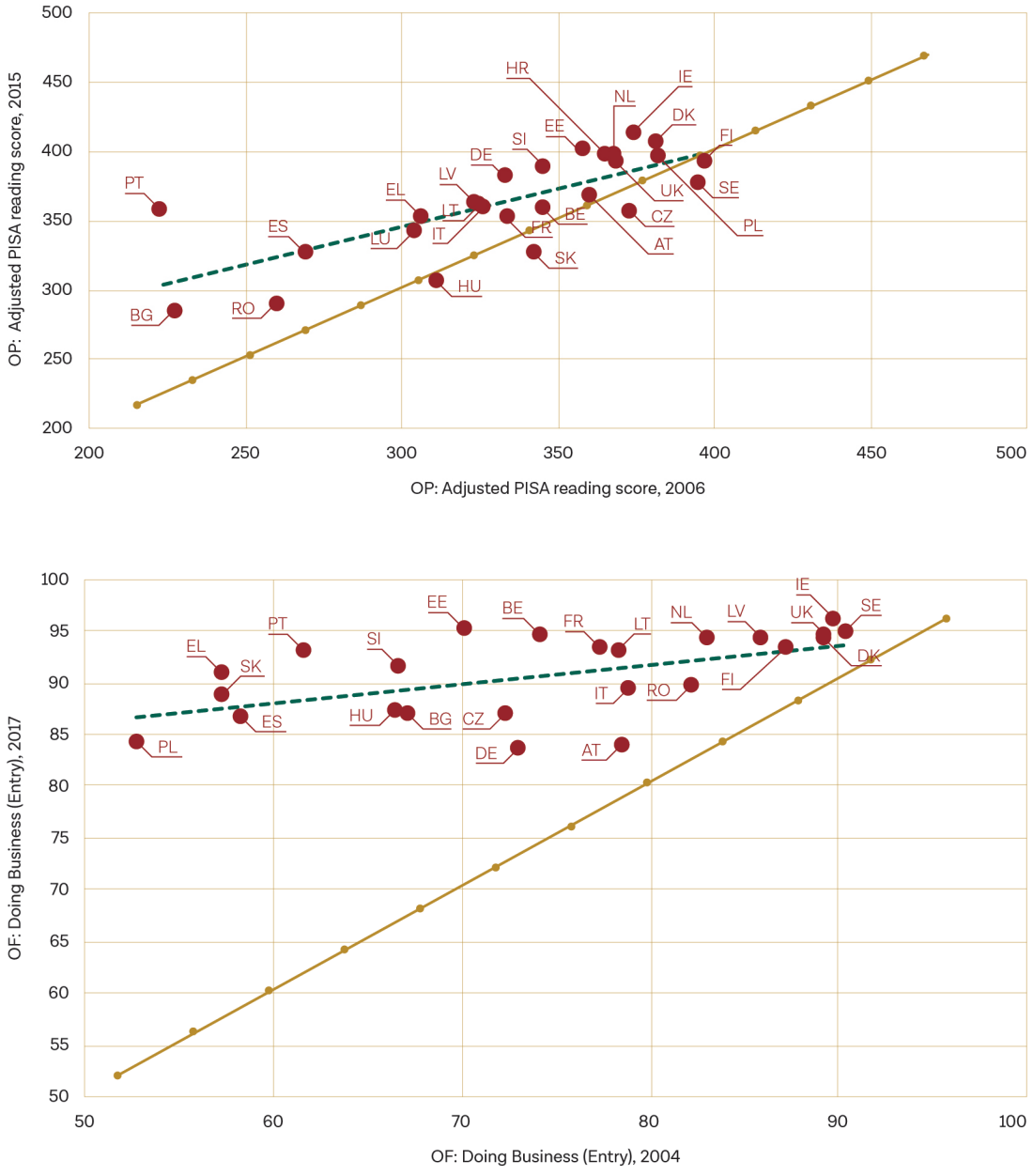


Source: Own calculations, based on PISA and Doing Business subnational data.

The good news: most countries have been moving in the right direction, particularly those starting with lower levels. Plotting the most recent people and firm opportunity values against 2006 and 2004 values, respectively (figure 5.3) shows that most countries have improved in opportunities for people, and all countries have improved opportunities for firms (they are above the 45-degree line). Only the Slovak Republic, Czech Republic, Sweden, Hungary, and Finland have seen a slight decline in opportunities for people. And the improvements are larger in countries starting with lower levels, particularly for opportunities for firms (this is indicated by the flatter linear relationship between end and initial opportunity values relative to the 45-degree line). This holds both for relative and absolute improvements. Portugal is the top improver in the adjusted PISA score, while Poland, Greece, the Slovak Republic, and Portugal have managed to increase the Doing Business Entry measure by more than 50 percent.

The bad news: this is no longer good enough — opportunity laggards need to accelerate their efforts to address barriers to opportunity or else risk diverging with opportunity leaders. In the past, low opportunity countries and regions could still grow, and converge, with moderate levels of inequality. This, however, will become ever more difficult. The acceleration of techno-

Figure 5.3 Most countries have improved opportunities for people and firms, particularly those starting lower



Source: Own calculations, based on PISA and Doing Business.

Note: See figure 5.1 for details. The Doing Business Entry measured is used because that is the only one available and comparable over time.

logical change is making it increasingly difficult for countries and regions with high shares of low-skill workers and lagging firms to continue to grow inclusively. Technological change is boosting inclusive growth in places where opportunities are high, but it is disrupting it in places where opportunities are low — generating divergence. As technological change accelerates, this divergence will widen as opportunity leaders will pull away — and will be increasingly difficult

to overcome. This is the threat to Europe's convergence machine: countries either prepare for the age of accelerating technological change — or they will be left behind, resulting in poor growth and poor inclusion outcomes. Countries in the bottom left space of figure 3 therefore need bold action to improve the skills of their workforce and to remove barriers to enterprise development. There is no time to wait, nor to assume that income convergence is automatic.

"Opportunity leaders" need not be complacent: in view of accelerating technological change, countries need to "run to stand still" or else risk falling behind. Finland has been the role model for PISA excellence and inclusion, but it has lost some of its model status in recent times. Top firm opportunity performers in Europe, like those in Northern Europe, may be doing well relative to other parts of Europe, but not as good as other advanced economies.

Upgrading the convergence machine by focusing on equalizing opportunities is a matter of urgency. The divergence of opportunities across the Union today risks undermining inclusive growth and convergence in the future. To prevent divergence of opportunities to translate into a divergence of living standards, the EU needs a clear policy focus on equalizing opportunities — rather than incomes and profits, maximizing the economic potential of regions and countries — rather than convergence of GDP per capita, and supporting those who fall behind. And there is no time to lose: As the spread of artificial intelligence widens across production and services, and machines take over ever more tasks previously managed by humans, policymakers need to act fast to upgrade Europe's convergence machine. What can policy makers at the EU, national, and regional levels do to boost opportunities and to upgrade Europe's convergence machine?

How to upgrade Europe's convergence machine: Toward convergence of opportunities

The convergence machine 2.0 should be about convergence of opportunity for people and firms across the Union — this requires bold action at the regional, national, and EU levels. This report contributes ideas and raises questions, without necessarily having answers to all. Its aim is to help stimulate further debate about what policy makers at the regional, national, and European levels can do to promote equality of opportunity. Most policy levers of the convergence machine 2.0 — from education, social and labor policies, to business regulations and innovation policies — are in the hands of national and regional policy makers. But enhanced coordination of policy at the EU level and exploiting the EU's biggest asset — its single market — is a major opportunity for member states to jointly upgrade Europe's convergence machine.

Upgrading the convergence machine need not mean new centralization of powers to the EU level, but fully exploiting its key instruments. How? By crafting joint policies and setting joint targets, jointly monitoring progress across the Union, promoting mutual policy exchange and learning between member states, and strategically deploying European Structural and Investment Funds (ESIF) in the post2020, multiannual financial framework (MFF). This is the European convergence machine: a machine that draws on diversity of experiences and common instruments to facilitate the charting of a shared economic and social policy path.

Equalizing opportunities for people

Equalizing opportunities for people is about building their capabilities (skills), providing a level playing field with flexible and secure ("flexicure") labor markets, and supporting those who fall behind. Equalizing opportunities for people is good for inclusion but also for economic growth, given the centrality of human capital to Europe's growth potential. This involves skilling up Europe's current and future workforce and adopting opportunity-enabling labor and social policies.

How to equip Europe's workers with the right skills?

Europe's skill divide shows that education and training policy is due for upgrading to deliver strong cognitive and social-emotional foundation skills to all children and youth. Skilling up the future workforce is central to Europe's convergence machine, but in view of the skill divide, more efforts are needed to ensure all children and youth acquire basic cognitive and socioemotional skills. Governments across Europe need to tackle poor performance — and this means, for the most part, to address its socioeconomic drivers. It entails rethinking the way education is organized inside and outside the classroom in early childhood, primary and secondary education, and how education and social policies can work hand in hand to address the skill divide. The examples of Estonia and Poland show that access to high quality education does not need to be limited to only a few students, and that sustained reforms can succeed. Estonia and Poland combine high aggregate PISA scores with a high degree of equity. Excellence and equity can go hand in hand. The reform agenda laid out in this report is most pressing for countries that lag in terms of opportunities for people. But even the leaders need to continuously readjust to the changing labor demand — as technology reshapes the world of work — and the changing needs of their student population.

Opportunity-oriented education policy needs to emphasize foundational cognitive and social-emotional skills for all. To enhance equality of opportunity, education systems need to equip all students, including those with disadvantaged background, with the necessary basic cognitive and social-emotional skills to make them resilient to technological change. In other words, the goal is to achieve universal basic proficiency in national and international student assessment, for example by maximizing the share of 15-year-olds who achieve basic proficiency in mathematics, reading and science in PISA. The goal of achieving universal proficiency would require a step up in monitoring of cognitive skills at various ages as well as investments in measuring social-emotional skills. Given important regional variations within countries, this would ideally involve producing a disaggregated picture at the regional level in each member state (for example, at the NUTS 2 level). Necessary data could be collected in sufficiently large sample sizes to produce a regionally disaggregated picture.

Achieving this target is largely about raising the performance of children and youth from disadvantaged backgrounds, given the strong equity dimension of cognitive achievement. Action is needed from early childhood, given the importance of the early years of a child's life in setting foundations for developing cognitive and social-emotional skills. Children from disadvantaged backgrounds stand to be the biggest gainers from early interventions. At the moment, however, they typically have the lowest participation rates in preschool.

Overcoming the skill divide requires policy "upgrading." In view of the centrality of skills to ensure inclusive growth in Europe, the discussion on how to address the skill divide moves to the center of the economic policy debate in Europe. Education systems across the European Union today are

highly diverse. Diversity comes in many ways, including around basic features like compulsory schooling ages and structural pathways (general vs. vocational schooling), teacher policies and remuneration and school assignment policies. Europe also features diversity in reform experiences — good and bad. While this diversity reflects different history and rich traditions, it is increasingly evident that some of these systemic policy differences translate into diverging capabilities of countries to provide equality of opportunity to its future workforce. In learning from these diverse experiences, countries in Europe need to critically reexamine their education systems. Many do so already, but now is the time to do it jointly, learning from each other and from global experience. Continuous testing and evaluation of new approaches is key, including by leveraging ESIF as an "innovation incubator."

Improving the chances of disadvantaged students through targeted policies

How can education and social policy go hand in hand in supporting disadvantaged students? Given the importance of student characteristics — including age, gender, and the student household's socioeconomic, and cultural status and language spoken at home — in explaining the skill divide, education policy needs to align more with social policy in delivering targeted support to disadvantaged students. While targeted support for disadvantaged students can be provided within schools through extra teachers and extra learning activities for disadvantaged students, successful approaches to address social disadvantage also entail outreach of schools to parents and the local community.

There are many inspirational examples across Europe. For example, Ireland has spearheaded a model of community outreach in schools ("Delivering Equality of Opportunity in Schools," DEIS) where schools designate a teacher to perform a community outreach role and engage with parents. Bulgaria and Romania — countries with large shares of poor performers and school drop-outs, are piloting approaches to develop closer collaboration between schools and social services at the local level to find out-of-school children and reach out to their parents.

Tackling social segregation in education, especially by avoiding early tracking

How to reduce social segregation of schools along socioeconomic lines and increase support for poorer children to thrive? Education policies — including early selection between vocational and academic tracks, school choice and school zoning — are key levers to tackle social segregation. Overcoming social segregation implies a shift from a model of separating disadvantaged students into separate school tracks, where quality is often low, toward integrating students from diverse socioeconomic backgrounds into the same school and providing variable support to students who need it. The latter model is at the heart of the currently discussed "reinvention" of the Finnish comprehensive school: while there is a recognition that students have diverse needs, these variable needs should be met within comprehensive schools as opposed to in different education tracks. This is an example of how Finland is responding to the recent slide in the PISA ranking.

Reducing social segregation means delaying selection between vocational and academic tracks until students have had a chance to develop cognitive foundation skills — and at least until the end of lower secondary education. Early selection is harmful because it facilitates social segregation. It does not automatically lead to, but enables, social segregation, especially in the wake of other phenomena such as the wider public availability of data on school performance. Aside from social segregation, in view of the relative importance of strong cognitive foundation skills over fast-depreciating technical skills, secondary education should emphasize cognitive over technical skills.

While politically difficult, reducing social segregation in schools is possible. A look at Poland and Paris shows how. While social segregation in schools in the EU has remained unchanged during the last 15 years, Poland has managed to reduce it substantially. As part of its comprehensive education reform launched in the late 1990s, which featured greater school autonomy and use of external assessment, Poland replaced the eight-year primary school with a six-year primary school and a new three-year lower secondary school (*gimnazjum*). This effectively delayed the selection of students into academic and vocational upper secondary tracks by one year, until the age of 15, which resulted in a decline in social segregation and improvements in PISA scores across the socioeconomic distribution. The most significant gains were among students who would have ended up in basic vocational schools under the old system, but were given a chance to acquire more general skills in newly created lower secondary schools.[3] Meanwhile in Paris, while social segregation in secondary schools in the French capital is high, a change in school assignment policy for upper secondary schools (lycées) in 2006, which introduced extra points for recipients of scholarships (received by socially disadvantaged students), was associated with a significant reduction in social segregation (Fack, Grenet, and Benhenda 2014).

Setting ambitious goals to reduce student repetition

Although countries in Europe share similar promotion schemes for students in primary and secondary schooling, repetition rates varies significantly across the EU. Schools in Belgium, France, Portugal, or Spain make excessive use of student repetition. This disproportionately affects students from the lowest ESCS, even those who have the necessary skills to move to the next level. To prevent EU countries from an excessive and ineffective use of student retention, a combination of targeted school and student level policies is needed. These could include, among others, stronger individualized support and tutoring to students at risk, early diagnosis programs of learning disadvantage, or compensatory programs such as summer schools. And given the cultural roots of the problem that are imbricated at the school day-to-day practices (Eurydice 2011), initiatives that raise teachers and principals' awareness on the issue are also needed.

Investing in teachers and promoting innovation in teaching methods that benefit all students

Equipping future workers with strong cognitive and social-emotional skills comes with great teachers as well as promoting innovation in curriculum and teaching methods. Teachers are the most critical driver of education success and, as such, are a central element of the policy package to overcome the skill divide. Teacher policy should not only focus on attracting, retaining and further developing great teachers, but also on deploying the best teachers to the students who need the most support. In addition, governments in Europe should empower education innovators across Europe and ensure that innovation spreads from leading to lagging schools. Curriculum, teaching and classroom practices need to shift from memorization to critical thinking and problem-solving in groups and emphasize student motivation.

How to adapt Europe's labor market and social policy?

Creating "flexicure" labor markets that protect people, not jobs

As technology disrupts labor markets, labor regulations, and social policies are also in line for upgrading. More than ever before, policies and regulations should aim to protect people and not jobs. To protect people, Europe should put back at the center of the discussion the question of how to achieve the right balance between labor market flexibility and security, that is the right

"flexicurity." More flexible labor markets with eased hiring and redundancy regulations offer more opportunities for lower skilled and vulnerable workers. But more flexibility should not be about promoting less well protected temporary jobs while open-ended jobs retain full protection, as this would lead to higher labor market duality. Rather, is there a case for reducing protection for open-ended contracts or introducing a single contract as the standard arrangement under which protection increases with seniority? To deliver the other part of the flexicurity bargain, countries in Europe need to consider how to modernize protection: by balancing increased income protection for the unemployed and the poor with more effective active labor market policies.

Boosting active labor market policies

Labor market policy is core to protecting people, but it needs to become more activating and less passive. There is room for increasing spending on labor market policy in parts of Europe, especially among the countries in Central and Southeastern Europe. But an expansion in spending needs to go hand in hand with an increased emphasis on active measures, including preventive programs that provide on-the-job training to vulnerable workers that are otherwise at risk of losing their job.

A fresh approach is needed to improve adult education and training including through a greater emphasis on social-emotional skills, and there is much room for innovation. While the right cognitive and social-emotional skills will help equip the next generation for tomorrow's labor market, upskilling today's adult workforce is far trickier. First, much less is known in the education profession about andragogy (how to teach adults) than about pedagogy. Second, the critical window to acquire cognitive skills ends with early adulthood. This means that upskilling mid-age and older workers will be more difficult if they lack the cognitive skill foundation for being effective lifelong learners. While there is scope to modernize training provision with new methods and technology (Bussolo et al, 2015), the record of lifelong learning and adult retraining is often poor, especially for older and less educated workers. Many social-emotional skills, meanwhile, remain malleable across the life cycle. Programs providing social-emotional skills training have typically targeted vulnerable youth, and have produced good results (Sanchez Puerta et al, 2016). There is a strong case for experimenting with embedding social-emotional skills in adult training.

Improving access to social protection for workers on nonstandard contracts and those left behind

The growing number of workers in nonstandard employment relationships and with disrupted careers raises questions about how to finance protection for old age and unemployment. Unemployment benefits and pensions are mostly contributory, insurance-based and linked to work history, with minimum contribution periods and larger benefit rights resulting from longer job tenure. Such schemes have been designed for standard employment relationships between firms and workers, where full-time and open-ended contracts are the norm. This system is not well placed with the changing realities in the labor market, where temporary jobs and self-employment are increasingly prominent, particularly among the young. At the core, there is a concern about how to protect people who cannot work long enough to qualify for these benefits. To respond to these challenges, member states that can afford it could consider putting greater emphasis on noncontributory schemes, at least for some basic benefit level for old-age and unemployment. They could also consider individual accounts which are linked to the worker and not the job he or she holds.

Many countries in Europe need to strengthen their social protection systems to respond to the changing labor market, while keeping aging related spending under control. In particular, there is room for strengthening social safety nets by increasing spending and refining their design.

The idea of a universal basic income has garnered a lot of attention of late, but it is unlikely to be solution. Among other reasons, it is hard to fit such a scheme within a fiscal envelope already under stress because of populating aging. Instead, countries in the European Union can do more to strengthen basic guaranteed minimum income programs as general social safety nets, while relaxing eligibility constraints for certain types of workers with no chances in the labor market. Spending pressures related to population aging can be limited by extending the healthy working lives of Europe's aging population. This can be done through incentives to delayed retirement, investments in continuous upskilling and greater emphasis on preventive health services (Bussolo et al. 2015).

The changes in the labor market and their impact on low-skilled workers also call for innovations in labor and social policy. For example, should publicly supported jobs be given another consideration through hiring and retention subsidies or public works? People value work not just for the income it provides but also for the status and dignity that comes with it. Hiring subsidies and public works programs have often been criticized for not improving their beneficiaries' employability. But in the new world of work they need to be assessed not just against the traditional objective of returning the unemployed to private sector employment. Rather, the case for such programs may rest equally on an argument of social inclusion and societal stability as they provide the losers from routine-biased technological change with a chance to earn their living and continue to make an active contribution to public life. While their traditional emphasis has often been on manual, menial jobs not much aligned with workers' skills and public needs, the age of automation could herald a new generation of public works with societal value: take, for example, jobs in child or elderly care where needs are rising fast with population aging.

Removing barriers to EU-wide labor mobility

Boosting intra-EU labor mobility is a central element of the convergence machine 2.0. While labor mobility across Europe's single market has been growing in recent years, there is room for more. Increasing labor mobility can help provide opportunities for Europe's workers (and firms) and contribute to a better allocation of labor. Amid concerns of brain drain and displacement of native workers there is a role for national and EU policy in steering labor mobility and creating a level playing field. This starts with reinforcing opportunities for young people to study, train and gain experiences across the EU (and acquire language skills), for example by further boosting the Erasmus+ program, and can be complemented by improving systems to provide information about jobs and to ensure recognition of qualifications across the EU. Effective steering of labor mobility also means combating illegal practices and enforcing labor regulations. Workers, particularly young and skilled, are increasingly mobile. Having different places compete over these workers by creating attractive conditions is healthy competition.

Equalizing opportunities for firms

Equalizing opportunities for firms is about providing an enabling business environment across all parts of Europe's single market and supporting the upgrading of firms' capabilities through innovation and technology adoption.

How to build an enabling business environment across Europe's single market?

Europe's convergence machine 2.0 would emphasize reforms to the business environment. Significant variations in the business environment between countries and regions suggest a need for the EU to reexamine its approach and tool-kit to promote a firm-friendly level playing field. The business environment toolkit — the setting of business regulations and their enforcement — is largely in the hands of national and regional governments, while EU-level policy is focused on rolling out the single market for goods, services, capital and people, on deepening capital markets and on boosting investment. While this division of labor need not change, the EU could deploy its convergence machine instruments to business environment policy: setting targets and benchmarking and monitoring of how the business environment manifest itself across the EU at both the national and subnational levels, promoting mutual learning and reflecting policy upgrades in the European Semester.

Accelerating reforms to improve the quality of business regulations, particularly in Southern Europe

Southern European countries need to accelerate reforms to improve the quality of business regulations if they are to narrow the productivity gap with their Northern neighbors. Burdensome regulations have generated an entrepreneurial profile that is not fit for a global market and the adoption of new technology, with too few top-performing firms and too many lagging firms. This is making these countries increasingly lag behind their Northern neighbors, as globalization and technological change have gained pace. Southern European countries have been making progress, but reforms need to be accelerated to avoid falling further behind. Reforms should cover all aspects of business regulations (entry, operations — including labor market regulations, and institutions), reducing excessive regulations and improving their implementation. Central and Southeast European countries have been successful at attracting foreign investments. These efforts should continue. However, further progress in narrowing their productivity gap with the rest of the Union requires more efforts to improve the quality of infrastructure (most countries) and business regulations (Bulgaria and Romania).

Removing barriers to services across the EU

Completing Europe's Single Market for services can boost productivity across the Union. Reducing service sector restrictions to the level of the three least-regulated EU member states (the United Kingdom, Denmark, and Sweden) would increase productivity of firms operating in services and manufacturing by up to 5.3 percent within two years of implementation (World Bank 2016). Governments should focus their attention on reforms that yield the biggest economic benefits. Reforming conduct regulations, which determine how service firms operate and constitute a deterrent to foreign direct investment, and reducing barriers to the provision of professional services appear to have the largest payoff. The gains will be higher in countries with relatively weaker institutions, for example, in many Central and Southern European countries. There would also be large productivity externalities from undertaking parallel service sector reforms across EU countries.

How to support innovation and technology adoption in Europe's enterprises?

With the acceleration of technological change, a good business environment is no longer enough for countries to sustain productivity growth — more support for firm innovation is needed. Firm innovation and use of digital technologies is low in many parts of the EU — Northern Europe and, to a lesser extent, Continental European countries are the exception. A good business environment,

with more competition and less restrictive labor regulations, has helped. But these countries have done much more than that. They have supported firm innovation and technology adoption through better incentives for enterprise-sponsored R&D, public funding mechanisms and intellectual property regimes that foster profitable relations between universities and firms, and a steady supply of high-skill workers and managers. This has made them productivity leaders in Europe. Finland is a good example of that. Countries in Central and Southeastern Europe can also do more to support the adoption of existing technologies and knowledge, using FDI and trade links as conduits.

How to support firms in lagging regions?

The convergence machine 2.0 would aim to maximize the economic potential of lagging regions by improving opportunities for firms and people. All lagging regions would benefit from higher quality business regulations at the national level, and a more streamlined implementation of these regulations at the local level. Improving the connective infrastructure, including broadband connectivity, is a priority everywhere to increase market access and mobility, but particularly in lagging regions with low population density but close to agglomeration centers. Support for secondary cities with high growth potential would allow densely populated regions to exploit economies of agglomeration. National governments should ensure children and youth everywhere, but particularly in lagging regions, acquire basic skills. Finally, improving the quality of local institutions — often lagging in lagging regions — is a critical precondition for delivering this policy package. The new MFF provides an opportunity for strengthening cohesion policy to support this policy package. Finally, while the convergence machine 2.0 would be about boosting opportunities for firms and people in lagging regions, it would also facilitate their movement to higher opportunity places.

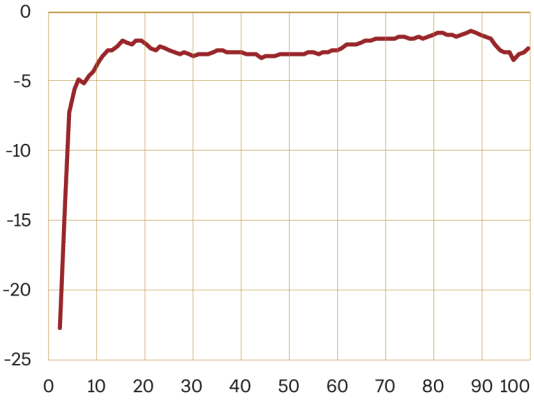
Notes

[1] The report also presents results using a measure of the innovation environment, as proxied by the percentage of innovating firms based on Eurostat's 2014 Community Innovation Survey (figure A5.1).
[2] The innovation environment is proxied by the percentage of innovating firms based on Eurostat's 2014 Community Innovation Survey.
[3] Jakubowski et al. (2016) and World Bank (2015).

Annex figures

Chapter 1

Figure A1.1 As between-country convergence stalled after 2008, EU-wide household income inequality increased between 2008 and 2014

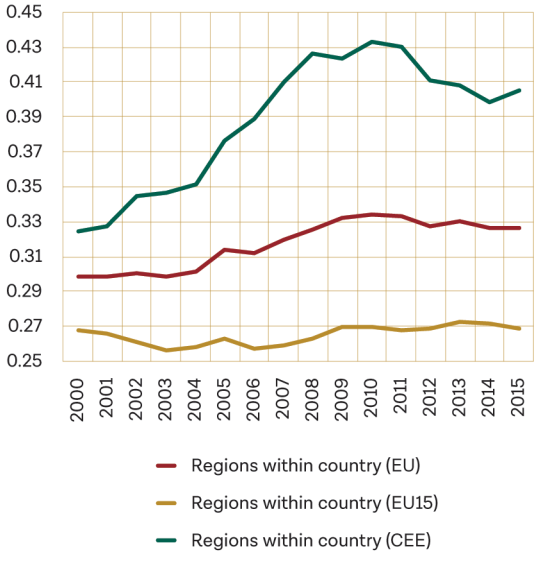


Source: EUSILC.

Note: The figure plots the growth rates in percentage terms (y-axis) for each percentile of the EU disposable income distribution (x-axis) between 2008 and 2014.

Figure A1.2 Regions within CEE countries were diverging, and regions within EU15 not converging, before 2008

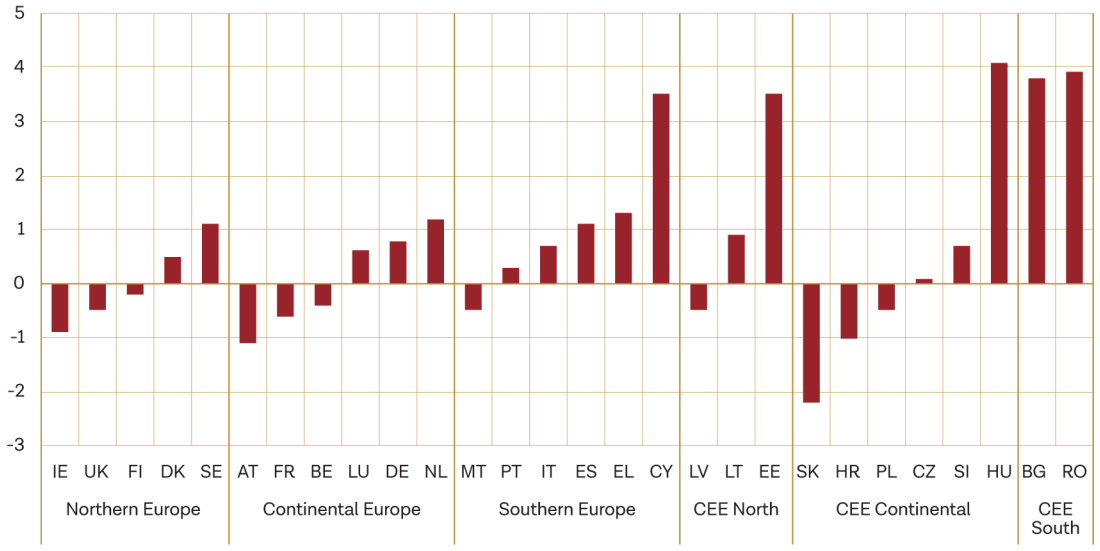
Within-country regional inequality in GDP per capita, as measured by the coefficient of regional variation, 2000–15



Source: Own calculations, using EUROSTAT.

Figure A1.3 Recovery has not brought inequality down

Change in Gini, 2010–15

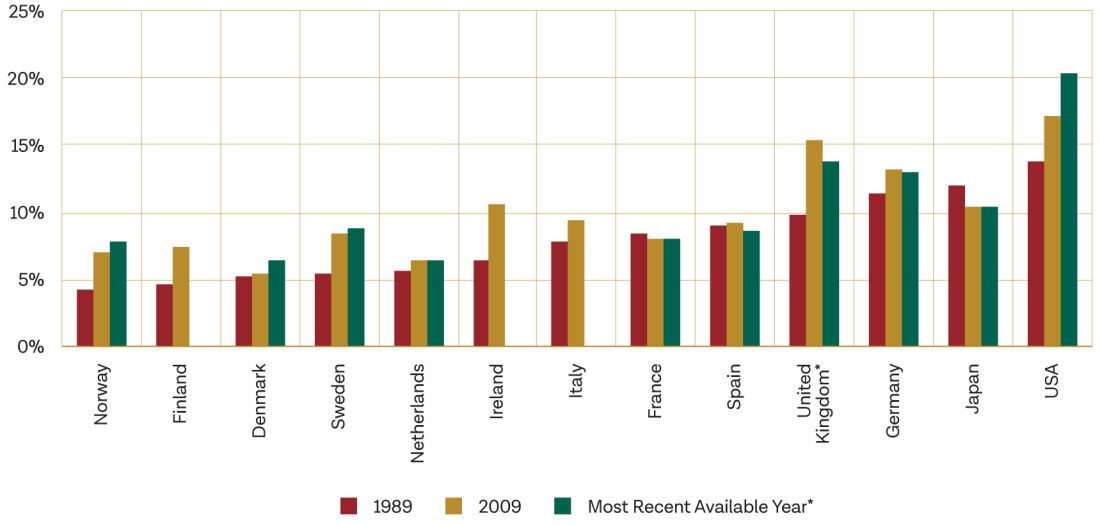


Source: EUSILC (Eurostat).

Note: Gini coefficient of equivalized disposable income.

Figure A1.4 The income share of the richest 1 percent of the population is increasing

Share of total income owned by the top 1 percent of the distribution, 1989, 2009, and most recent



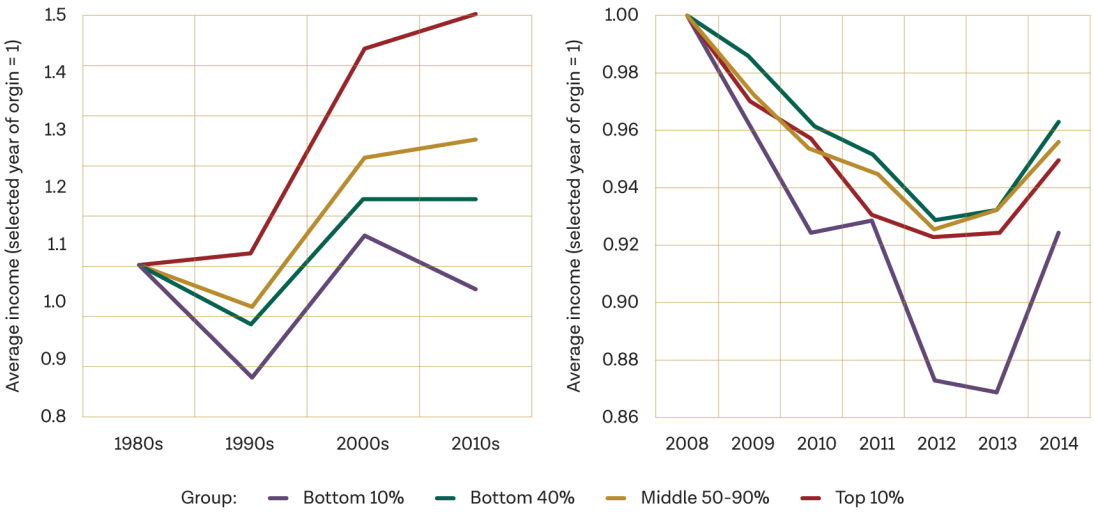
Source: World Wealth and Income Database (WID).

Note: UK 1989 value is missing, 1990 is used instead. Most recent year varies between 2010 and 2014 among countries.

Figure A1.5 Labor income growth of lower income households has been falling behind

A. Labor income per capita trends by segment of the household income distribution, 1980 = 1, EU average, 1990s–2010s

B. Labor income per capita trends by segment of the household income distribution, 2008 = 1, EU average, 2009–2014

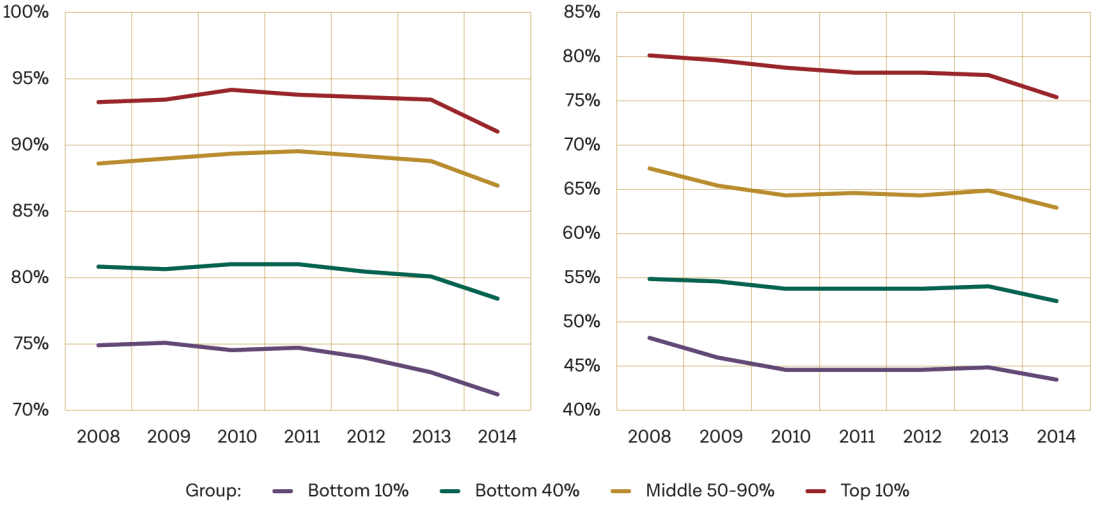


Source: Own estimates using LIS (left) and EU-SILC (right). Left panel plots the change in total household labor income per capita (indexed to the 1980s) in the median year of the 1980s and 1990s, and the most recent year of the 2010s. The distribution is defined by total household disposable income per capita. EU averages include today's EU countries.

Figure A1.6 The employment rate of lower income households has been falling behind

A. Share of employed adults by segment of the household income distribution, EU average, 2009–14

B. Share of adult earners by segment of the household income distribution, EU average, 2009–14

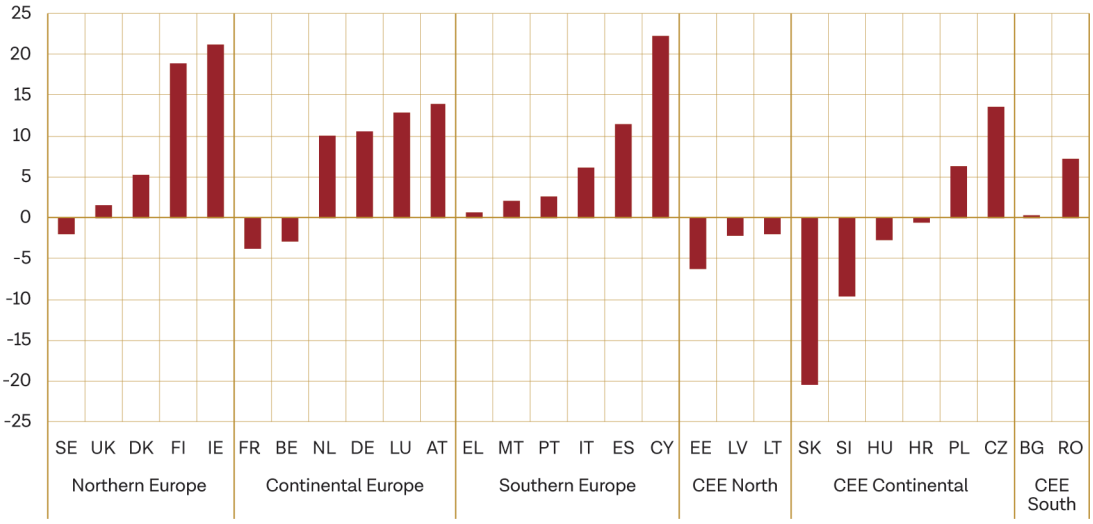


Source: Own estimates using EUSILC Surveys.

Note: Shared of employed adults is defined as the share of adults 16 and over in the household that self-report current employment status, whereas the share of adults earners is the share of adults in the household who earn income from labor activities (as employees or self-employed).

Figure A1.7 Wealth inequality is rising in most EU countries

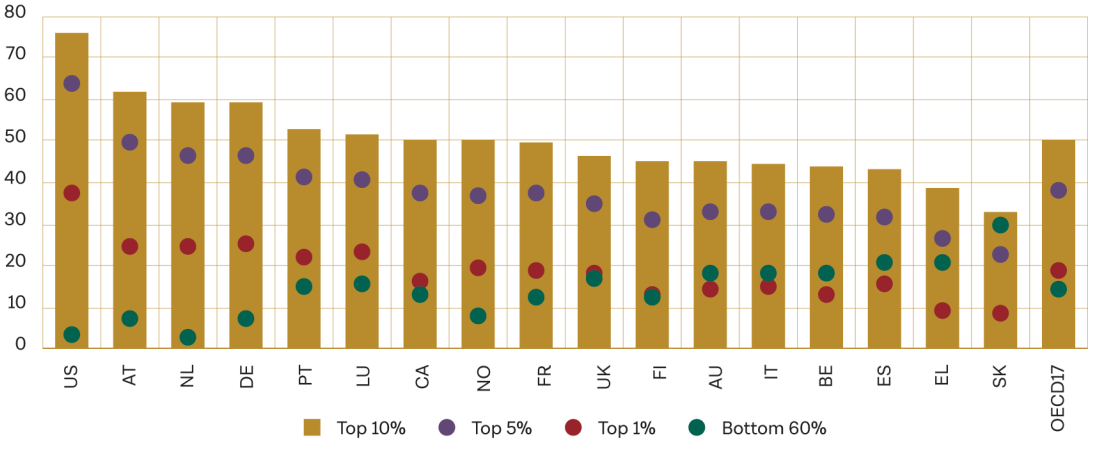
Change in wealth Gini, 2010–16



Source: Credit Suisse — Global Wealth Report.

Figure A1.8 The wealthiest 1 percent command a high share of total wealth

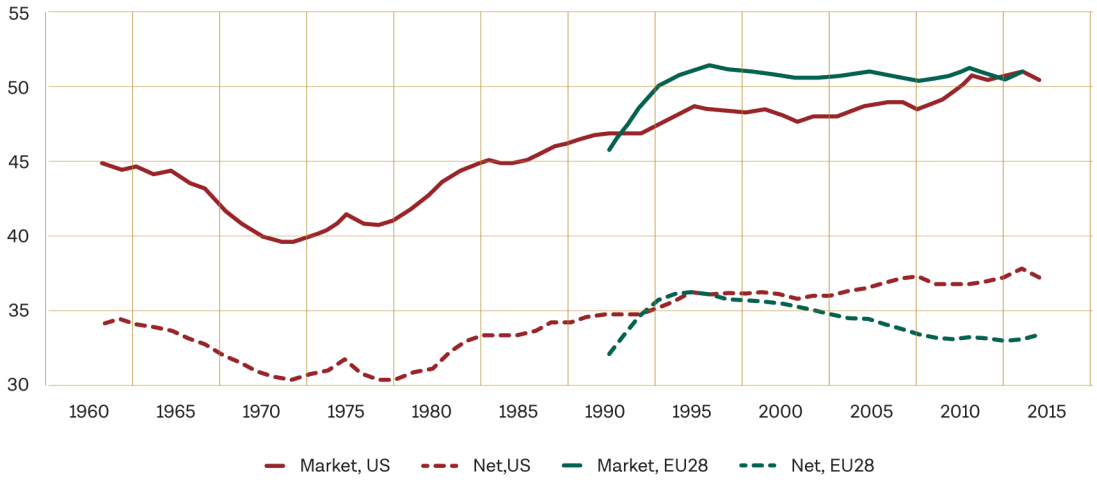
Shares of top 1 percent of net wealth distribution, 2010 or latest year (percent)



Source: OECD (2015).

Figure A1.9 Between 1995 and 2008, fiscal policy drove EU-wide net income inequality down at a time when US net income inequality was increasing

Gini coefficient of market and net income inequality, 1960–2014

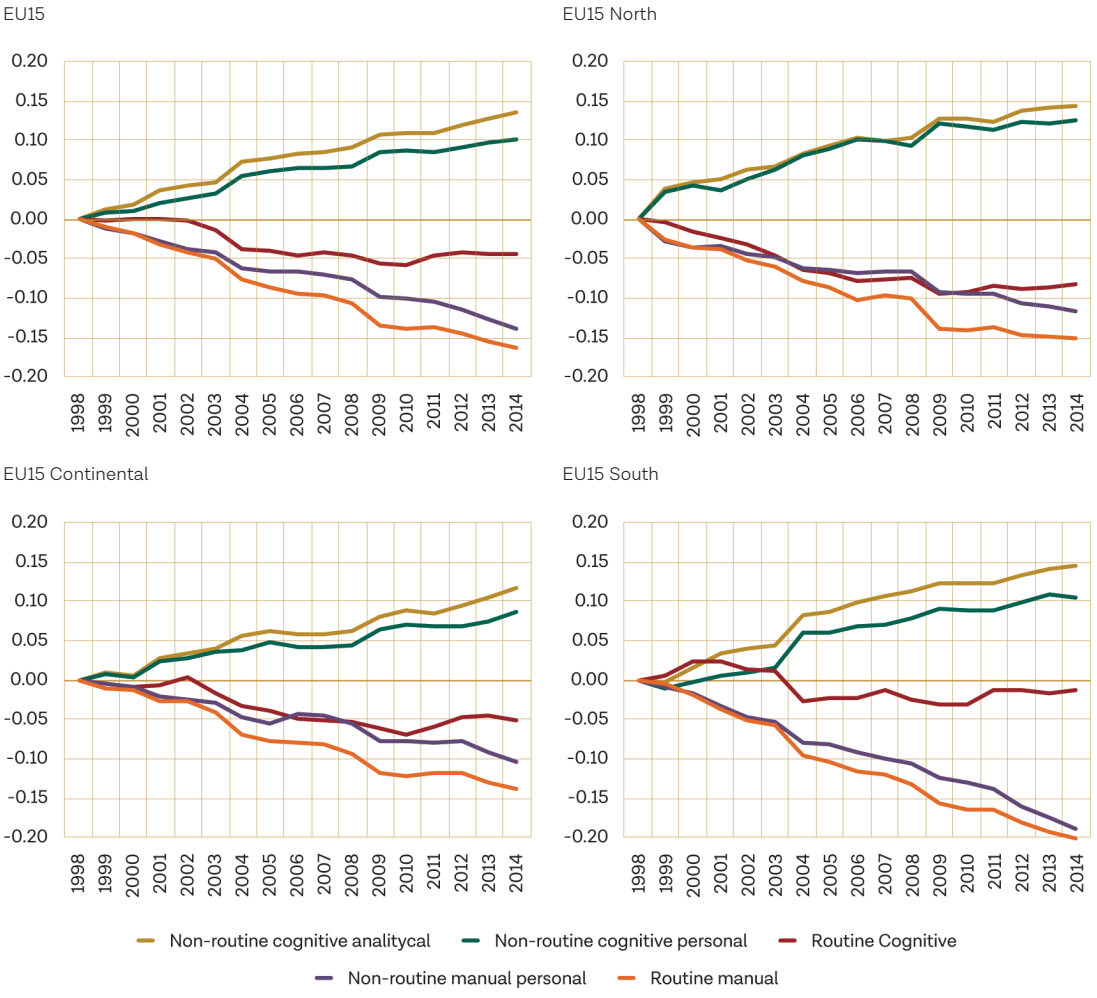


Source: Darvas and Wolf (2016), based on the Standardized World Income Inequality Database (SWIID).

Note: Market income is before taxes and transfers, while net income is after taxes and transfers.

Chapter 2

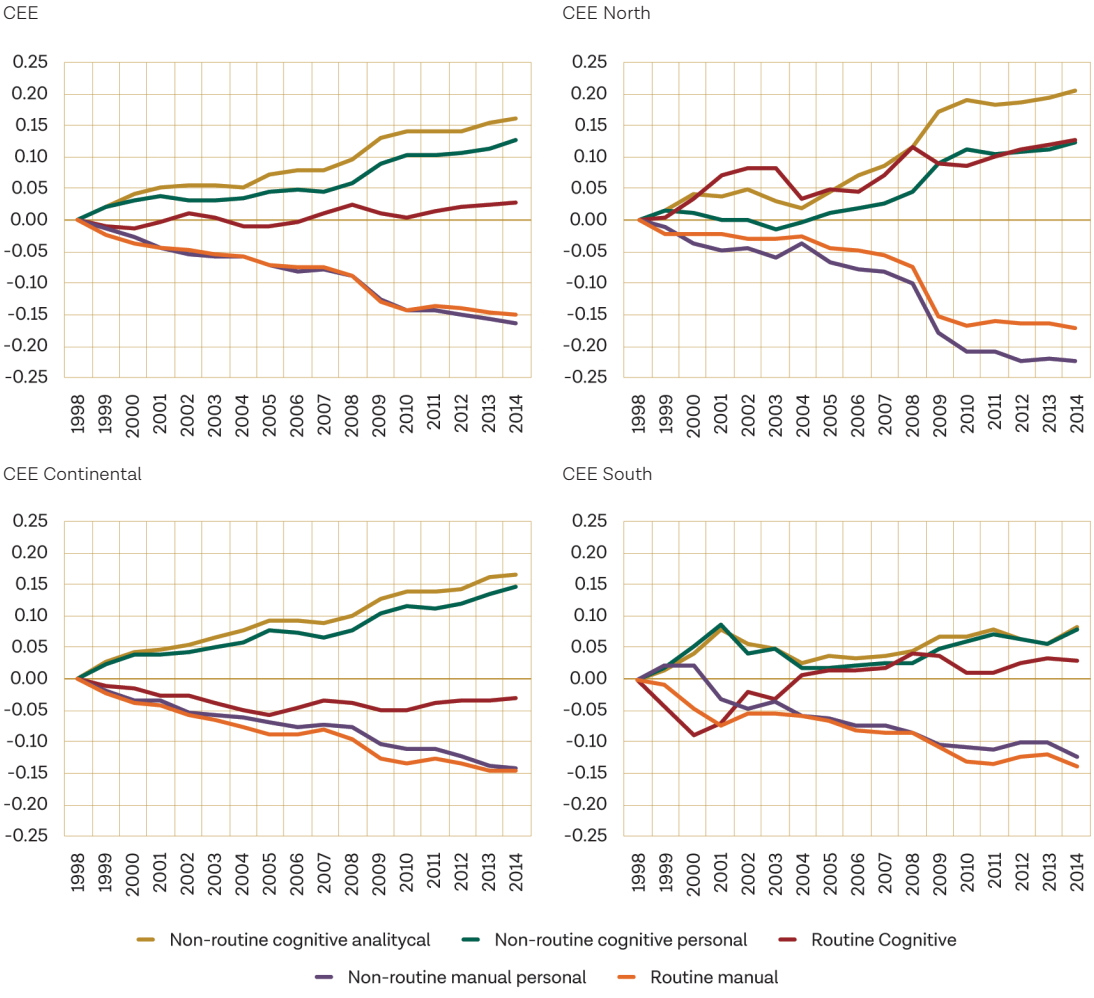
Figure A2.1 Jobs are becoming more cognitive- and less routine-task intensive in EU15 countries



Source: Gorka et al. (2017a), commissioned for this report.

Note: Malta, Cyprus and Luxemburg are not included in the analysis because samples are too small for the analysis. Individual country results are available upon request. The intensity of each task is measured for each occupation, aggregated for each country and standardized over time. Reported values are averages for different country groups.

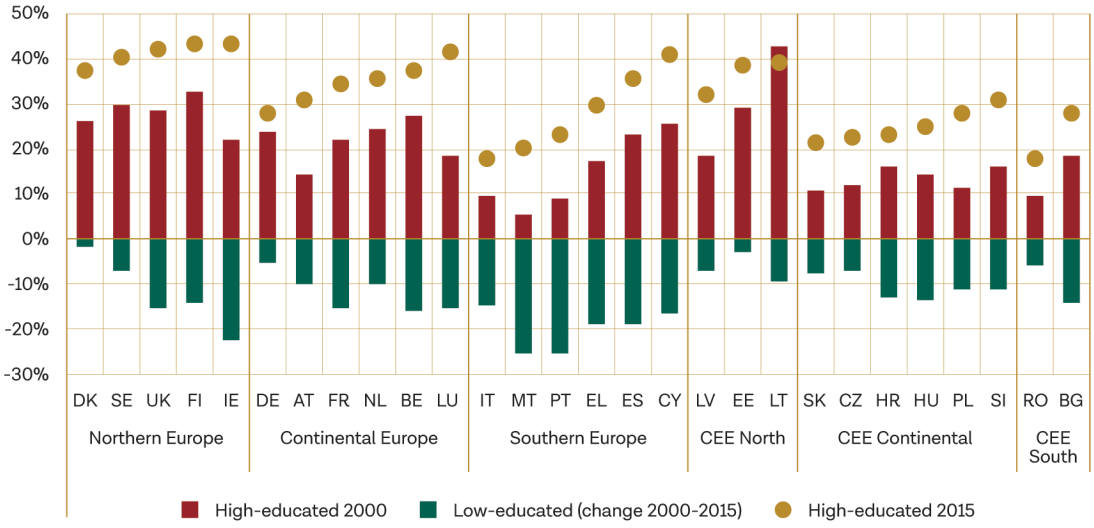
Figure A2.2 Similar trends for CEE countries, but less pronounced, as routine-cognitive tasks are still increasing in some countries



Source: Gorka et al. (2017a), commissioned for this report.

Figure A2.3 A significant education upgrading of the working age population

Share of working age population with tertiary education / less than upper secondary education

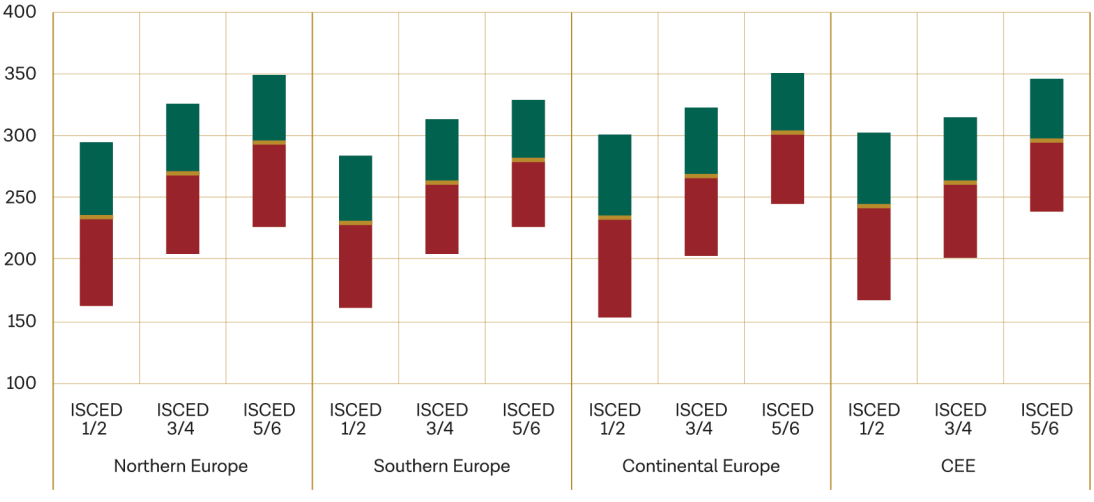


Source: Eurostat.

Note: Highly educated (ISCED 5-8), low-educated (ISCED 0-2).

Figure A2.4 Differences in skills are strongly driven by differences in education

Mean and dispersion of numeracy skills by level of education, PIAAC, 2012

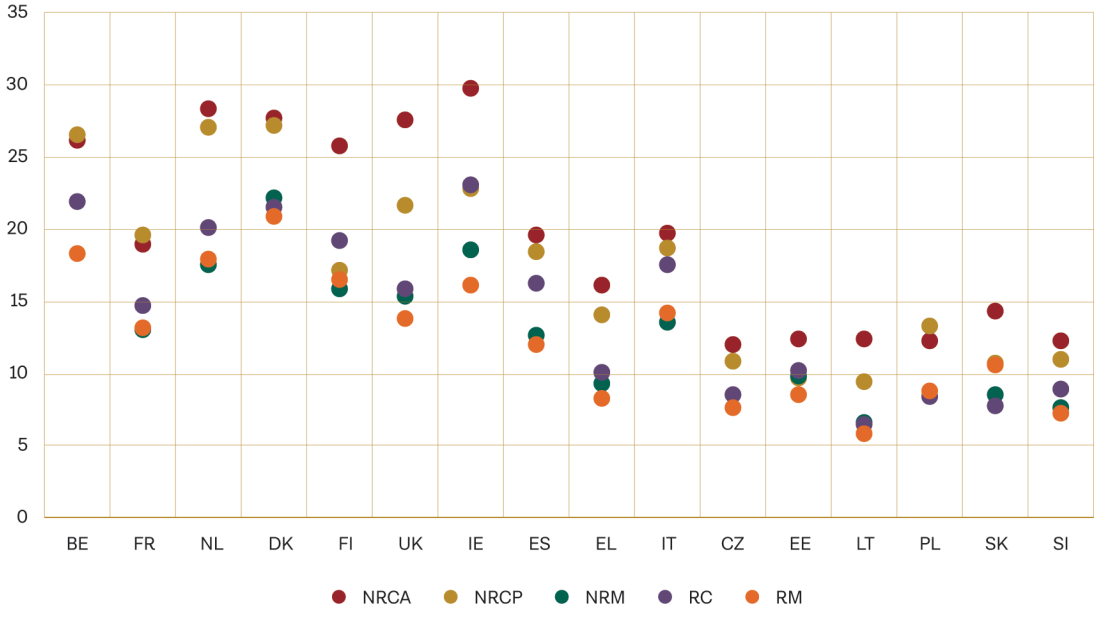


Source: Own estimates using PIAAC.

Note: All estimates refer to the working age population (16–65). ISCED 1/2: Primary and lower secondary education; ISCED 3/4: Upper secondary education, postsecondary, nontertiary education; ISCED 5/6: Tertiary education and above. Below basic competency (below level 2), basic competency (levels 2 and 3), proficiency (levels 4 and 5).

Figure A2.5 Jobs most intensive in nonroutine cognitive tasks pay the most, manual jobs pay the least

Average wages by type of job, PIAAC 2012

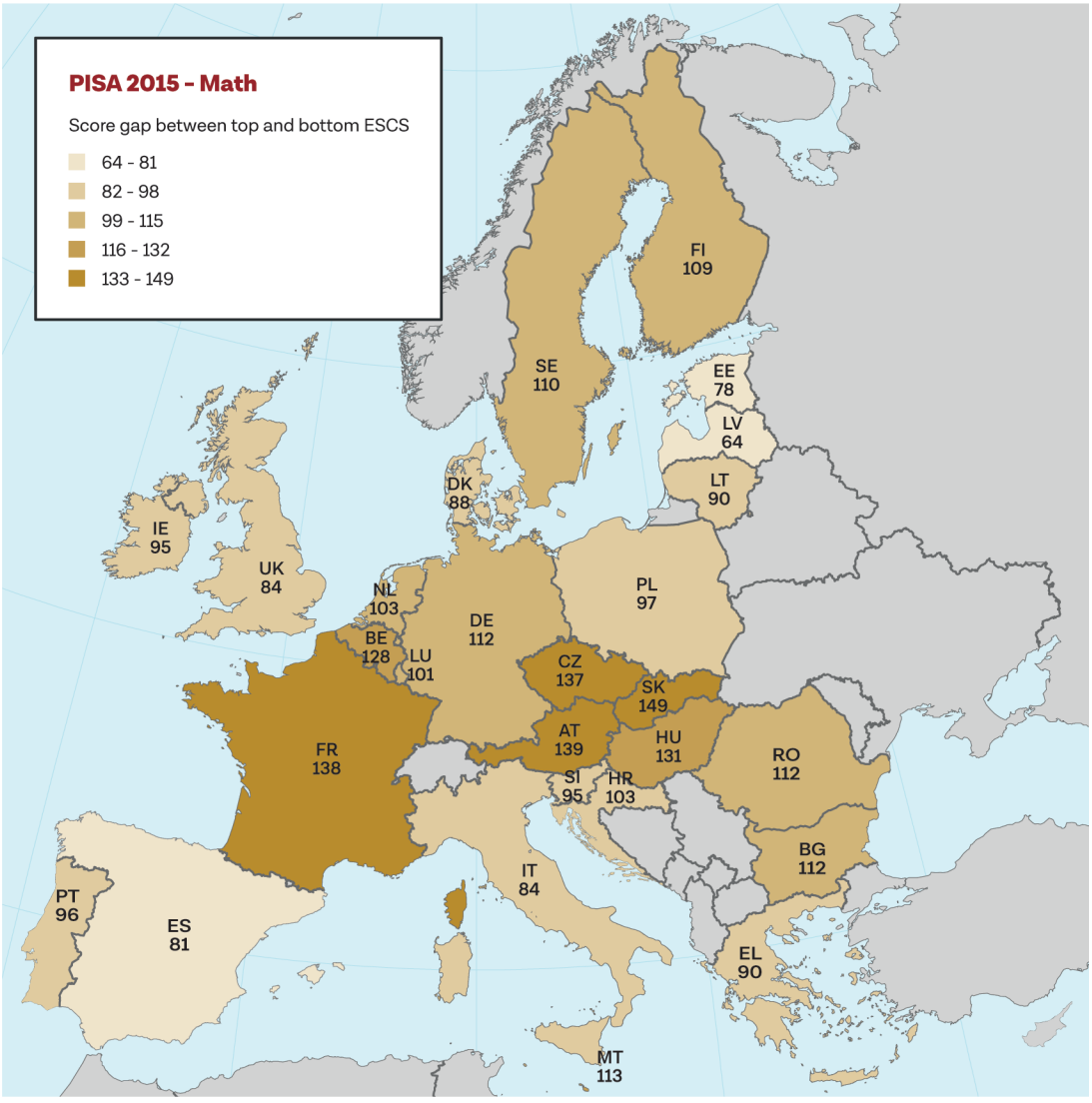


Source: Own estimates using PIAAC.

Note: Jobs are classified by their most intensive task into nonroutine cognitive analytical (NRCA), nonroutine cognitive personal (NRCP), routine cognitive (RC), nonroutine manual (NRM), and routine manual (M).

Chapter 3

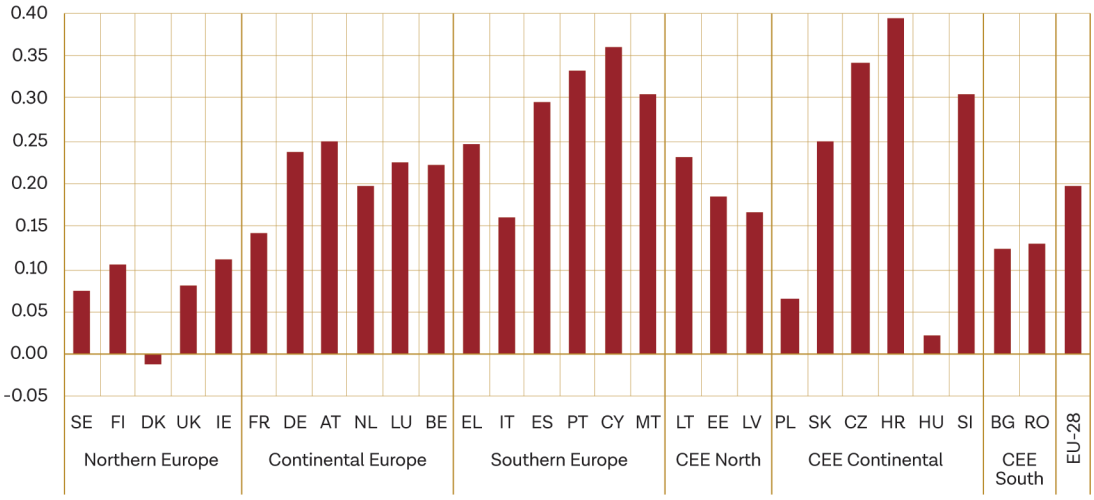
Figure A3.1 The skill divide: a performance gap between rich and poor students



Source: World Bank staff calculations based on PISA 2000–2015 database.

Figure A3.2 Direct taxes are largely progressive in the EU

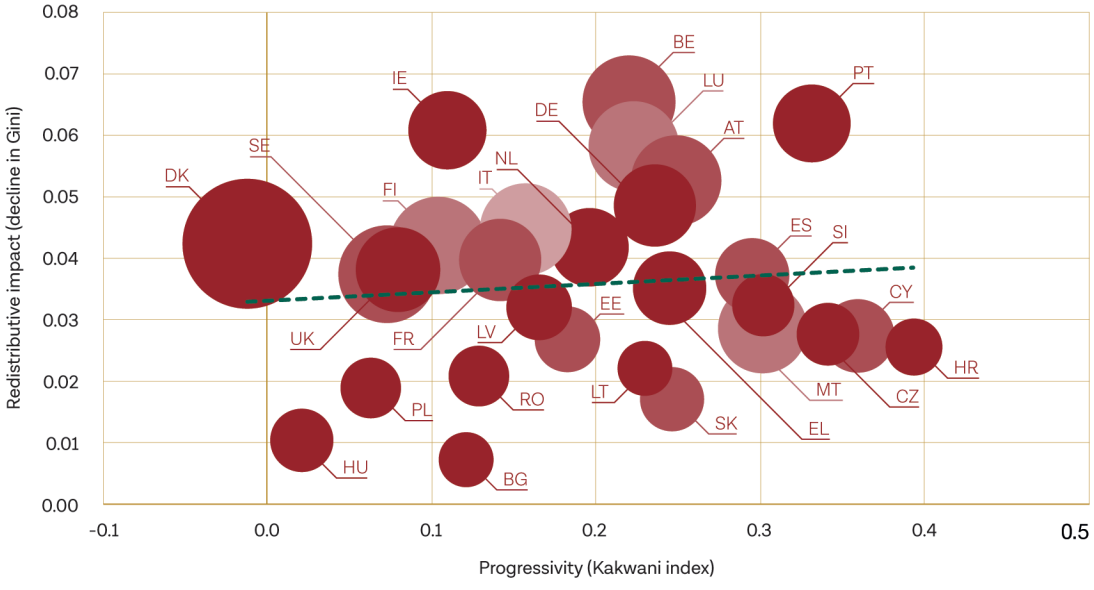
Kakwani progressivity index, income and property taxes



Source: World Bank calculations based on Euromod.

Note: The Kakwani index is the difference between the concentration coefficient of the tax and the Gini for market income. Estimates are calculated using 2012 EU-SILC uprated to 2016, and policy simulations for 2016.

Figure A3.3 The redistributive impact of progressive taxes is reduced when little is collected



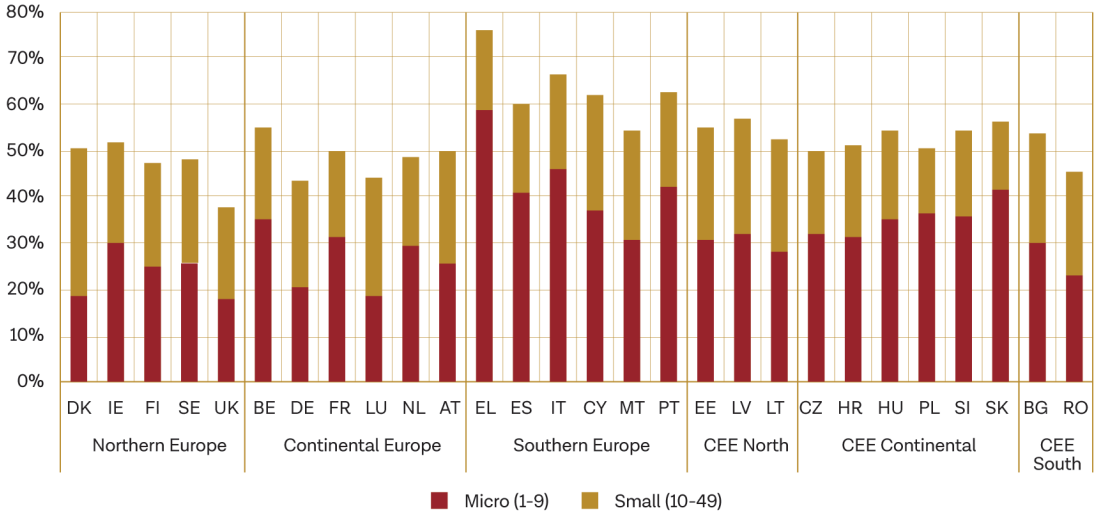
Source: World Bank calculations based on Euromod and Eurostat.

Note: Larger bubbles indicate higher tax collections as a share of GDP.

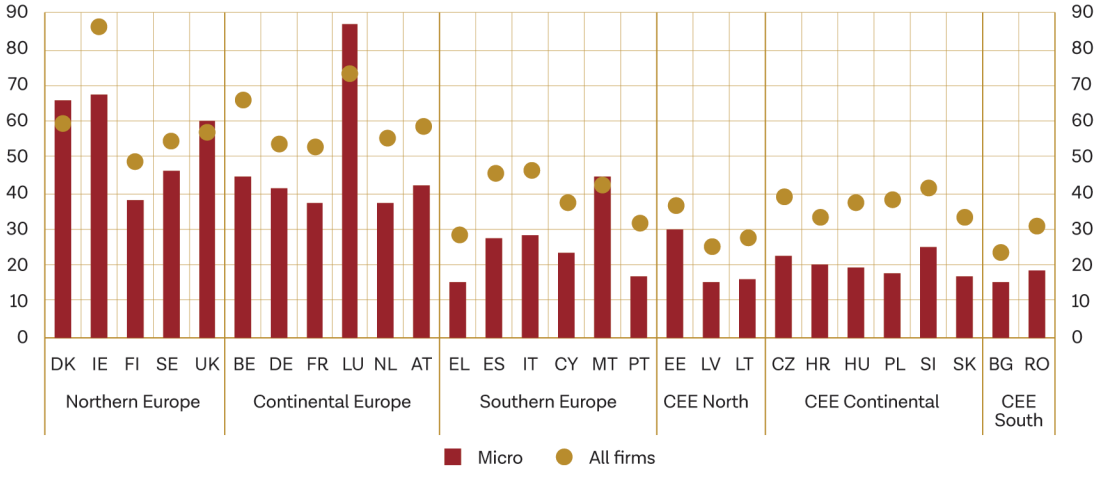
Chapter 4

Figure A4.1 Microenterprises in Southern Europe are more prominent and account for a larger share of value added than in Northern and Continental Europe

Distribution of firms by size, 2014



Share in value added by firm size, 2014 (percentage)

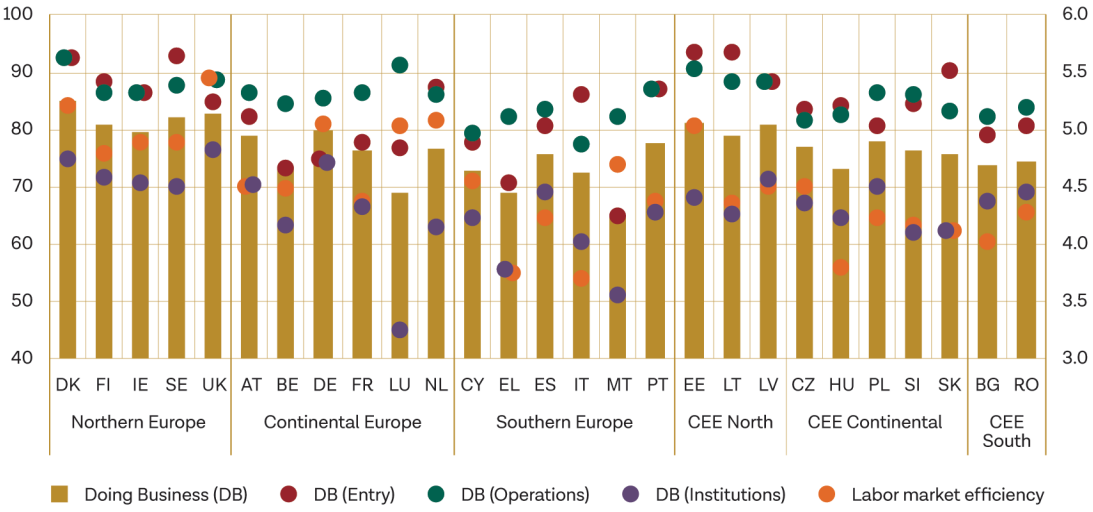


Source: Own calculations, using Eurostat.

Note: Gross value added is at factor cost.

Figure A4.2 Business regulations are more burdensome in the Southern Europe, Bulgaria, and Romania

Doing Business and labor market efficiency, 2017



Source: Doing Business and World Economic Forum.

Note: Doing Business Indicators measure distance to best performer in Doing Business (best performer = 100). Labor market efficiency is measured in a scale from 1 to 7 (best) and reported in the right axis.

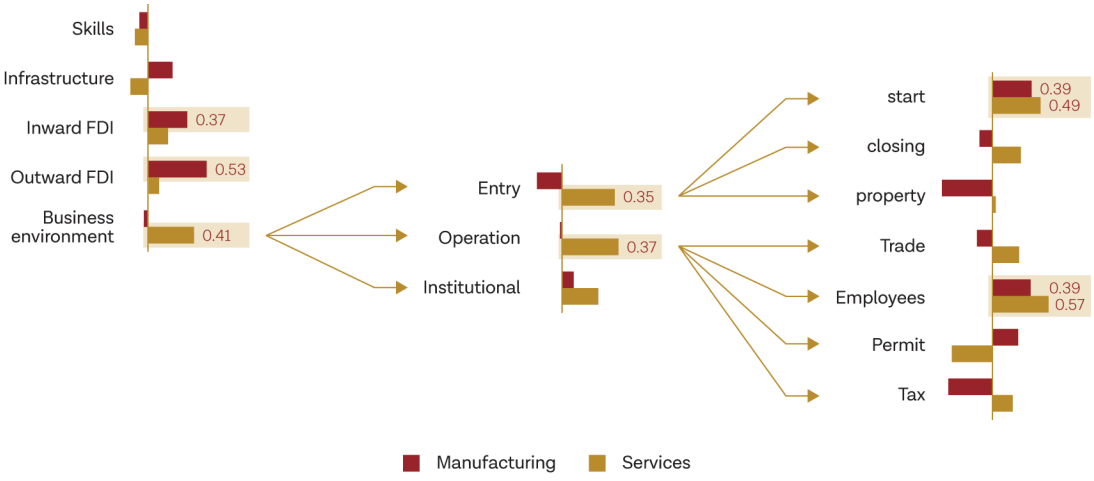
Figure A4.3 More restrictions on FDI reduce the presence of foreign firms in the country

Source: Own calculations, using Eurostat and WEF.

Note: Business impact of rules on FDI measures the restrictiveness of regulations on FDI, as assessed by business executives, in a scale from 1 (most restrictive) to 7 (least restrictive).

Figure A4.4 FDI and regulations are the closest correlates of productivity growth in the EU15 countries

Correlations between country effects and policy variables

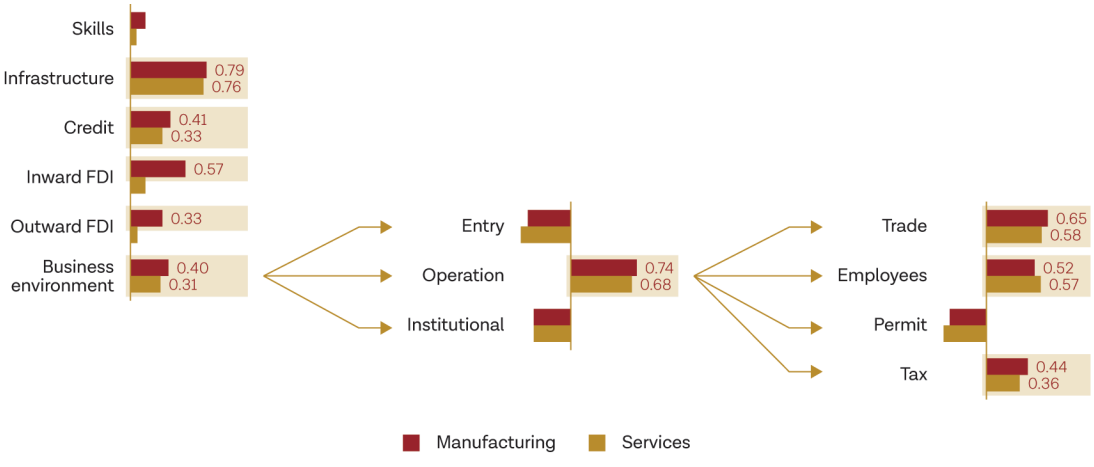


Source: Goldern Growth (World Bank 2012).

Note: Calculations, based on Amadeus, Doing Business, WEF's Global Competitiveness Reports, and WDI.

Figure A4.5 Business regulations, the quality of infrastructure, and FDI flows are strongly associated with productivity performance in CEE countries

Correlations between country effects and policy variables

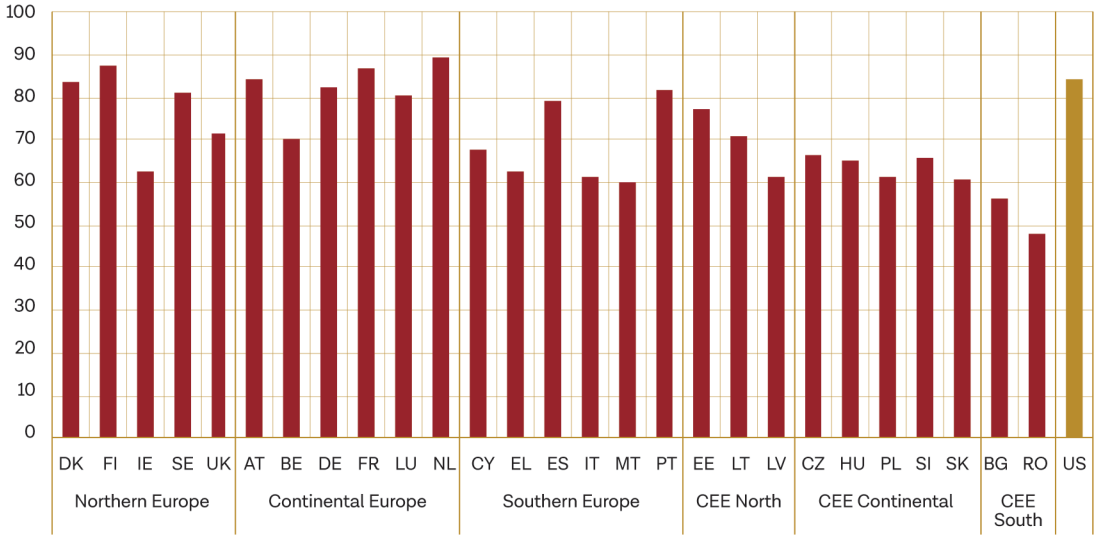


Source: Golden Growth (World Bank, 2012).

Note: Calculations, based on Amadeus, Doing Business, WEF's Global Competitiveness Reports, and WDI.

Figure A4.6 The quality of public infrastructure remains low in most CEE countries

A. The quality of public infrastructure remains low in most CEE countries…

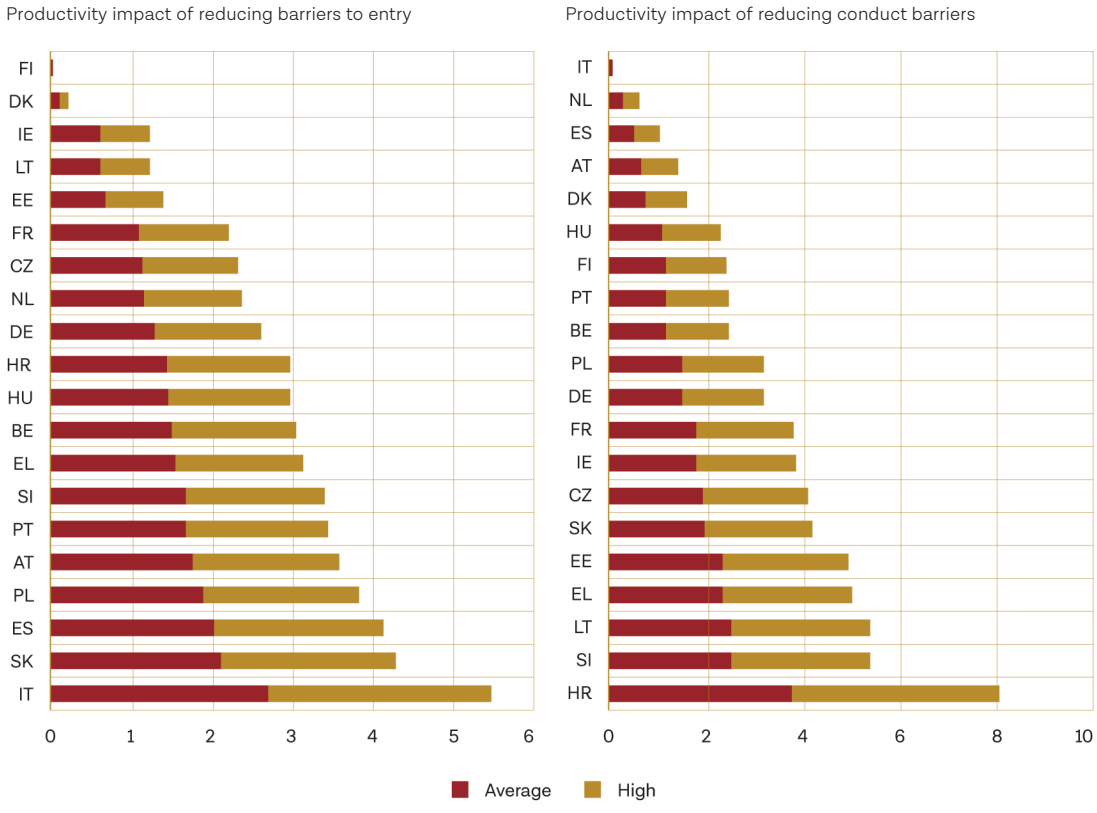


B. …And this has a drag on productivity

Source: WEF and Orbis.

Note: The quality of infrastructure is as assessed by business executives, in a scale from 0 to 100.

Figure A4.7 Reducing entry and conduct barriers would boost productivity



Source: Services to Rescue (World Bank 2016b), based on OECD data.

Note: Charts show the percent increase of TFP from reducing barriers to an average for EU or to the three least restrictive countries.

References

Acemoglu, D., and D. H. Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." In *Handbook of Labor Economics.*, edited by D. Card and O. Ashenfelter. Amsterdam: Elsevier.

Acemoglu, D., and P. Restrepo. 2017. "Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation." *American Economic Review* 107 (5): 174–79.

Adler, G., R. Duval, D. Furceri, S. K. Çelik, K. Koloskova, and M. Poplawski-Ribeiro. 2017. "Gone with the Headwinds: Global Productivity." IMF Report.

Aghion, P., R. Blundell, R. Griffith, P. Howitt and S. Prantl. 2009. "The Effects of Entry on Incumbent Innovation and Productivity." *Review of Economics and Statistics* 91 (1): 20–32.

Alesina, A., M. Battisti, and J. Zeira. 2015. "*Technology and Labor Regulations: Theory and Evidence.* NBER Working Paper 20841. Cambridge, MA: National Bureau of Economic Research.

Arias, O. S., C. Sánchez-Páramo, M. E. Dávalos, I. Santos, E. R. Tiongson, C. Gruen, N. de Andrade Falcão, G. Saiovici, and C. A. Cancho. 2014. *Back to Work: Growing with Jobs in Eastern Europe and Central Asia.* Europe and Central Asia reports. Washington, DC.: World Bank.

Autor, D. H. 2015. "Why Are There Still So Many Jobs? The History and Future of Workplace Automation." *Journal of Economic Perspectives* 29 (3): 3–30.

Autor, D.H., and D. Dorn. 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market." *American Economic Review* 103 (5), 1553–1597.

Autor, D. H., F. Levy, and R. Murnane. 2003. "The Skill Content of Recent Technological Change: An Empirical Exploration." *Quarterly Journal of Economics* 118 (4): 1279–1333.

Berlingieri, G., P. Blanchenay, and C. Criscuolo. 2017. *The Great Divergence(s).* OECD Science, Technology. and Industry Policy Paper 39. Paris: OECD Publishing.

Bessen, J. E. 2016. "How Computer Automation Affects Occupations: Technology, Jobs, and Skills." Boston University School of Law, Law and Economics Research Paper 15–49.

Broecke, S., G. Quintini, and M. Vandeweyer. 2017. "Explaining International Differences In Wage Inequality: Skills Matter." *Economics of Education Review* 60: 112–24.

Boyd, D., H. Lankford, and S. Loeb. 2003. *The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools.* NBER Working Paper 9953. Cambridge, MA: National Bureau of Economic Research.

Bussolo, M., J. Koettl, and E. Sinnott. 2015. *Golden Aging: Prospects for Healthy, Active, and Prosperous Aging in Europe and Central Asia.* Washington, DC: World Bank.

CEDEFOP (European Center for the Development of Vocational Training). 2013. *Quantifying Skill Needs in Europe Occupational Skills Profiles: Methodology and Application.* CEDEFOP Research Paper 30. Thessaloniki: CEDEFOP.

Checchi, D., V. Peragine, and L. Serlenga. 2016. "Inequality of Opportunity in Europe: Is There a Role for Institutions?" In *Inequality: Causes and Consequences*, edited by L. Cappellari, S. W. Polachek, and K. Tatsiramos. Bingley, U.K.: Emerald Group.

Coleman, J. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94: 95–121.

Darvas, Z., and G. B. Wolff. 2016. "The Anatomy of Inclusive Growth In Europe." Bruegel Blueprint Series #26, Bruegel, Brussels.

De Agostini, Paola. 2017. "United Kingdom 2013–2016." EUROMOD Country Report. Tax-Benefit Microsimulation Model for the European Union, Essex.

De la Rica, S., and L. Gortazar. 2016. "Differences in Job De-Routinization in OECD Countries: Evidence from PIAAC." IZA Discussion Paper 9736. Institute for the Study of Labor, Bonn.

De Wolf, Inge. 2017. "Unintended Consequences of Education Policy in Netherlands (Growing) Inequity as Nobody's Problem." Background paper for Growing United. World Bank, Washington, DC.

Dreger, C., E. López-Bazo, R. Ramos, V. Royuela, and J. Suriñach. 2014. 2014. "Income Inequality: Wage Dispersion in the European Union." Policy Department A: Economic and Scientific Policy, European Parliament, Brussels.

Easterly, W., and R. Levine. 2001. "What Have We Learned from a Decade of Empirical Research on Growth? It's Not Factor Accumulation: Stylized Facts and Growth Models." *World Bank Economic Review* 15 (2): 177–219.

European Commission. 2017. *2016 Annual Report on Intra-EU Labour Mobility.* Brussels: European Commission.

Farole, T., M. Roberts, J. Park, and C. Hooton. 2018. *Assessing the Economic Potential of Europe's Regions.* Washington, DC: World Bank.

Fordham, S., and J. Ogbu. 1986. "Black Students' School Successes: Coping with the Burden of 'Acting White.'" *Urban Review* 18: 176–206.

Frey, C. B., and M. A. Osborne. 2017. "The Future of Employment: How Susceptible Are Jobs to Computerization?" *Technological Forecasting and Social Change* 114 (C): 254–80.

Garicano, L., C. Lelarge, and J. Van Reenen. 2016. "Firm Size Distortions and the Productivity Distribution: Evidence from France." *American Economic Review* 106 (11): 3439–79.

Garner, C. L., and S. W. Raudenbush. 1991. "Neighborhood Effects on Educational Attainment: A Multilevel Analysis." *Sociology of Education* 64 (4): 251–62.

Gill, I., and M. Raiser. 2012. *Golden Growth: Restoring the Lustre of the European Economic Model.* Washington, DC: World Bank.

Goos, M., A. Manning, and A. Salomons. 2014. "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring." *American Economic Review* 104: 2509–26.

Gorka, S., W. Hardy, R. Keister, and P. Lewandowski. 2017a. "Tasks and Skills in European Labor Markets." Background paper for Growing United, IBS Research Report 03/2017. Institute for Structural Research, Warsaw.

Gorka, S., W. Hardy, R. Keister, and P. Lewandowski. 2017b. Age, Tasks and Skills in European Labor Markets." Background paper for Growing United, IBS Research Report 04/2017. Institute for Structural Research, Warsaw.

Gortazar, L., K. M. Herrera-Sosa, M. A. Hoftijzer, and M. Ruiz. 2018. "Skills in Europe: Equal Opportunities for Successful Participation in Europe's Changing World of Work." Background paper for Growing United. World Bank, Washington, D.C.

Karver, J., and G. Inchauste. "Perceptions of Welfare in the European Union." Background paper for Growing United. World Bank, Washington, D.C.

Grigoli, F., and A. Robles. 2017. "Inequality Overhang." IMF Working Paper 17/76. International Monetary Fund, Washington, DC.

Handel, M. J. 2012. "Trends in Job Skill Demands in OECD Countries." OECD Social, Employment, and Migration Working Papers 143. OECD, Paris.

Hanushek, E. A., and L. Woessmann. 2006. "Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence across Countries." *Economic Journal* 116: C63–C76.

Hanushek, E.A., G. Schwerdt, S. Wiederhold, and L. Woessmann. 2015. "Returns to skills around the world: Evidence from PIAAC." *European Economic Review* 73: 103–130.

Hardy, W., R. Keister, and P. Lewandowski. 2016. "Technology or UPSKILLING? Trends in the Task Composition of Jobs in Central and Eastern Europe." IBS Working Paper 01/2016. Warsaw: Institute for Structural Research.

Hummels D., J. Munch, and C. Xiang. 2016. *Offshoring and Labor Markets.*" NBER Working Paper 22041. Cambridge, MA: National Bureau of Economic Research.

Inchauste, G., and J. Karver. 2018a. "Fiscal Redistribution in the European Union." Background paper for Growing United. World Bank, Washington, D.C.

Inchauste, G., and J. Karver. 2018b. "Understanding Changes in Inequality in the European Union." Background paper for Growing United. World Bank, Washington, D.C.

Inchauste, G., and I. Rubil. 2017. "The Distributional Impact of Taxes and Social Spending in Croatia." Policy Research Working Paper 8203. World Bank, Washington, DC.

Jakubowski, M., and J. Wiśniewski. 2017. "Pro-equity Education Reforms in Poland in the 1990s and 2000s: A Success Story." Background paper for Growing United. World Bank, Washington, D.C.

Jakubowski, M., H. Patrinos, E. Porta, and J. Wiśniewski. 2010. "The Impact of the 1999 Education Reform in Poland." Policy Research Working Paper 5263. World Bank, Washington, DC.

Koske, I., I. Wanner, R. Bitetti. and O. Barbiero. 2015. "The 2013 Update of the OECD Product Market Regulation Indicators: Policy Insights for OECD and Non-OECD Countries." OECD Economics Department Working Paper 1200. Organisation for Economic Co-operation and Development, Paris.

Lakner, C., and B. Milanovic. 2015. "Global Income Distribution: From the Fall of the Berlin Wall to the Great Recession." *World Bank Economic Review* 30 (2).

McKinsey. 2017. *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation.* New York: McKinsey Global Institute.

Medina, O., and L. Gortazar. 2017. "Protecting the Children? Equity Concerns and Inertias in the Spanish Education and Welfare System." Background paper for Growing United. World Bank, Washington, D.C.

Melitz, M., and S. Polanec. 2015. "Dynamic Olley-Pakes productivity decomposition with entry and exit," *RAND Journal of Economics* 46(2), 362–375.

Mullainathan, S., and E. Shafir. 2013. *Scarcity: Why Having Too Little Means So Much.* New York: Times Books.
Naticchioni, P., G. Ragusa, and R. Massari. 2014. "Unconditional and Conditional Wage Polarization in Europe." IZA Discussion Paper 8465. Institute for the Study of Labor, Bonn.
OECD (Organisation for Economic Co-operation and Development). 2013. "Protecting Jobs, Enhancing Flexibility: A New Look at Employment Protection Legislation." In *OECD Employment Outlook 2013.* Paris: OECD Publishing.
OECD (Organisation for Economic Co-operation and Development). 2015. *In It Together: Why Less Inequality Benefits All.* Paris: OECD Publishing.
OECD (Organisation for Economic Co-operation and Development). 2016. *OECD Economic Surveys: European Union 2016.* Paris: OECD Publishing.
OECD (Organisation for Economic Co-operation and Development). 2017a. *Bridging the Gap: Inclusive Growth 2017 Update Report.* Paris: OECD Publishing.
OECD (Organisation for Economic Co-operation and Development). 2017b. *OECD Employment Outlook 2017.* Paris: OECD Publishing.
OECD and Korea Institute of Public Finance. 2014. "The Distributional Effects of Consumption Taxes in OECD Countries." OECD Tax — Policy Studies 22. OECD Publishing, Paris.
O'Donoghue, C. 2017. "Ireland 2011–2016." EUROMOD Country Report. Tax-benefit microsimulation model for the European Union, Essex.
Packard, T., and C. Montenegro. 2017. "Labor Policy and Digital Technology Use: Indicative Evidence from Cross-Country Correlations." Policy Research Working Paper 8221. World Bank, Washington, DC.
Pellegrino, B., and L. Zingales. 2017. *Diagnosing the Italian Disease.* NBER Working Paper 23964. Cambridge, MA: National Bureau of Economic Research.
Petersen, J., B. Greve, and M. A. Hussain. 2017. "Denmark 2011–2016." EUROMOD Country Report. Tax-benefit microsimulation model for the European Union, Essex.
Piketty, T. 2014. *Capital in the 21st Century.* Cambridge, MA: Harvard University Press.
Piopiunik, M. 2014. "The Effects of Early Tracking on Student Performance: Evidence from a School Reform in Bavaria." *Economics of Education Review* 42 (C): 12–33.
Robles, A., and F. Grigoli. 2017. "Inequality Overhang." IMF Working Paper 17/76. Washington, DC: International Monetary Fund.
Sánchez-Puerta, M. L., A. Valerio, and M. Gutiérrez-Bernal. 2016. *Taking Stock of Programs to Develop Socioemotional Skills: A Systematic Review of Program Evidence.* Directions in Development — Human Development. Washington, DC: World Bank.
Smith, E. 2017. "Ireland's Delivering Equality of Opportunity in Schools (DEIS) Program." Background paper for Growing United. World Bank, Washington, D.C.
Solt, F. 2016. "The Standardized World Income Inequality Database." *Social Science Quarterly* 97 (5):1267–1281. SWIID Version 6.1, October 2017.
Spitz-Oener, A. 2006. "Technical Change, Job Tasks, and Rising Educational Demands: Looking Outside the Wage Structure." *Journal of Labor Economics* 24: 235–70.
Syverson, C. 2017 "Challenges to Mismeasurement Explanations for the U.S. Productivity Slowdown." *Journal of Economic Perspectives* 31 (2): 165–86.
Välijärvi, J., and H. Alasuutari. 2017. The Current Challenges of Finnish Education: Changes of the Society Affecting Quality and Equity in Schools." Background paper for Growing United. World Bank, Washington, DC.
World Bank. Forthcoming. *Rethinking Lagging Regions in the EU: Evidence-Based Principles for Future Cohesion Policy.* Washington, DC: World Bank.
World Bank. 2005. *World Development Report 2006: Equity and Development.* Washington, DC: World Bank.
World Bank. 2015. Doing Business in Spain 2015. Doing Business Subnational Series. Washington DC; World Bank.
World Bank. 2016a. *World Development Report 2016: Digital Dividends.* Washington, DC: World Bank.
World Bank. 2016b. *Growth, Jobs and Integration: Services to the Rescue.* Regular Economic Review, Fall 2016. Washington, DC: World Bank.
World Bank. 2017. *Doing Business in the European Union 2017: Bulgaria, Hungary and Romania.* Doing Business Subnational Series. Washington, DC: World Bank.
World Bank. 2018a. *Thinking CAP: Supporting Agricultural Jobs and Incomes.* Regular Economic Review. Washington, DC: World Bank.
World Bank. 2018b. *World Development Report 2018: Learning to Realize Education's Promise.* Washington, DC: World Bank.

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