# The Productivity-Inclusiveness Nexus




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# *Foreword*

We have reached a pivotal moment for the world economy. Eight years on from the start of the financial crisis, weak trade growth, sluggish investment, weak demand, and a slowdown of economic activity in emerging economies continue to drag on global growth. As policy makers face up to the realities of an ever more complex and inter-connected world, there is a need to look again at how our policy frameworks are configured in order to address multiple challenges. The moment is ripe for new solutions, and the first step has to be putting people's well-being back at the centre of the policy efforts. In the spirit of the OECD's *New Approaches to Economic Challenges* (NAEC) project and the *All on Board for Inclusive Growth* initiative, this is precisely what this report on the ***Productivity-Inclusiveness Nexus*** sets out to achieve.

This report explores two troubling trends that add to the challenging global outlook: the slowdown in productivity growth, and the rise in inequalities of income, wealth, well-being and opportunities.

The slowdown in productivity growth that has been seen in many advanced economies over recent decades has in part resulted from weak global demand in the aftermath of the crisis, a persistent fall in investment in physical capital, and the decline in business dynamism. But there may be other more structural issues at play. The period since the turn of the millennium has seen pronounced divergence in productivity growth rates between 'global frontier' firms - which have continued to register strong productivity gains - and the laggard firms. The report highlights how this divergence between the productivity performance of global frontier firms and others may have resulted from a breakdown of the 'diffusion machine' as the pace at which innovations spread from the frontier throughout the economy slowed. It notes that several structural factors may have played a part in this, with skills mismatch singled out as playing an important role in trapping valuable human resources in un-productive activities dragging on productivity growth and exacerbating inequalities.

But the productivity slowdown is only one part of the story. The report also charts the rise in income inequality seen across several OECD countries that has come to stand at levels unprecedented in the post- war era. Today, the average income of the richest 10% in the OECD is around 9.5 times that of poorest 10%, up from just 7 times 25 years ago. In terms of wealth, the situation is markedly worse, with the top 10% controlling almost half of household assets in 2012. Yet inequalities are not just a question of wealth and income. The OECD's work on Inclusive Growth has highlighted the multidimensional nature of inequalities, demonstrating how low income groups and deprived regions accumulate disadvantages with poorer access to quality education, jobs, health and infrastructure. This perpetuates a vicious circle of exclusion resulting in wasted talent, lower aggregate productivity growth and even greater inequalities. Nowhere is this more acutely felt than in education: in the OECD area adults aged 25-64 with tertiary education have lower unemployment rates than their worse educated counterparts, are more likely to be in the labour force in the first place, earn higher salaries, enjoy good health and even live longer.

The *Productivity-Inclusiveness Nexus* sets out the latest OECD evidence on each of these trends and examines how they may be interlinked. It explores how divergent productivity growth rates may have contributed to rising inequality of incomes between workers, as large increases in the "sorting" of workers across firms has led to the most productive workers increasingly working together and for the most productive firms. It outlines how the increased prevalence of knowledge-based capital and digitalisation may have unleashed winner-take-all dynamics in key network markets leading, in some instances, to an increase in rent seeking behaviour, and that competition frameworks need to be revised in the context of the digital economy. It discusses how the growing weight of finance in the global economy may have compounded rising inequalities and diverted investment away from productive activities. It also emphasises how the rise in inequality over the last three decades has negatively affected human capital accumulation amongst disadvantaged groups.

In this context, we cannot take for granted that technological advances, innovation and entrepreneurship will automatically lead to stronger, more sustainable growth. Nor is there any guarantee that the benefits of higher levels of growth or productivity – if and when they emerge – will be broadly shared across the population.

Making the *Productivity-Inclusiveness Nexus* work for all will require a deeper understanding of the multiple interactions between inequalities and productivity, and how these interactions play out across countries,

regions, firms and between individuals. Ultimately, however, it is policies that will make the difference. This will call upon governments to break down policy silos to focus on the range of win-win policies that can reduce inequalities and support productivity growth simultaneously, thereby creating a virtuous cycle for inclusive and sustainable growth. It will also require efforts to ensure that one goal is not pursued at the expense of the other. Adopting a Nexus framework for promoting more inclusive productivity growth can ensure that policy levers are, ex-ante, coherently aligned to harness self- reinforcing synergies between policy domains whilst providing a clear indication, ex-post, of how compensatory measures can best be enacted when trade-offs occur.

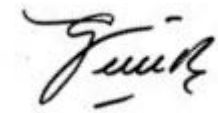
In concrete terms this will first call for a new approach to boost productivity at the individual level so that everyone has the opportunity to realise their full productive potential. Expanding the supply of skills in the population through more equal access to basic quality education is crucial, but not enough. With rapid technological change, skills need to keep up with the demands of the market to avoid the skills mismatches which have contributed to the productivity slowdown. A broad strategy is also needed to ensure a better functioning of the labour market, promote job quality, reduce informality, to allow for the mobility of workers and inclusion of underrepresented groups such as women and youth, and to promote better health outcomes for everyone.

Second, for people to realise their full productivity potential, businesses have to realise theirs. While heterogeneity among firms is a normal phenomenon, the widening dispersion we observe and the implications it has for aggregate productivity and workers is a cause for concern. The larger the share of business that can thrive, the more productive and inclusive our economies will be. Achieving this requires a reassessment of competition, regulatory and financial policies to ensure a level playing field for new firms relative to incumbents, and policies to facilitate the diffusion of frontier innovations from leading to lagging firms. While highly skilled workers are benefitting from further investment in competency building in the work place, there are signs that low-skilled workers in low productivity firms are missing out on skills-building opportunities, getting left even further behind.

Third, policy prescriptions will need to take regional and local circumstances into account. Inequalities that play out in regions, like housing segregation by income or social background, poor public transport and poor infrastructure can lock individuals and firms in low-productivity traps. This means that some policies to promote both productivity and inclusiveness require investments at those levels, particularly in lagging regions.

Fourth, adopting a more holistic approach to policy requires adapting public governance and institutional structure to strengthen the ability of national governments to design policy that promote synergies and deal with trade-offs. Macro-economic policy also has a role to play and monetary and fiscal policies that strengthen aggregate demand, by promoting stronger investment, can increase productivity and household income by boosting job creation and employment. Finally, in highly unequal societies, governments also need to address political economy issues including the capture of the regulatory and political processes by elites that benefit from the status quo, and policies that favour the incumbents.

None of this will be easy, but it is nevertheless essential. Our productivity and inequality challenges are not insurmountable. It is time we took a comprehensive approach to Inclusiveness and Productivity to overcome them. Taking a Nexus approach marks the first step.



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# *Executive Summary*

Eight years on from the start of the economic and financial crisis, the international economic context remains challenging, with growth still modest in advanced economies and continuing to slow in key emerging markets. While this weakness is in part cyclical, reflecting the realities of the post-crisis environment, it also results from a worrying slowdown in productivity growth which predates the crisis. Indeed, some 90% of OECD countries experienced a decline in trend labour productivity growth after the turn of the millennium, and the slowdown has now also spread to emerging market economies, despite their comparatively low productivity levels and continued scope for catch up.

Of equal cause for concern is the fact that this decline in productivity growth has played out against a global backdrop of rising, or persistently high, inequalities of income, wealth and well-being. In 2012, the average income of the top 10% of earners in the OECD area grew to just under 10 times that of the bottom 10%, up from around 7 times in the mid-1980s. In terms of wealth, the situation is considerably starker, with the top 10% controlling half of all total household wealth in 2012 in the 18 OECD countries with comparable data.

Among the myriad challenges facing our economies, few pose greater obstacles to better economic performance than the productivity slowdown and the rise in inequalities. Both have been exacerbated in recent years, as the climate of low investment and high unemployment bequeathed by the crisis has taken its toll, but they also reflect more fundamental challenges with the way our economies function.

In such a context, we can no longer take it for granted that technological advances, and the related innovations in processes and business models, will automatically lead to better economic performance and stronger productivity growth. At the same time, there is no guarantee that the benefits of higher levels of growth, or higher levels of productivity in certain sectors, when they materialise, will be broadly shared across the population as a whole. On the contrary, there is a risk of a vicious cycle setting in, with individuals

with fewer skills and poorer access to opportunities often confined to operate in low productivity, precarious jobs, and - in many emerging-market countries - in the informal economy. This reduces aggregate productivity, widens inequality, and ultimately undermines policy efforts to increase productivity and growth.

This report on the ***Productivity-Inclusiveness Nexus*** gathers the most recent empirical evidence on the main factors behind slowing productivity gains and rising inequality; it suggests possible common foundations and linkages between these two trends; it draws preliminary conclusions on the type of policy packages that are needed and on the implications for policy making, and it also suggests the specific areas where more research may be needed.

The main message of this report is a call for policy makers to adopt a broader, more inclusive, approach to productivity growth that considers how to expand the productive assets of an economy by investing in the skills of its people and providing an environment where all firms have a fair chance to succeed, including in lagging regions. The overriding aim behind this is to broaden the productive base of the economy to generate strong and sustainable future productivity gains that everyone is empowered to contribute to, whilst also ensuring that productivity growth benefits all parts of society, in terms of improved living standards and opportunities. Achieving this will require a comprehensive policy framework to account for the multiple interactions between inequalities and productivity and how these interactions play out across countries, regions, firms and between individuals. Such a framework can help policy makers to put in place *ex-ante* and *ex-post* measures to promote synergies and deal with trade-offs when productivity policies impact on inequality.

The report is organised as follows:

**Chapter One** examines the productivity slowdown and the apparent dispersion between frontier and non-frontier firms:

- The failure to translate rapid technological change into commensurate productivity growth reflects a mix of cyclical and structural factors. One factor reflecting such a mix has been persistently weak investment in physical capital: in most advanced countries, the recovery in non-residential investment is lagging behind that of GDP, particularly so among European countries. Chief amongst structural factors are those that have led to the growing dispersion in productivity performance between leading firms and their non-frontier counterparts within countries and sectors. For instances, the 2000s saw labour productivity at the global technological frontier increase at an average annual rate of 3.5% in the manufacturing sector, compared to just

0.5% for non-frontier firms. The gap was even more pronounced in the services sector.

- There are several, possibly complementary, explanations for the dispersion in productivity growth. Possible contributing factors include: the growing capture of rents by frontier firms; the ability of these firms to attract the limited pool of highly skilled workers with new sets of horizontal skills required to cope with the rapid pace of innovation, and the lingering presence of poorly-performing firms, that have remained in the market rather than closing down, trapping valuable resources in unproductive activities. All of these may have contributed to the slowdown in the pace of diffusion from the productivity frontier to the rest of the economy.

- Structural settings limiting competition, discouraging firm entry and exit, and leading to skills mismatch may have contributed to each of these phenomena. The extent and combined impact of each of them likely varies across different countries and will require further investigations.

**Chapter Two** looks at widening and persistently high inequalities of income, wealth and well-being:

- The growth in income inequality witnessed in the OECD over the last three decades reflects both a surge in income at the top, especially the top 1%, and much slower income growth around the median or stagnation at the bottom.

- A main driver has been an increased dispersion in labour and capital earnings. Beyond the impact of the crisis which hit the incomes of those at the bottom hardest, this underlying dispersion in earnings seems to have been driven by long-term structural adjustment engendered by technological progress and changes in labour market institutions and policies. In particular, new technologies have placed a premium on high-skilled workers - the so-called 'skill-biased technological change' hypothesis. Moreover, they may have led to job polarisation and a hollowing out of the middle class. It is also related to what happens at the top of the income distribution, with wealth inequalities being seven times higher than income inequalities, on average in OECD countries.

- Inequality is not only a matter of income or wealth; there is also great divergence in outcomes across a broad range of well-being dimensions in OECD countries. The better-off everywhere report superior health levels, benefit from greater access to job opportunities, and can expect their children to attain better educational performance and acquire higher levels of skills, including social and emotional skills that put them in better position to interact

with a demanding work environment. In many other areas too, from access to quality public services, to opportunities to succeed in life, important components of well-being tend to be correlated with and compounded by income inequality.

- Furthermore, these inequalities tend to feed off of each other, considerably limiting the ability of part of the population to fulfil their productive potential and improve their lives. This is especially the case in disadvantaged regions and in poor neighbourhoods of large cities. The extent of this divergence in well-being outcomes has important implications for policies aimed at helping people to fulfil their productive potential.

**Chapter Three** explores the potential linkages between productivity and inequality, considering the latest empirical evidence on possible linkages and policies that exacerbate both trends, and whether there are common root causes, whilst also setting out the prospects for future work:

- The effect of inequalities in areas like income, education, training opportunities, health, and access to quality jobs or new technologies, tend to feed off each other and may also reduce aggregate productivity and growth. In other words, the income groups that accumulate disadvantages face economic and social failure. In particular, higher income inequality results in fewer people in the bottom 40% of the population investing in skills, and thereby worsens inequality and reduces productivity growth.

- In many instances, the obstacles standing in the way of broader productivity gains also contribute to wider inequality. There is some evidence that growing productivity dispersion across firms has contributed to widening of the wage distribution over the past two or three decades.

- The growth of the digital economy, in particular, raises new challenges for jobs and skills, with a risk of a persistent digital divide between those that have access to the technology and the related skills and those that do not. At the same time, digitalisation provides new opportunities for more inclusive productivity growth, e.g. by reduce the costs of acquiring skills, facilitating entrepreneurship or gaining access to financial markets.

- Rent capture by frontier firms and the underutilisation of resources may also have slowed the diffusion of innovation and limited productivity gains while entrenching inequalities of income, not least by trapping workers in unproductive activities and low-quality jobs and producing “winner takes all” dynamics in the economy.

- It is also plausible that the growing weight of finance in the global economy in recent decades has compounded rising inequalities and diverted investment away from productive activities, while resulting in a higher concentration of wealth at the top of the income distribution. At the same time, small and medium size enterprises and individuals with low level skills are less likely to have access to finance to support their economic activities.

- Individuals, firms and regions that have been left behind and that have not been able to acquire the assets and tools to become more productive subsequently go on to become a drag on economic growth and, more importantly, to accumulate disadvantages that perpetuate lost potential across generations. Regions that have fallen behind fail to attract investment and economic activity, due to a lack of infrastructure, skills and connectivity, but this ends up creating a spiral of diminishing potential. Here too, there is a vicious cycle at play: a lack of public investment in necessary infrastructure reduces regions' attractiveness to private investors, and therefore harms their capacity to increase tax revenues. This impacts their ability to invest in quality public services such as health, security, education, innovation. An agenda for inclusion and productivity is therefore key.

- The various mechanisms and policy settings that have led to such dynamics will need to be explored further. They likely vary across countries. But it is clear already that policy settings and regulatory frameworks across a broad range of areas, including product, financial and labour market regulations, innovation policies, and skills policies may be producing suboptimal outcomes, both in terms of productivity and inclusiveness.

Finally, **Chapter Four** looks at the implications for policy.

- Better understanding the links between productivity and inclusiveness, their possible correlation or common causality, as well as how different outcomes result from distinct policy and regulatory settings, is key to developing a strong agenda for addressing the nexus. The overarching objective is to identify win-win policies that could deliver both improved inclusiveness and productivity growth.

- Ensuring that all individuals, firms and regions are empowered to both contribute to improved productivity growth and benefit from it in terms of improved living standards and that all firms have an equal shot at thriving and contributing to higher productivity growth is key to addressing the productivity-equality nexus:

- It first means looking at policies aimed at ensuring that all individuals are equipped to, and supported in, fulfilling their productive potential with adequate investment in skills and health and good opportunities for quality jobs. Inequalities in terms of access to education have decreased to a large extent given the expansion both at the school and University levels. However, differences in quality have greater implications today than ever before given the increased demand for highly skilled people that knowledge based societies and the pace of technological change have created. Policies at the individual level should also include an adequate social safety net and labour market activation policies. Focussing on the bottom 40% who have fewer such opportunities is particularly important and will require reducing the barriers they face in accessing life-long learning, digital technologies, innovation, finance, and entrepreneurship.

- Such policies can work in unison with measures aimed at firms to support innovation and experimentation at the frontier and its diffusion throughout the economy, in areas related to: skills, labour, competition, product market regulation, financial regulation, innovation and regulations related to the corporate sector.

- The regional and urban levels are key. While many productivity-promoting policy interventions are "spatially blind", others have an important place-based dimension. For instance, local conditions are crucial to the effectiveness of policy efforts to improve information about labour-market conditions and ensure more effective training or subsidies to employers. For similar reasons, economy-wide policies aimed at increasing skill levels must often undergo local adaptation to be effective. In addition, regional and urban policies can do much to reduce or remove the barriers to opportunity faced by disadvantaged groups that are related to housing and transport. Finally, regional development policies also promote innovation diffusion to lagging regions.

- The details of policy packages that deliver stronger and broader based productivity growth and reduce inequality will depend on each country's specific circumstances, governance and institutional settings. This means recalibrating traditional 'silo' policies to address these challenges. Indeed, in all countries, designing and implementing these policy packages require a renewed approach to policy making where different government departments, agencies and ministries work together to deliver joined-up solutions and where the regional and spatial dimensions of policies are taken into account. Mechanisms to strengthen public governance, including a whole-of-government approach, and reinforce public institutions and avoid rent seeking and corruption are especially important.

Given the global nature of these challenges, deepening international collaboration and co-ordination will be required in a number of areas, including tax and innovation policies.

# *Chapter 1*

# *The Productivity Paradox*

Why has aggregate productivity growth slowed across OECD countries and emerging economies over recent years? What was the relative importance of structural and cyclical factors in driving this trend? This chapter sets out to answer these questions by examining the evolution of the great productivity slowdown that has taken place in OECD countries since the turn of the millennium, and subsequently spread to prominent emerging markets. It highlights the paradox of slowing aggregate productivity at a time of fast technological change before going on to consider possible causes of this phenomenon. In particular, it looks in greater depth at the role played by the divergence in productivity performance between global frontier firms and poorer-performing non-frontier firms, and at the pronounced discrepancies between the productivity growth rates of different regions. The chapter suggests that structural policy settings limiting competition may have been an important contributor to the trends described.

Recent decades have seen a persistent and worrying slowdown in productivity growth. Productivity gains, which are a central driver of long-term improvements in living standards, have slowed in many advanced economies over recent decades. More recently, this slowdown has extended to emerging economies. This *slower* productivity growth is fuelling concerns of persistently low global growth with population ageing in several economies leaving productivity and investment as the main potential sources of income growth in the decades to come. The on-going debate on the future of productivity often pits a pessimistic view against a more optimistic view.

The pessimistic view holds that the recent slowdown is a permanent phenomenon. According to this perspective, the types of innovations that took place in the first half of the 20th century (e.g. electrification etc.) are far more significant than anything that has taken place since then (e.g. ICT), or indeed, likely to transpire in the future (Gordon, 2012; Cowen, 2011). These arguments are bolstered by evidence of the slowdown in business dynamism observed in frontier economies such as the United States. Gordon (2012) also argues that there are a number of strong headwinds on the horizon that will cause productivity growth in the US to slow further, including ageing populations, a deterioration of education, growing inequality, globalisation, sustainability, and the overhang of consumer and government debt.

Conversely, technological optimists argue that the underlying rate of technological progress has not slowed and that the IT revolution will continue to dramatically transform frontier economies. According to Brynjolfsson and McAfee (2011), the increasing digitalisation of economic activities has unleashed four main innovative trends: i) improved real-time measurement of business activities; ii) faster and cheaper business experimentation; iii) more widespread and easier sharing of ideas; and iv) the ability to replicate innovations with greater speed and fidelity (scaling-up). While each of these trends is important in isolation, their impacts are amplified when applied in unison.

Drawing on recent OECD analysis of productivity trends this chapter shows that:

- The slowdown in productivity growth reflects a mix of cyclical and structural factors, which have – thus far – prevented rapid technological change from propelling aggregate productivity growth as it has done in the past. One factor has been persistently weak investment in physical capital (machines and equipment, physical infrastructure). In most advanced countries, the recovery in non-residential investment is lagging behind that of GDP, and this is particularly the case among European countries (OECD, 2016).

- Behind the slowdown in aggregate productivity growth, there has been a growing dispersion of productivity performance within countries between firms and regions, with some of them enjoying fast productivity gains enabled by rapid technological progress, and others lagging behind. In other words, while the productivity frontier keeps advancing, these gains have not diffused throughout the rest of the economy.

- Boosting productivity growth will require policy actions to address the obstacles to knowledge and technology diffusion, while continuing to support technological progress and innovation at the frontier.

This chapter is organised as follows. It first reviews the aggregate productivity trends in advanced and emerging economies and highlights the paradox of slowing aggregate productivity at a time of fast technological change (Section 1). It then reviews the role played by the divergence in productivity performance between firms (Section 2) and between regions (Section 3).

## 1.1 Trends in aggregate labour productivity

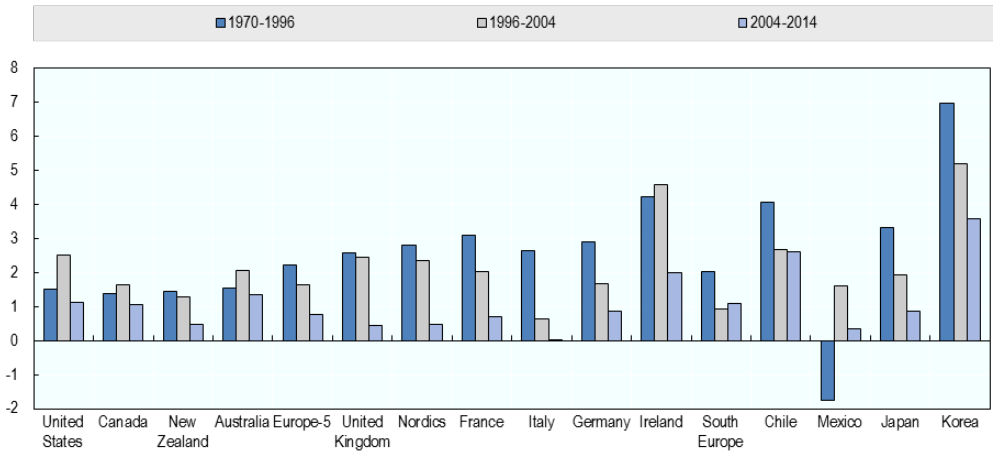
Productivity is about "working smarter", rather than "working harder". It reflects firms' ability to produce more output by better combining inputs, a process that is made possible by new ideas, technological innovations, as well as process and organisational innovations, such as new business models. Labour productivity is defined here as GDP per hour worked, which can be decomposed into the contributions of capital deepening (i.e. higher capital per unit of labour) and a residual, total factor productivity (TFP).

### *1.1.1 Productivity gains have been decelerating over recent decades in most advanced economies.*

Until the mid-1990s aggregate labour productivity growth in advanced economies was driven by convergence towards the productivity frontier. Those economies whose productivity levels started furthest behind the US saw relatively faster productivity growth (Figure 1.1). While for some economies, this phenomenon partly reflected the rebuilding of war-ravaged capital stocks, it was also the result of technology and knowledge spill-overs from the global productivity frontier, which facilitated the adoption of more advanced technologies and better practices (Aghion and Howitt, 2006).

**Figure 1.1. Labour productivity performance in advanced economies had been converging with that of the US until the mid-1990s.**

GDP per hour worked; annual average growth

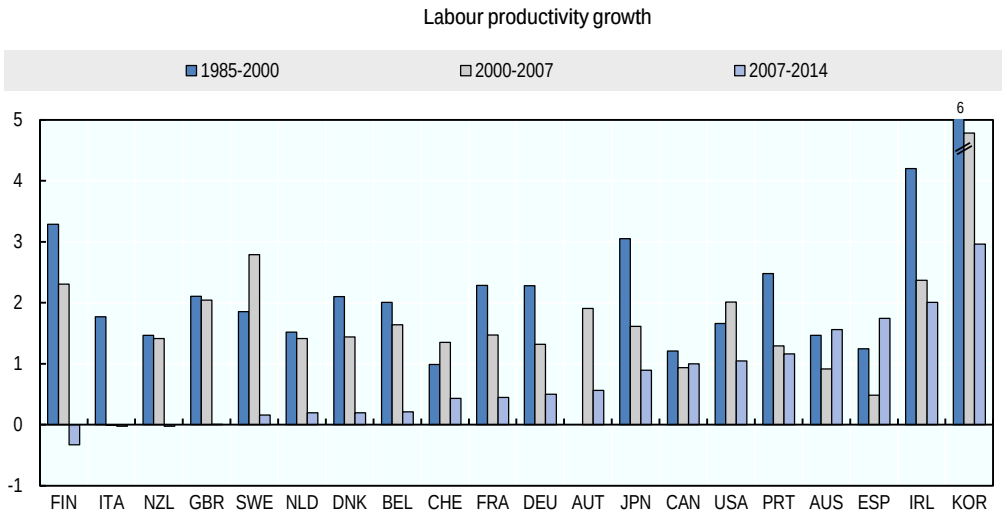



Notes: Europe-5 includes Austria, Belgium, Luxembourg, the Netherlands and Switzerland; Nordics includes: Denmark, Finland, Iceland, Norway and Sweden; Southern Europe includes Greece, Portugal and Spain. For 1970-96, Europe-5 excludes Austria.

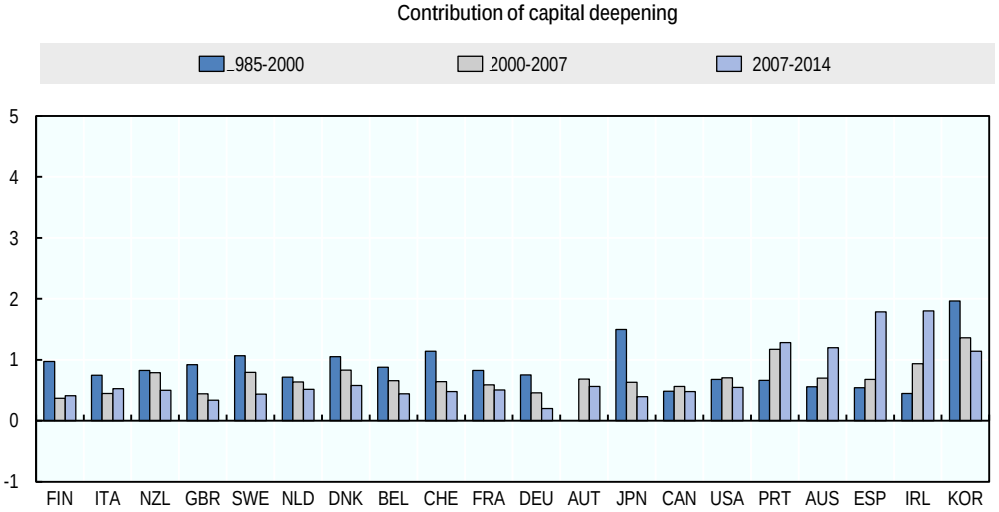
Source: OECD Productivity database, January 2016.

Yet the convergence process faded in the mid-1990s, and aggregate labour productivity growth slowed in many OECD countries. While properly measuring productivity and assessing its trends has always been a challenge – and is even more so today, due to the changing nature of many economic activities (**Box 1.1**) - there are clear signs of a slowdown. From the mid-1990s, many countries, particularly in Europe, did not keep pace with the acceleration of productivity growth associated with rapid diffusion in ICT in the United States, and gaps in productivity levels between the US and other advanced economies started to widen again. However, from 2004 the benefits from the ICT revolution on labour productivity began to wane in the US too. Many OECD countries experienced a slowdown in labour productivity growth between 2000 and 2007 (see **Figure 1.2, Panel A**). This slowdown mainly reflected slowing total-factor productivity (TFP) growth (**Figure 1.2, Panel C**).

**Figure 1.2. From the early 2000s labour productivity growth was hit by a weakened contribution from TFP and by a fall in the contribution from capital deepening**

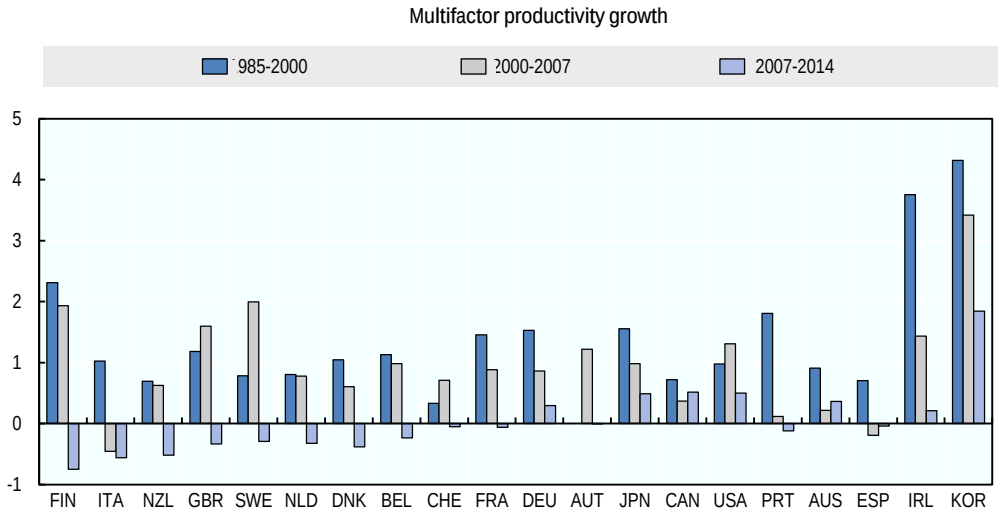



Notes: Data for 1985-2000 for Switzerland correspond to 1992-2000; Data for 2007-2014 for Australia,




Ireland, Japan, Portugal, Spain and Switzerland correspond to 2007-2013.

Source: OECD Productivity Database, March 2016.




Since the crisis, a further slowdown in labour productivity growth in the OECD was driven by a decline in the contribution of capital per worker. In the aftermath of the great recession that followed the 2007-08 global financial crisis, labour productivity has been curbed by a stark weakness in capital deepening (Figure 1.2, Panel B). The recovery in investment since 2009 has been sluggish compared with previous cycles (OECD 2015a). In 2014, for 40% of OECD countries, the estimated contribution of capital per worker to trend labour productivity growth was less than ¼ per cent per annum, while this was true for only two OECD countries in 2000 and 2007. Moreover, the under-investment in assets with high spill-over effects, such as physical and digital infrastructure and network sectors, has been particularly damaging for productivity performance. This post-crisis weakness in investment reflects both structural and cyclical factors, including weak aggregate demand, which affected capital accumulation through the typical accelerator mechanism. Weak product market competition, impaired financial systems, and elevated levels of uncertainty also played a role. Consequently, more balanced and robust global demand, improved market conditions, and reduced uncertainty are key to propelling investment to a higher growth rate. Another possible explanation for the decline in the contribution of capital per worker to trend labour productivity growth is growing business investment in knowledge-based capital, which was more resilient than tangible capital during and following the crisis, but which cannot contribute much to productivity performance in a context of weak demand.

### Box 1.1. The challenge of accurately measuring productivity

There are a number of difficulties in accurately measuring productivity, calling for a careful interpretation of available measures and international comparisons. These difficulties concern both the measurement of the factors of production, labour and capital, and the measurement of output. They have been exacerbated by ongoing changes in the labour market, rapid technological change and digitalisation.

**Labour**

The volume of labour input should reflect the time, effort and skills (quality) of the workforce employed in the production process. This volume should in theory be measured as the total number of hours effectively worked. This requires going beyond simple head-counts of employed people, to adjust for differences in the relative shares of part and full-time employment --which have changed substantially in recent years-- and changes in hours worked, accounting for example for vacation time, holidays or paternal leave. The effective quantity of labour also depends on the characteristics (notably skills) of those performing the work, which are difficult to measure. Existing measures of labour characteristics usually rely on the identification of workers' industry of employment, occupation, educational attainment, age, etc., weighting these characteristics with the average labour compensation shares attributable to each type of workers.[a] Some countries also face issues with the measurement of the hours of foreign workers. Another recurring challenge is measuring productivity at the sub-national level. For instance, price indices are typically only available for the entire economy and regional GDP is sometimes difficult to delineate. More subtle questions regarding labour measurement include the treatment of the (often increasing) commuting time to work (i.e. whether this time should be counted as labour input) and of the time workers with zero hour contracts may be spending on stand-by.

**Capital**

Comprehensive productivity estimates require **exhaustive coverage of capital assets** (including the capital services provided by natural, non-produced assets). Broad coverage, however, remains elusive. This is partly by design, as the System of National Accounts (SNA) only recognises as capital certain categories of assets. In particular, standard measures of multifactor productivity growth often ignore the contribution of the depletion or use of **natural resources**, such as subsoil mineral assets (e.g. oil, gas, copper, lead), land and soils, freshwater, wild fisheries and natural forests, while the income generated by these assets is captured in GDP. Increased productivity can therefore sometimes reflect higher natural resource use.

While the SNA recognises a number of **intellectual property assets** (research and development expenditures, software and databases, mineral exploration costs, and artistic and literary originals) as capital, other knowledge-based items such as organisational capital, brand equity, training, or design are not included in the SNA, mostly because of the practical difficulties involved in measuring them in a comparable and meaningful way across countries. New international measurement guidance (for instance OECD, 2010) has greatly improved international comparability, but scope for further improvement remains, noticeably in measuring price changes[b] (capturing changes in quality is a challenge because of the often unique nature of the assets, as well as the difficulty is determining depreciation rates for different categories of assets). Another challenge is measuring productivity for **multinational**

**enterprises** (MNEs), as the benefits from their assets — especially organisational capital, design, brand — can accrue to any or all of the affiliates, while the methods used to estimate their value typically allocate it to the country where the asset creation occurred (such as R&D departments in headquarters); from a standpoint of measuring productivity, capital services should be measured where they enter the production process. The potential disconnect between capital on one side and recorded output and value-added on the other carries even greater weight in the light of tax optimisation by MNEs as profits are shifted between jurisdictions without any recorded transfer or shifting of the assets, such as brands, R&D etc., generating that production.

**Output**

Any mis-measurement of output has direct consequences on measures of productivity. This is particularly true in the area of services where good price indices that can capture qualitative changes are often elusive.[c] The lack of information on market prices and the difficulties of measuring the volume of **health, education and public administration services** constitute another important challenge for productivity measurement. In some countries, the volume of these services is estimated on the basis of inputs, meaning that output and input volumes are not independent and implying zero productivity growth. While progress has been made in the development of output-based measures for health and education services (Schreyer, 2010), implementing the same approach for other activities of the general administration (e.g. security) remains a challenge for conceptual and empirical reasons.

More generally measuring how the public sector contributes to overall productivity is particularly complex. On the one hand, the National Accounts do not capture the full range of inputs and outputs necessary to measure appropriately the efficiency of government operations. On the other, it is difficult to assess empirically the direct and indirect effects of government interventions on broader outcomes, such as the education and health status of the population, which are the ultimate objectives of policy.

Moreover, output measures could be enhanced by correcting GDP for undesirable output (i.e. emissions) (see Brandt, Schreyer and Zipperer, 2014). While the costs of investment in pollution abatement are fully captured in traditional measures of productivity growth (in terms of factor inputs including labour and produced capital), the benefits of such investments are not taken into account, as pollution is not considered an output of the production process. In a number of cases, **accounting for environment-related outputs** can lead to an *upward* adjustment of measured productivity when undesirable outputs grow less quickly (or decline faster) than desirable outputs.

**Some implications of digitalisation and the collaborative or 'sharing' economy**

One area of considerable debate in recent years has been the **digital revolution and the collaborative or 'sharing' economy along with new business models**, with new players such as AirBnB and Uber. It has been argued that these business models, enabled through digital platforms ('business to consumer', B2C; and peer to peer (P2P)) call into question traditional productivity measures by ignoring production and transactions among households. However, apart from cases where new P2P models create opportunities for tax evasion (and so under-declaration of output and employment), it is unlikely that these new models necessarily cause new significant systemic measurement problems. P2P transactions, some of which resemble

bartering transactions (e.g. house swapping), may have a disruptive impact on economic activity (e.g. on the hotel sector), with a potential impact on the output recorded in the national accounts as the P2P activity is not picked up; but this effect is tempered by the fact that the accounts already include an estimate of output for dwelling services where owners occupy their own dwellings. Moreover, for productivity estimates, any lack of recorded output may be further tempered by the likelihood that under-declarations of recorded income may also be matched by under-declarations of recorded labour input.

Where new forms of activity do raise philosophical questions is with the accounting framework itself. Business models like Cashierless tills are dependent on greater participation (labour input) on the part of the consumer, but the consumer's activity here remains outside of the GDP production boundary. This implies at least a partial shifting of a service activity to the final consumer, in many cases for the ultimate benefit of the same consumer. These changes increase measured productivity in the business sector but do not necessarily constitute welfare-enhancing innovations from a societal perspective, although consumers may benefit from greater choice. The digitalisation of the economy has brought with it the provision of free services such as internet search capacity or contents available for free. Some authors[d] have argued that this increases consumer welfare so that GDP, where such welfare gains are not reflected, may have to be adjusted accordingly. However, GDP is not designed as a measure of consumer welfare, but as a measure of production and, rather than changing its nature, the emergence of free products calls for complementing GDP with appropriate measures of welfare and well-being.

[a] See Jorgenson et al 1987, BLS 1993, Schwerdt et al 2007, O'Mahony et al 2009 as well recent measures of labour quality by Australia, Canada, New Zealand, United Kingdom, United States.

[b] See for example 'Changes to National Accounts for Blue Book 2015: the deflation of investment in software' UK Office for National Statistics.

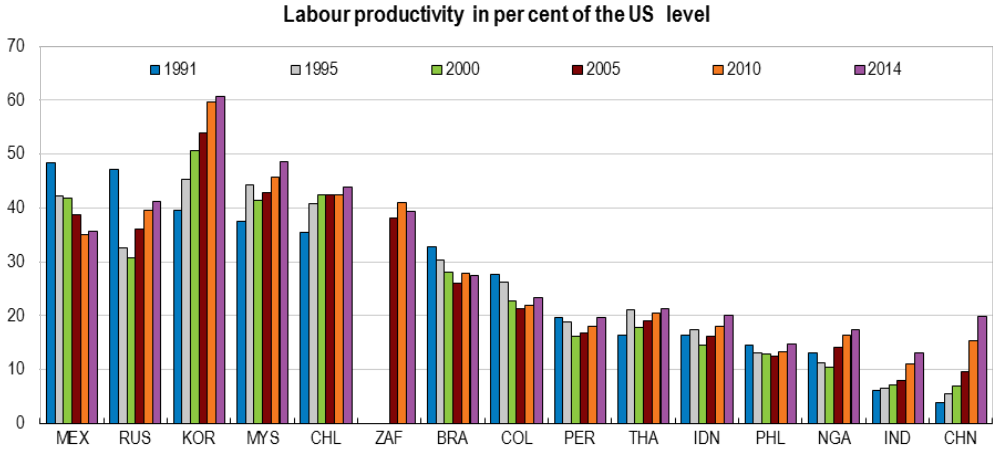
[c] Significant efforts are however being made to improve this situation, for instance Eurostat and OECD (2014).

[d] Brynjolfsson and McAfee (2014); *The Second Machine Age*, New York

### *1.1.2 Emerging and developing countries have not caught up with their OECD counterparts fast enough and are now also experiencing a slowdown in productivity.*

Despite some catch-up, labour productivity levels in emerging and developing countries continue to be well below those in advanced countries. There has been some convergence in the level of labour productivity in emerging and developing economies. However this convergence has often been slower than expected and the gap with advanced economies remains large due to the comparatively very low starting points. For instance, labour productivity in China, India, and Indonesia has at least doubled between 1990 and 2015. However, labour productivity levels in China and Indonesia remained five times lower than in the United States in 2014, while in India they remained eight times lower (Figure 1.3).

**Figure 1.3. In many emerging economies, the productivity catch-up vis-à-vis the United States has been limited over the past 25 years**

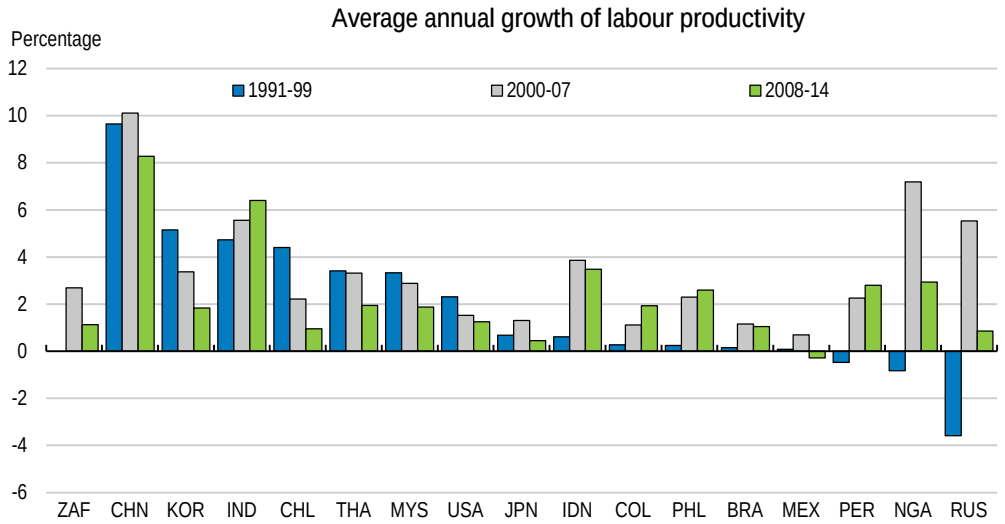



*Notes:* Labour productivity levels is defined as GDP per person employed, based on 2010 PPPs.

Source: OECD calculations based on World Bank and ILO KILM data

Moreover since the crisis, emerging countries have experienced a slowdown in total factor productivity. Recent data shows that many developing economies have recently experienced slower labour productivity growth when compared to the 2000s. In contrast with advanced economies, the slowdown largely reflects slower TFP rather than weaker capital deepening (e.g. China, Malaysia, and Thailand). In some emerging and developing countries, productivity growth has even turned negative (e.g. Mexico, Chile, Viet Nam and Peru). In these countries too this slowdown reflects both cyclical factors, including the end of the commodity boom, and structural factors (**Figure 1.4**).

**Figure 1.4. Labour productivity growth has slowed in many emerging market economies since the crisis**




Source: OECD calculations based on World Bank and ILO KILM data.

### *1.1.3 The full effects of rapid technological change have yet to filter into labour productivity growth.*

There is a paradoxical element to the aggregate labour productivity growth slowdown. This slowdown has been taking place against a background of ongoing technological change. Historically, periods of rapid technological change have often provided fresh impetus to productivity growth - albeit with several years, even decades, of delay - e.g. the steam engine and electrification or, more recently, the digital technologies that affected productivity growth in a range on ICT-using industries in the 1990s.

This suggests that the full effects of rapid technological progress may not yet be visible in aggregate productivity measures. From the late 1950s, when "information technology" was first established as a proper category in the US national accounts, to the mid-2000s, relentless progress in micro-chips, processing power and software algorithms has allowed for computer power to double no less than 32 times (i.e. a doubling every 18 months or so, "Moore's Law"). This has contributed to a very rapid fall in the price of computer technologies, making them cheap and increasingly applicable throughout all sectors of the economy. The resulting digitalisation of the economy has not only led to the development of new goods and

services but also unleashed several new innovative trends.. Yet, despite all these effects, labour productivity growth has slowed down. This implies that either these favourable effects have not yet fully materialised and are therefore likely still to come, or that they are being off-set by countervailing forces elsewhere. So, there may be another story - that the aggregate productivity measures mask important divergences between frontier innovators and other firms.

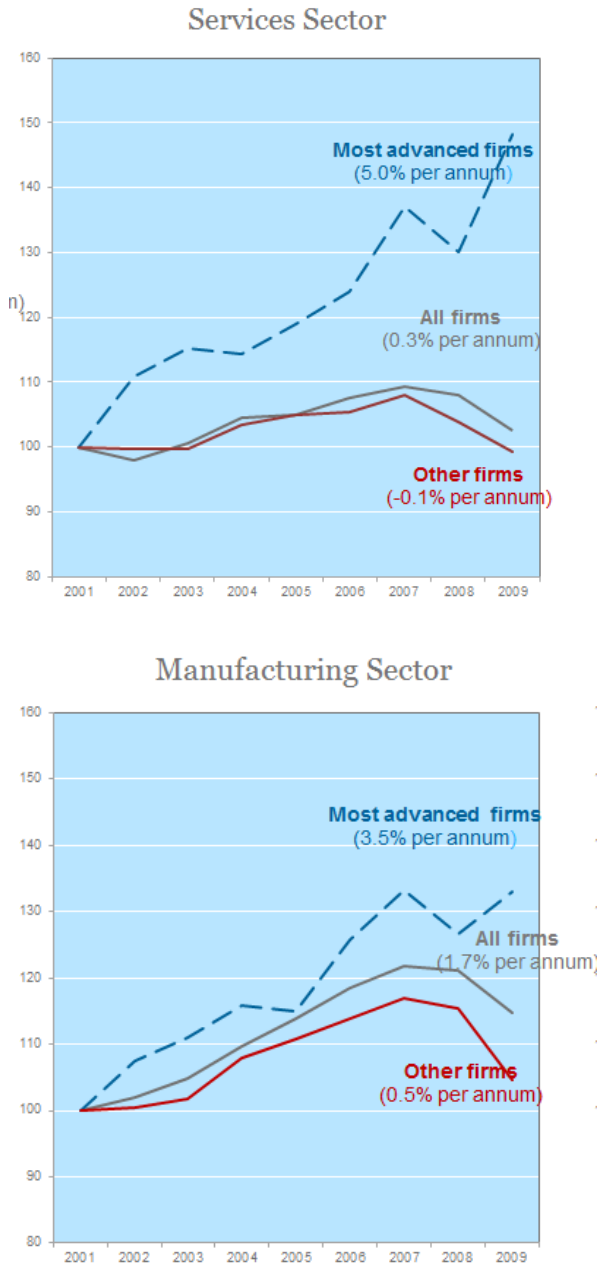
## 1.2 A breakdown of the diffusion machine

### *1.2.1 Increased between-firm divergence in productivity performance is a factor behind the paradox of slow aggregate labour productivity growth occurring concurrently with fast technological improvement.*

Behind the aggregate slowdown of productivity performance since the early 2000s, there has been a marked divergence between the productivity performance of global frontier firms and others. Productivity growth of the global frontier firms - a category comprised of firms from different countries, reflecting varying patterns of comparative advantage and natural endowments (Andrews, Criscuolo and Gal, 2015) - remained robust, at an average annual rate of 3.5% in the manufacturing sector over 2000s, while it slowed sharply in non-frontier firms, which registered only 0.5% productivity growth over the same period (**Figure 1.5**).[1] This gap in productivity performance was even more pronounced in market services, where the labour productivity of frontier firms grew at an annual rate of 5%, but remained flat for other firms.

[1] Figure 1.5 is based on firm-level data available only from the late 1990s. While it is possible that the divergence started earlier than shown on the figure, it cannot be verified from these data.

**Figure 1.5. Marked between-firm divergence has been observed from the early 2000s**




Labour productivity; index 2001=100

Notes: "Frontier firms" corresponds to the 100 globally most productive firms in each 2-digit sector. "Non-frontier firms" is the average of all other firms. "All firms" is the sector total. The average annual growth rate of average labour productivity (value added per worker) is shown in parentheses. The broad patterns depicted in this figure are robust to: *i*) using different measures of productivity (e.g. TFP based on the Solow residual from a value added production function containing tangible capital and employment, using uniform factor shares across countries and over time for comparability); *ii*) following a fixed group of frontier firms over time; and *iii*) excluding firms that are part of a multi-national group (i.e. headquarters or subsidiaries) where profit shifting activity may be relevant.

Source: Andrews, Criscuolo and Gal (2015).

Emerging evidence from official micro data – that covers a longer period for some countries – also points to a divergence in productivity growth across different firms in the productivity distribution within countries (Figure 1.6). This data – currently available for twelve OECD countries – shows that in recent years the productivity gap between the "national frontier"[2] and the worst performing firms[3] has increased in the manufacturing sectors of a number of countries such as Austria, Belgium, Canada, Denmark, Japan, Norway and Sweden. In most countries, the gap increased significantly at the beginning of the 2000s, and in some it further increased during the crisis. Aside from the case of Finland and Italy, there has not been a consistent catch-up by the worst performing firms with the national frontier throughout the period. In some countries, the worst performing firms have caught up with the "median firm" (i.e. in the manufacturing sector in Canada), while in others the catch up was interrupted by the financial crisis (e.g. Chile and France). For the services sector, the results are broadly similar, although for several countries such as Canada, Chile, France, Italy, Japan and Sweden, the divergence has grown larger in services than in manufacturing.

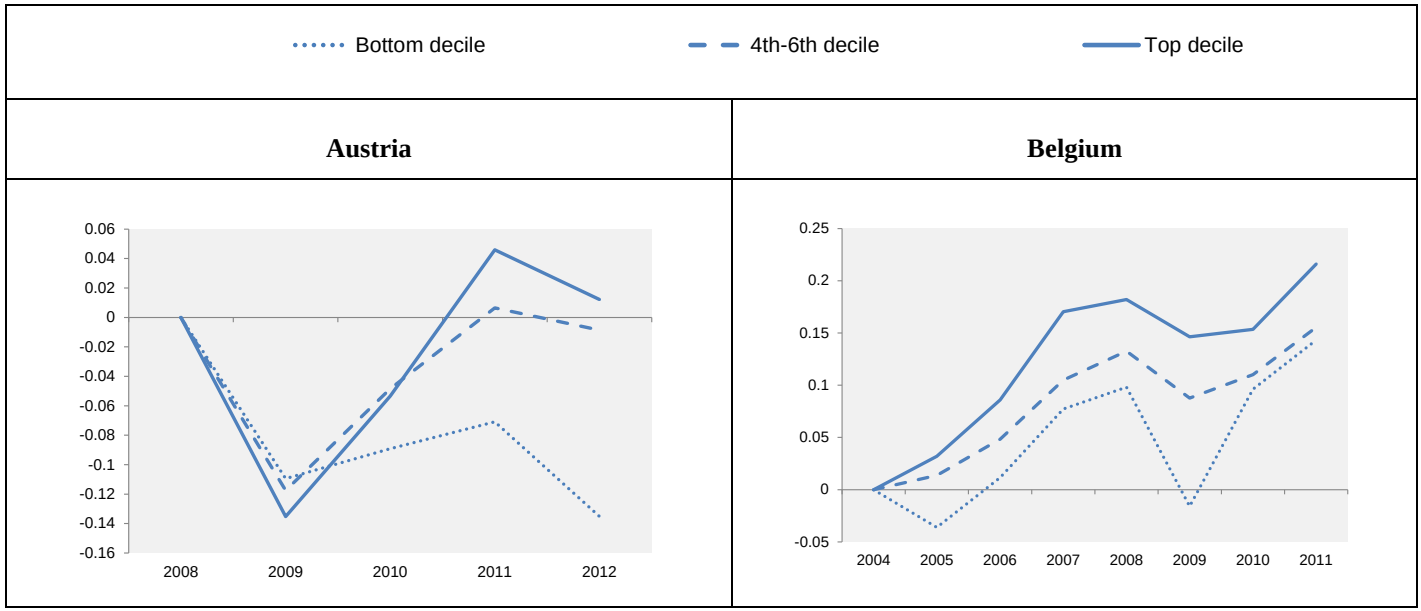
Despite the prevalence of similar trends, it is important to note that the sources of the productivity divergence differ across countries. In Canada, the divergence is mainly driven by the take-off of the productivity frontier at the beginning of the 2000s. In contrast, in manufacturing and services in Denmark, and in Swedish services divergence is not so much a question of productivity at the frontier "taking off", but rather of laggard firms decoupling from the rest of the distribution. In most cases divergence comes from a combination of the two: take-off at the top and the worsening of performance at the bottom. This was the case for manufacturing in Japan, Norway and Sweden and for services in France and Japan.

2 i.e. the best performing firms in the country defined as the top 10% in terms of labour productivity.

3 i.e. the bottom 10%.

**Figure 1.6. Increasing divergence in Labour Productivity Performance in many OECD countries**

A. Manufacturing



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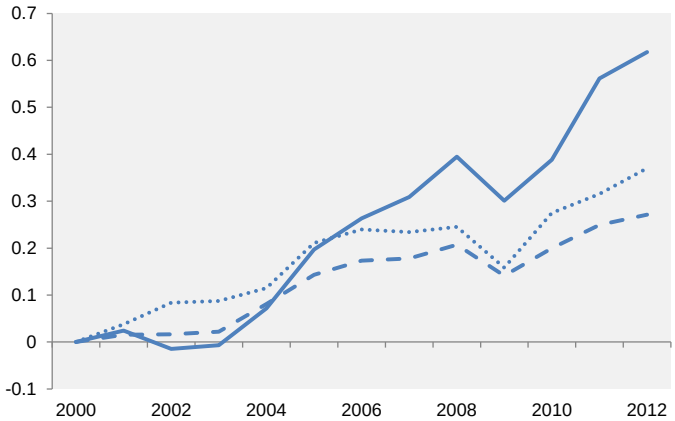
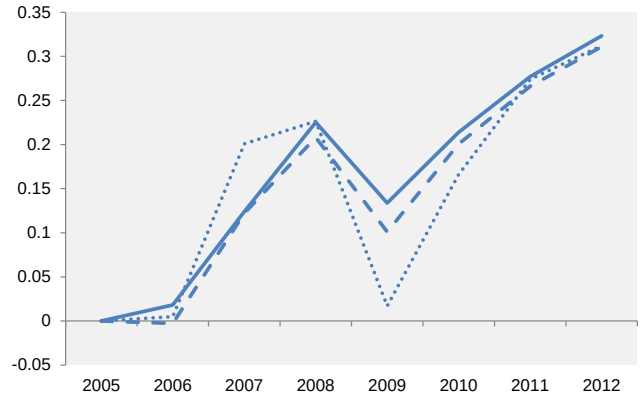
|  |  |

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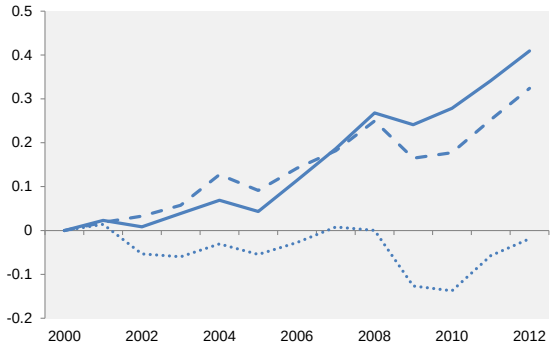
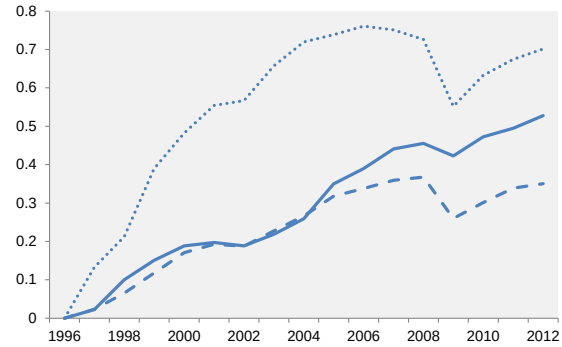
|  |  |

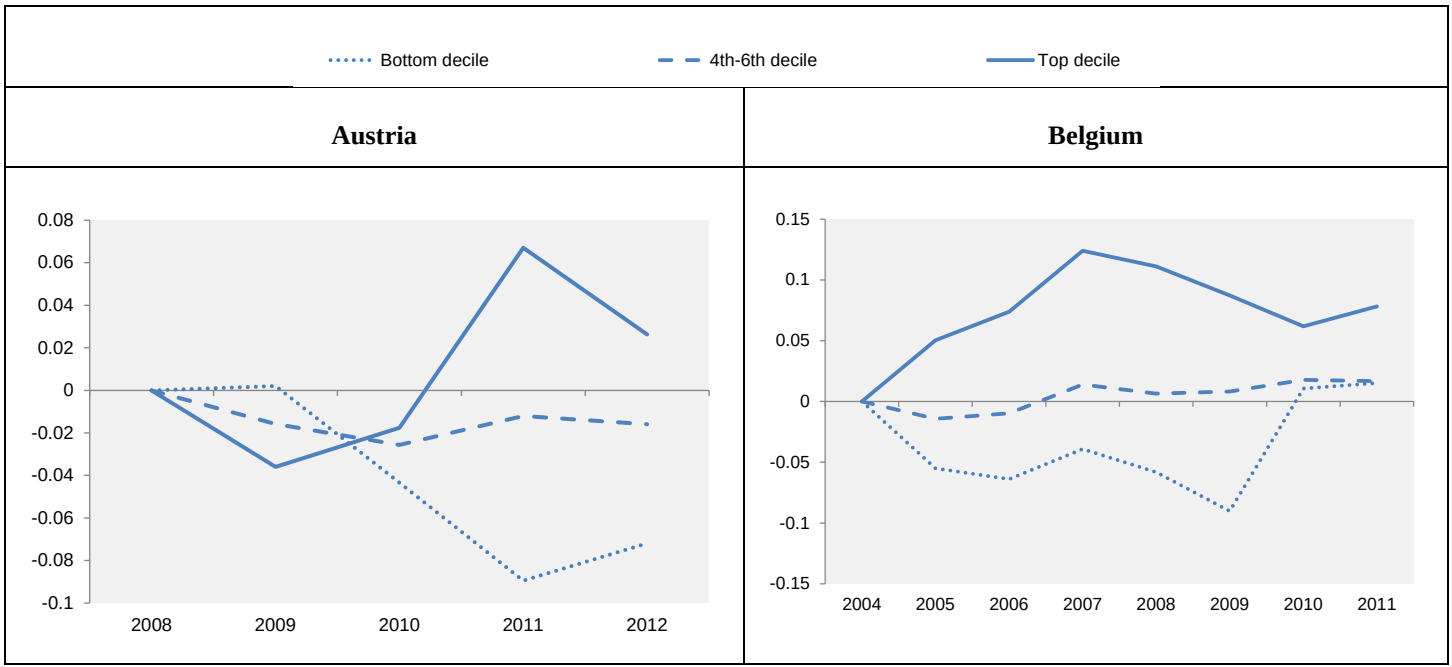


Notes: The graph reports the unweighted average of real labour productivity (defined as real value added per employee) expressed in 2005 US dollars for firms in the bottom decile, between the 4th and 6th deciles, and in the top decile of the labour productivity distribution in any given year. The values are normalised at their initial values in 1996 for Finland, France, Japan and Norway, 1998 for Hungary, 2000 for Canada and Denmark, 2001 for Italy, 2002 for Sweden, 2004 for Belgium, 2005 for Chile and 2008 for Austria. Data for Japan only includes firms above 50 employees.

Source: Data from the OECD Multiprod project, preliminary results, April 2016, see: http://www.oecd.org/sti/ind/multiprod.htm and Berlingieri, Blanchenay and Criscuolo (2016) for more details.

Disclaimer: estimates are based on micro-aggregated data and might differ from official national statistics.

B. Non-Financial Services



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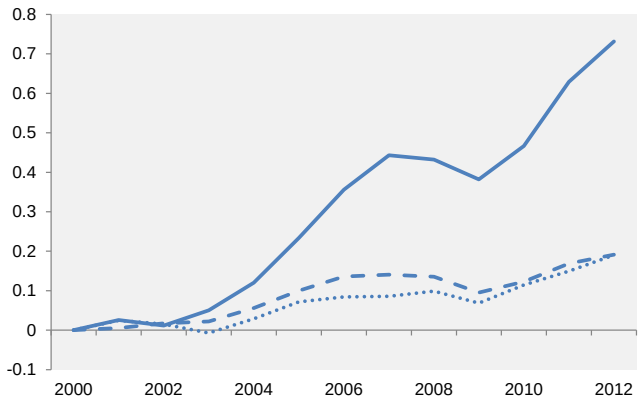
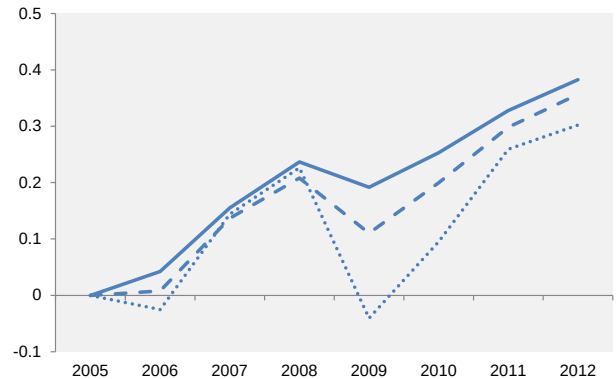
|  |  |

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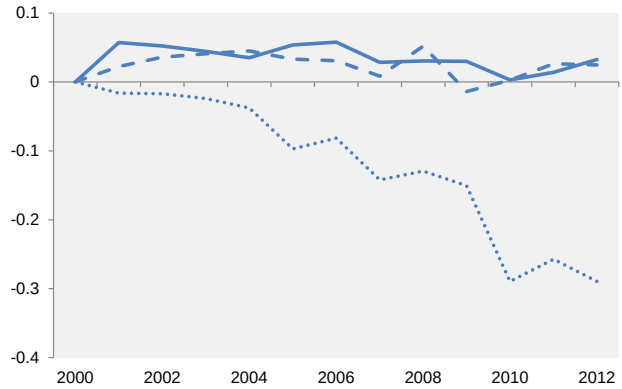
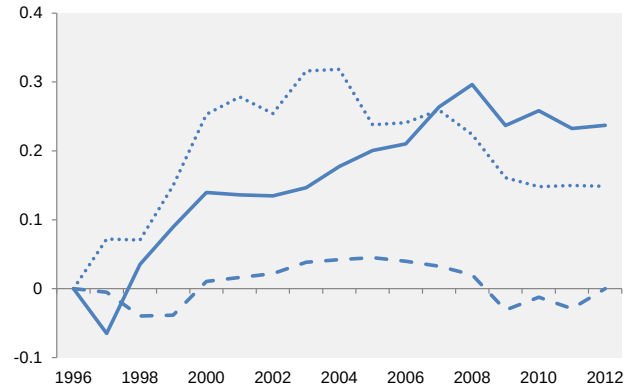
|  |  |

| France | Hungary |
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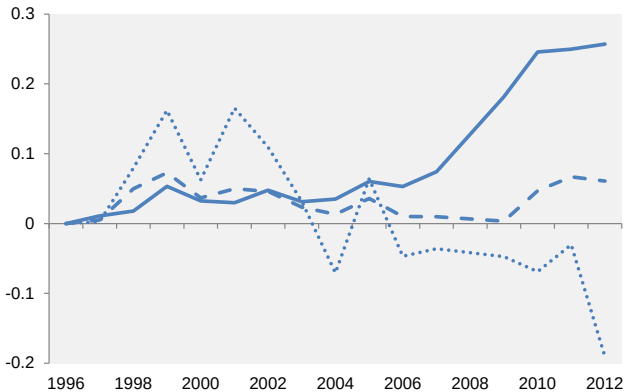
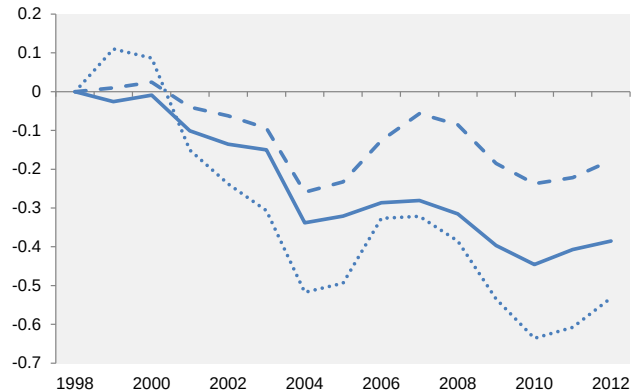
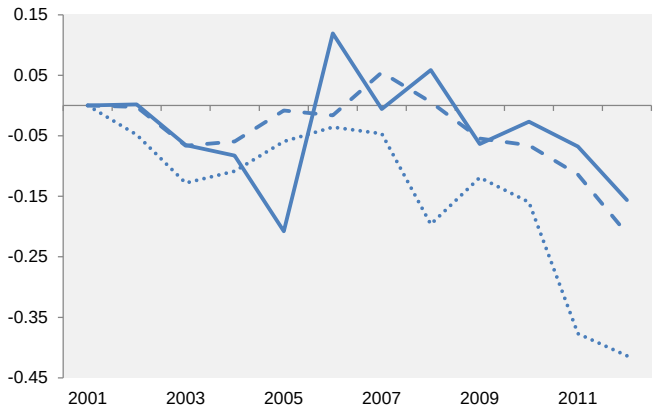
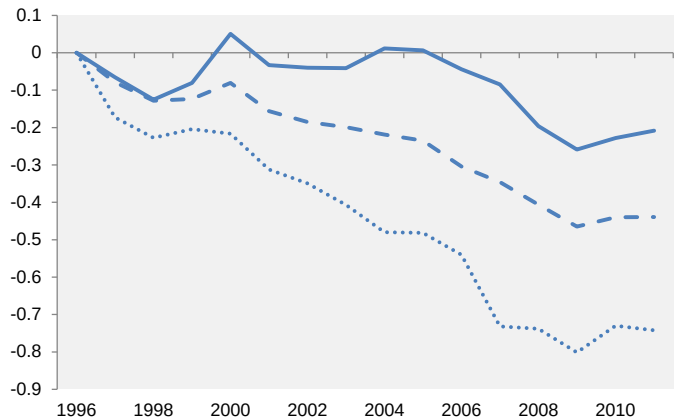
|  |  |

| Italy | Japan |
| --- | --- |
|  |  |

| Norway | Sweden |
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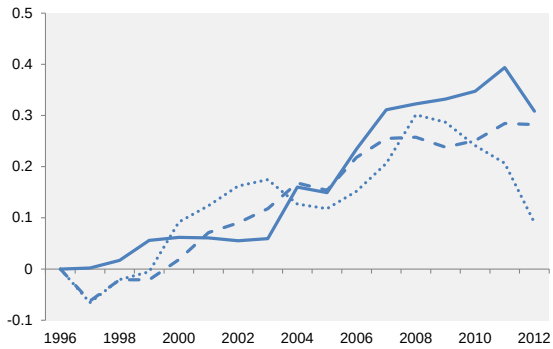
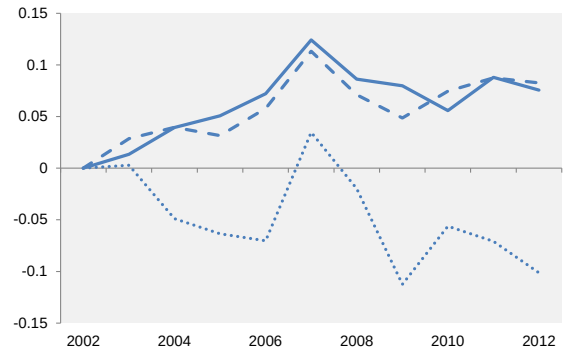
|  |  |



Notes: The graph reports the unweighted average of real labour productivity (defined as real value added per employee) expressed in 2005 US dollars for firms in the bottom decile, between the 4th and 6th deciles, and in the top decile of the labour productivity distribution in any given year. The values are normalised at their initial values in 1996 for Finland, France, Japan and Norway, 1998 for Hungary, 2000 for Canada and Denmark, 2001 for Italy, 2002 for Sweden, 2004 for Belgium, 2005 for Chile and 2008 for Austria. Data for Japan only includes firms above 50 employees.

Source: Data from the OECD Multiprod project, preliminary results, April 2016, see: http://www.oecd.org/sti/ind/multiprod.htm and Berlingieri, Blanchenay and Criscuolo (2016) for more details.

Disclaimer: estimates are based on micro-aggregated data and might differ from official national statistics.

### *1.2.2 There are several interpretations to the increased between-firm divergence.*

There are several ways to interpret this growing dispersion in productivity growth, with one plausible explanation stressing the possible breakdown of the diffusion machine. One possible explanation suggests that the main source of the productivity slowdown is not the slowing of the rate of innovation by the most globally advanced firms, but rather a slowing of the pace at which innovations spread throughout the economy: a breakdown of the diffusion machine (Andrews, Criscuolo and Gal, 2015).[4]

Both the rate of innovation and productivity gains at the frontier seem to have remained strong. Firms on the global productivity frontier are typically larger, more profitable and more likely to apply for patents than other firms. Moreover, they are on average younger than other firms. They are also typically "global firms" in the sense that they operate in different countries (often as part of a MNE group), and are interconnected with suppliers/customers from different countries along global value chains (GVCs). This makes them better placed than other firms to enhance productivity, using their capacity to innovate, which increasingly requires not only investment in R&D and advanced technologies, but also a combination of technological, organisational and human capital in production processes throughout global value chains (GVCs). Global frontier firms may also be in a better position to harness the power of digitalisation to rapidly diffuse and replicate cutting-edge ideas, technologies and business models.

Corporate strategies also play an important role in achieving high productivity gains. Recent analysis of financial data for 11,000 large global companies shows that two groups of high level productivity firms can be identified: incumbent firms, with high but slowing productivity growth; and fast growing, high-productivity firms. Three aspects of the corporate strategies of the fast growing productivity firms appear to play a major role: i) an increase in R&D spending; ii) a preference for equity financing, while declining companies favoured debt financing;[5] and iii) previous high M&A activity.

4 Andrews, Criscuolo and Gal (2015) show that these trends are robust for a range of measurement issues.

5 Weaker firms might borrow excessively to compete with more successful firms to carry out mergers and acquisitions (M&As), to remunerate shareholders or to garner takeover defences, which in turn undermines their ability to have a longer-

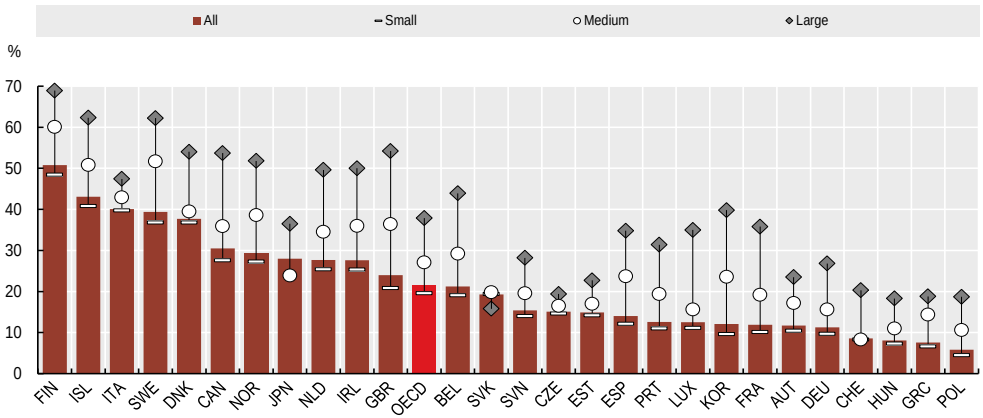
At the same time, the capacity of other firms in the economy to learn from the frontier may have diminished. The rising gap in productivity growth between firms at the global frontier and other firms since the beginning of the century suggests that non-frontier firms face increased difficulties in learning from the frontier. This is consistent with: i) longer run evidence on the penetration rates of new technologies (e.g. Comin and Mestieri, 2013); ii) possible winner takes all dynamics (Gabaix and Landier, 2008); and iii) the rising importance of tacit knowledge.

Many firms have also failed to successfully adopt new technologies and best practices. The main obstacle to stronger productivity growth has not been the unavailability of advanced technology, but rather the lack of successful adoption by many firms. There are many possible factors that could explain this, including access to finance or talent, which can prevent smaller firms from making the necessary investments and turning them into better business performance. In addition, as discussed in more detail below, many characteristics of the policy environment, ranging from product market competition to labour market policies, to financial structures are key reasons for why smaller and/or national firms do not take advantage of technological progress. The difficulty of making the complementary changes and investments that underpins the success of frontier firms, e.g. investments in the necessary skills, organisational practices, process innovation and management, may have also contributed. For example, new OECD evidence shows that, contrary to common belief, the uptake of cloud computing remains very low among small firms, despite the fact that small firms can disproportionately benefit from this technology (**Figure 1.7**).

term focus because debt must be serviced and the company is forced to shorter-term cash generating activities.

**Figure 1.7. The uptake of cloud computing is comparatively low amongst small firms**

Uptake of cloud computing service by size, 2014 as a percentage of enterprises in each employment size class




Source: OECD, ICT Database; Eurostat, Information Society Statistics Database, July 2015. See STI Scoreboard 2015, http://dx.doi.org/10.1787/888933274459.

A complementary explanation for the divergence in productivity performance involves growing rents for global frontier firms, leading to higher measured firm-level productivity.[6] The growing importance of knowledge-based capital in total business investment (Andrews and de Serres, 2012; OECD, 2013a; 2015b) may to some extent have favoured market concentration and in some instances may have contributed to rent seeking behaviour. The non-rivalrous nature of knowledge means that the initial cost incurred in developing new ideas – typically through R&D – does not need to be re-incurred as those ideas are combined with other inputs in the production of goods or services. This gives rise to increasing returns to scale.

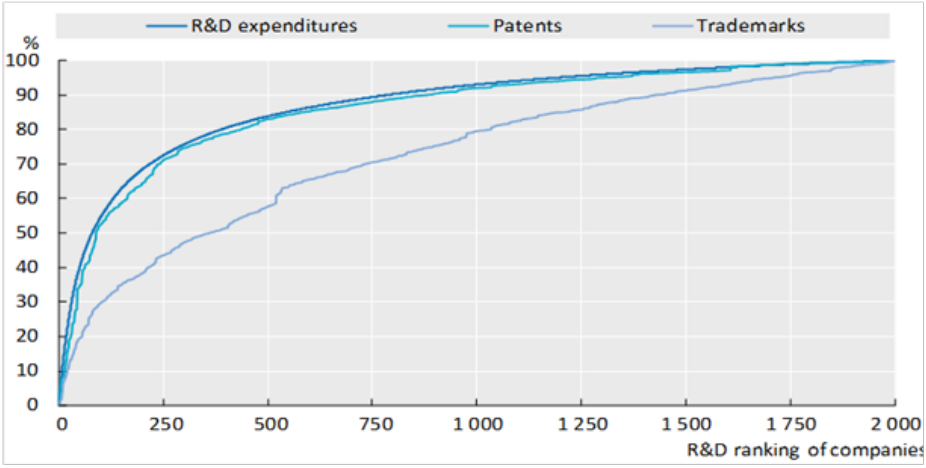
Several structural settings may favour the creation of rents for global frontier firms. First rent seeking can be reinforced by network externalities (*i.e.* the benefit from the network rises with the square of the number of users), which are particularly prevalent in some industries, such as those

6 Analysis at the firm level makes use of industry level price indices to compute productivity growth. Differences in measured productivity levels between firms can reflect either actual differences in productivity performance or differences in price levels, where the latter may result from market rents. The two components are difficult to separate with the available data.

involving digital platforms. This process can lead to growing concentration in certain markets, and can contribute to winner-take-all dynamics in these markets. Winner-take-all dynamics may not lead to growing rents if the resulting market dominance is temporary and rents are eroded by competition, including from other platforms and new business models (OECD, 2013a). However, if combined with a lack of competition, winner-take-all dynamics can lead to greater rent-seeking behaviour, which would benefit certain firms over others. They could also lead to a higher capital share in the economy, unless such rents are also shared with workers through higher wages. Further work is needed to assess empirically whether rents are growing in certain markets, and how these are being shared across investors and workers. In the end, attention to policies related to competition and innovation are key.

Policy settings which favour incumbents can reinforce the process of market concentration and rent seeking. Market concentration and rent seeking that result from the interaction between digital technologies, tacit knowledge and globalisation can be reinforced by policies that favour incumbents and slow the growth of challenger firms. For instance, intellectual property rights are important in an economy that is increasingly based on knowledge, but may lead to excessive concentration, unless coupled with pro-competition policies (OECD, 2013b). Similarly, poorly designed R&D tax credits may prevent challengers from competing on an equal basis in existing and emerging markets. There is also some evidence pointing to a slowdown in business dynamics; the average age of global frontier firms has been increasing since 2001, which could reflect a slowdown in the entry of new firms to the global frontier. Recent OECD evidence also shows that R&D and invention are highly concentrated. For instance, OECD work finds that the top 5% of the world's 2000 largest corporate investors in R&D account for 55% of their joint R&D expenditure, 53% of patents and 30% of trademarks (**Figure 1.8**).

**Figure 1.8. Cumulative shares of R&D expenditures and the IP bundle within top 2000 R&D companies, 2012**




Source: OECD, STI Micro-data Lab: Intellectual Property Database, http://oe.cd/ipstats, June 2015.

A third complementary explanation for the growing divergence in productivity growth is related to those firms furthest behind. As shown in Figure 1.6, the median firm (50$^{th}$ percentile) in several countries, e.g. Denmark and Norway, has not experienced much slower productivity growth than the most productive firms (90$^{th}$ percentile). Rather, it is the poorest performing firms (10$^{th}$ percentile) in some countries that have strongly negative productivity growth, bringing down aggregate performance. While poor productivity is not always a problem, as it can reflect the performance of new firms faced with high start-up costs, persistently poor performance points to lack of market selection (Andrews and Criscuolo, 2013), in particular when poorly-performing firms continue to exist in the market, rather than closing down. The relative importance on aggregate productivity growth of inadequate diffusion from the frontier on the one hand, and/or weak selection of the laggards on the other hand, is an important open research question.

### *1.2.3 There are major obstacles to stronger productivity growth.*

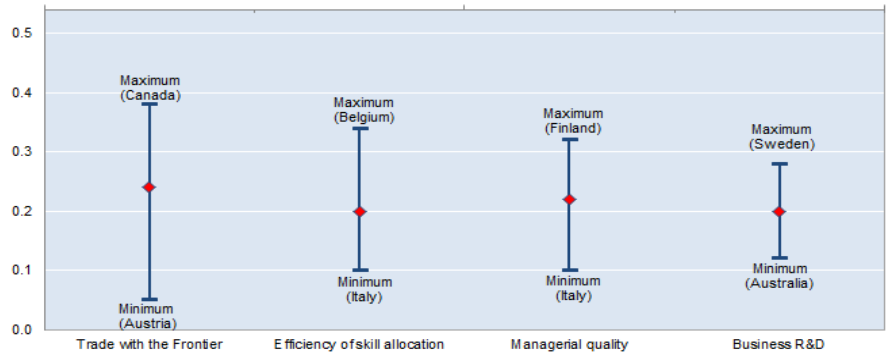
Future productivity growth will benefit from the revival of the diffusion machine. The rising gap between high productivity firms and the rest raises key questions about the obstacles that prevent all firms from successfully adopting well-known and replicable innovations. Future growth will benefit from harnessing the forces of knowledge diffusion. This is particularly vital

in the services sector that accounts for an increasing share of economic activity, and in particular logistics, finance, business services and communications that are needed for firms to compete in the global market place. OECD analysis has identified five key factors that shape the diffusion process: i) global connections via trade, FDI, participation in GVCs and the international mobility of skilled labour; ii) connections and knowledge exchange within the national economy, e.g. the interaction between scientific and higher education institutions and businesses; iii) scope for experimentation by firms – especially new entrants – with new technologies and business models; iv) synergistic investments in R&D, skills, organisational know-how (i.e. managerial capabilities) and other forms of knowledge-based capital efficient reallocation of scarce resources.

There are significant differences between OECD countries with respect to the structural factors that shape the diffusion process. Figure 1.9 presents estimates of how the benefits of a 2% acceleration in productivity growth at the global frontier – roughly equivalent to that observed in the United States during the late 1990s ICT boom – diffuse across economies, depending on some different structural factors. For example, countries that trade very intensively with the frontier economy (e.g. Canada) realise 0.35 percentage points higher productivity growth per annum, compared to countries with fewer such trade linkages (e.g. Austria). Higher efficiency of skill allocation - notably a reduction in the degree of over-skilling in the economy - business investment in R&D and managerial quality have similar effects on the diffusion process, and these gains are economically significant, particularly given an average MFP growth of only ½ per cent per annum over the period of analysis.

**Figure 1.9. Different structural factors shape productivity diffusion from the global frontier across OECD countries**

Estimated frontier spill-overs (% per annum) associated with 2% point increase in MFP growth at the global frontier




Notes: The chart shows how the sensitivity of MFP growth to changes in the frontier leader growth varies with different levels of policy variables. The diamond refers to the estimated frontier spill-over effect associated with a 2% MFP growth at the frontier around the average level of the policy. The label "Minimum" (Maximum) indicates the country with the lowest (highest) value for the given structural indicator in a given reference year.

Source: Saia, A., D. Andrews, and S. Abrizio (2015), "Productivity Spillovers from the Global Frontier and Public Policy Industry-Level Evidence", OECD Economics Department Working Papers, No. 1238, OECD Publishing, Paris.

Barriers to exit and skills mismatch play an important role in trapping valuable resources in low productive activities. Coexistence of poorly performing firms with star performers could result from a number of factors, but barriers to exit and skill mismatch clearly play a role. The opportunity cost of such barriers and mismatch can be large as – at least in the short to medium-run – firms' innovation activities draw from a scarce and fixed pool of contestable resources, particularly skilled labour. Thus, trapping resources in relatively small and low productivity firms can hinder the growth prospects of more innovative firms (Acemoglu, et al., 2013).

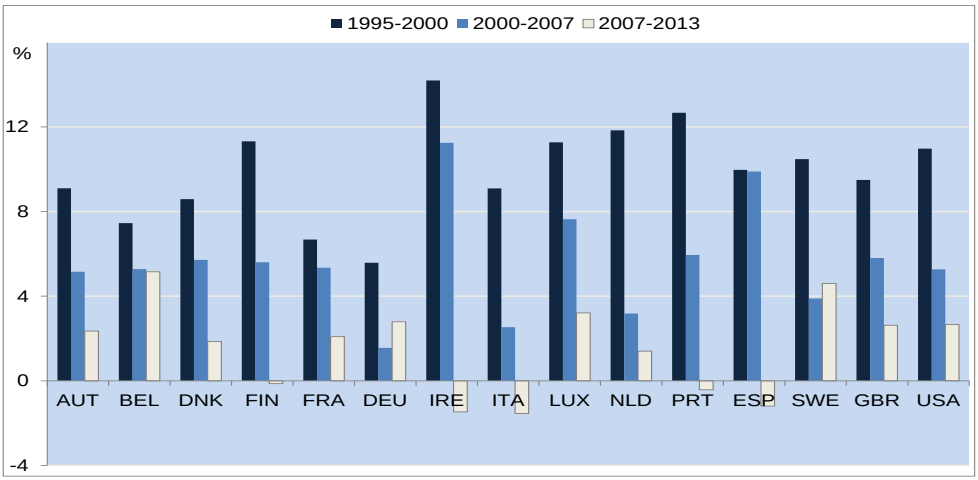
Similarly, the incidence of skill mismatch might be harmful to aggregate productivity because it constrains the growth of the most productive firms. These frictions may explain why national frontier firms are undersized in some economies, greatly diminishing their aggregate impact (OECD, 2015b). The probability of skill mismatch is related to many of the framework conditions already noted – product market competition and labour market policies - which affect the ability of workers to move from

job to job. It is also worsened by transportation and housing costs, which make it difficult for workers to move to a better matched job.

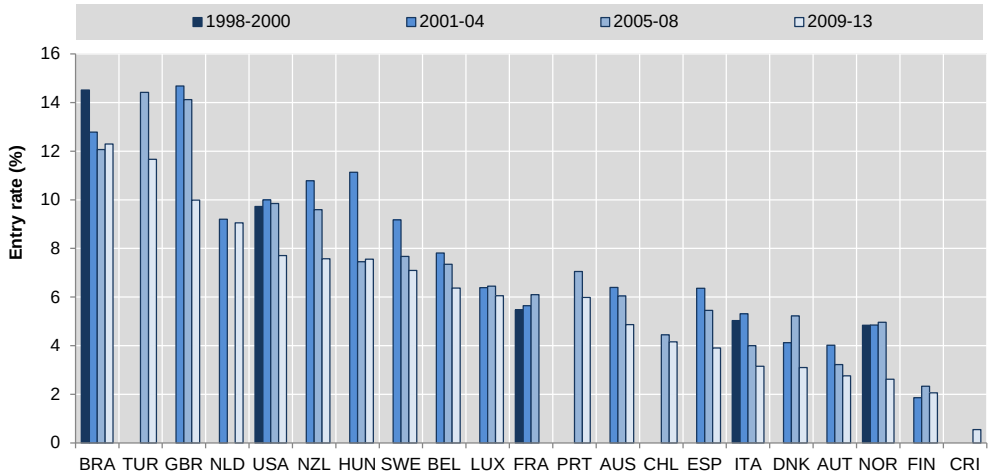
More generally, productivity growth would benefit from continuous resource allocation in the economy. The decline in business dynamism from the early 2000s may result in both slower diffusion and weaker dynamism at the frontier. A decline in business dynamism has been observed since the early 2000s (Criscuolo, et al., 2014). In particular, this is reflected in a slowdown in knowledge-based capital accumulation, which usually underpins innovations and their subsequent adoption, and in a decline in business start-ups, which are a key source of innovations and put pressure on incumbents to innovate (**Figure 1.10)**. This decline consequently raises concerns about a structural slowdown in productivity growth and may foreshadow a possible slowdown in the arrival of breakthrough innovations. A satisfactory explanation for these developments remains elusive. A possible important factor could be the persistence of small, old firms that have very low productivity. Costly delays and slow exit of poorly performing firms, sometimes supported by government guarantees, and compounded by financial institutions that do not want to realise non-performing loans on their balance sheets, creates a particularly unfavourable environment for productivity growth.

**Figure 1.10. The pre-crisis slowdown in TFP growth coincided with a decline in business dynamism**

A: Investment in Knowledge-Based Capital; annual average growth



B: The role of start-ups by country over time




Notes: Panel A reports the average annual growth in nominal KBC investment within each time period. Panel B reports entry rates (calculated as number of entrants with positive employment over total number of units with positive employment). Figures report averages for the periods 1998 – 2000; 2001 – 2004; 2005 – 2008 and 2009 – 2013 conditional on availability. Sectors covered are: manufacturing, construction, and non-financial business services. The first available year for which the database has been validated is: 1998 for Brazil; 1999 for Norway, France and the United States; 2000 for Italy; 2001 for Austria, Denmark, Luxembourg and the Netherlands; 2002 for Belgium, Finland, Hungary, New Zealand and Sweden; 2003 for Australia and the U.K.; 2004 for Spain; 2006 for Chile; 2007 for Portugal and Turkey; 2010 for Costa Rica. The last available year for which the database has been validated is: 2013 for Spain, Turkey and the United States; 2012 for Austria, Australia, Brazil, Chile, Costa Rica, Denmark, Luxembourg, the Netherlands, Portugal and Sweden; 2011 for Belgium, Finland, Hungary and New Zealand; 2010 for the U.K. and Italy; 2009 for Norway; 2007 for France. The period between 2005 and 2008 has been excluded for the Netherlands due to a redesign of the business register in 2006. Figures for Chile are preliminary. Owing to methodological differences, figures may deviate from officially published national statistics reports start-up rates (defined as the fraction of firms which are from 0 to 2 years old among all firms) averaged across three-year periods for the manufacturing, construction, and non-financial business services sectors. Data refer to 2001-2010 for AUT, BRA, ITA, LUX, NOR, ESP and SWE; 2001-2009 for JPN and NZL; 2001-2007 for FRA; and 2006-2011 for PRT. Owing to methodological differences, figures may deviate from officially published national statistics. For Japan, data are at the establishment level. Data for Canada refer only to organic employment changes and abstract from M&A activity.

Source: Panel A is sourced from Corrado et al., (2013); Panel B is sourced from OECD DynEmp v.2 database. Data for some countries are still preliminary.

## 1.3 Increased divergence between the most and least productive regions within a country

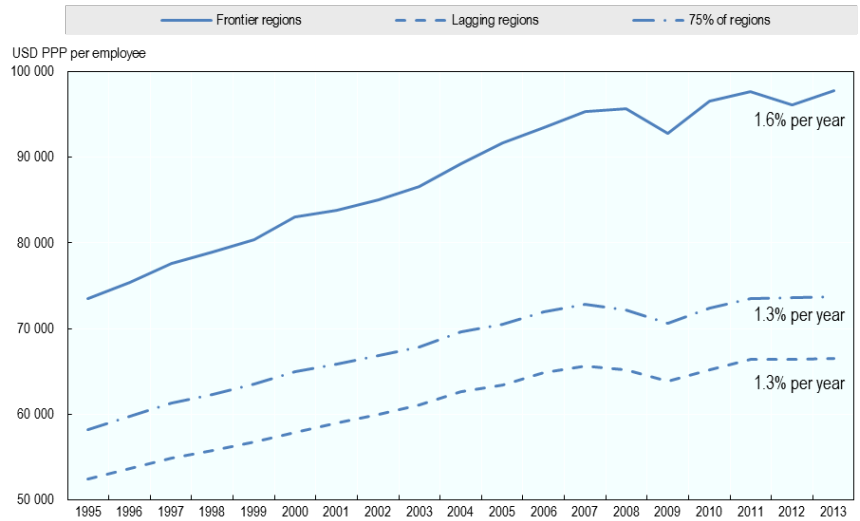
### *1.3.1 The widening gap in productivity growth between regions at the productivity frontier and lagging regions may have contributed to the labour productivity slowdown.*

Between 1995 and 2013, disparities in productivity performance between regions within countries have also increased. From 1995 to 2013, labour productivity (measured by GDP per worker[7]) increased on average by 1.6% for the frontier regions, as opposed to only 1.3% per year in the majority of regions (the lowest 75%) as well as the lagging regions (the lowest 10%). This growth differential, when cumulated over the same period, generates an increase of the gap between the frontier and the most lagging regions of approximately 50% (from around USD 21 000 to 31 000 PPP per worker) (Figure 1.11). These inter-regional divergences largely stabilised after the crisis, but mainly as a result of a slowdown in the most advanced regions, rather than of catching up by lagging regions.

7 The best measure of labour productivity available at the regional level, which suffers from the lack of accurate price deflators at the regional level. A new OECD project has just begun that will seek to measure regional level price differences.

**Figure 1.11. The gap between frontier and lagging regions was widening even before the crisis**

Averages of highest top 10% (frontier), lowest 75% and lowest 10% (lagging) regional GDP per worker, TL2 regions

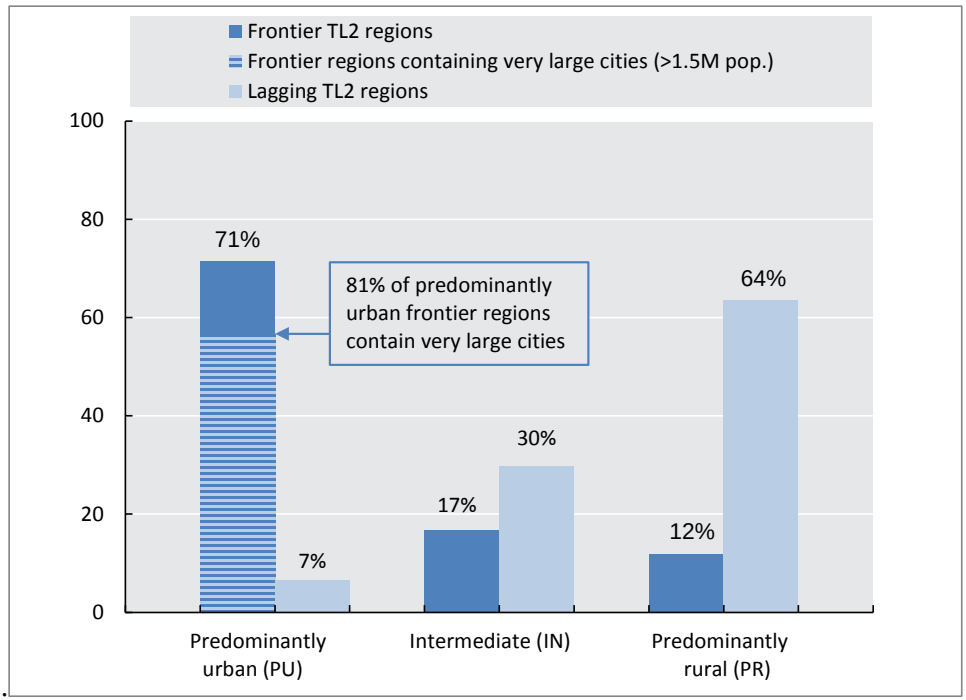



Note: Average of top 10% and bottom 10% TL2 regions, selected for each year. Top and bottom regions are the aggregation of regions with the highest and lowest GDP per worker and representing 10% of national employment. The bottom 75% regions account for 75% of national employment. Due to lack of regional data over the period, only 20 countries are included in the averages.

Source: Calculations based on the OECD Regional Database.

Frontier regions are predominantly urban, whereas lagging regions are predominantly rural. The frontier is dominated by predominantly urban regions, in particular those containing very large cities (Figure 1.12). Conversely, two-thirds of the lagging regions are predominantly rural. The large and persistent gaps between frontier and lagging regions are to a great extent the result of agglomeration forces that increase productivity in regions that contain large cities. Furthermore, the rising importance of tacit knowledge as a source of frontier productivity developments could lead to increased disparities between urban and rural areas insofar as tacit knowledge is more difficult to diffuse across firms than other forms of productivity enhancement.

**Figure 1.12. Frontier regions are predominantly urban, whereas lagging regions are predominantly rural**




Note: Share of frontier/lagging regions distributed by typology over the period 2003-2013. TL2 region typology defined by their degree of rurality using the following thresholds: PR>50%, PU<30%, other=IN, plus upgrade PR->IN and IN->PU if contain a city >1.5M pop.

Source: Calculations based on the OECD Regional Database.

Even if it is to be expected that economic activities concentrate spatially, lagging and less populated regions should also be expected to see some catch-up. As with countries, productivity is the main determinant of regional growth. It spreads from large cities to the regions around them, even to a distance of 200-300 km, driven by their economic and demographic linkages with urban areas. Moreover, smaller cities can reap productivity gains by being closely linked to other cities using connectivity as a substitute for size (OECD, 2014). Other factors driving regional per capita growth vary with the level of productivity they have already achieved. For example, R&D investment appears to be more important for growth among regions that were already at the highest levels of GDP per capita, than for regions well below the national average (OECD, 2012).

The fact that lagging regions are not currently benefiting from catch-up dynamics may be due to several factors. First, the breakdown of the "diffusion machine" across firms may have had a particularly negative impact on lagging regions disconnected from global frontier firms. Also, in an increasingly knowledge-intensive economy, regions with a large share of low-skilled workers (e.g., those that have only completed primary education), may be increasingly penalised. Evidence shows they are a bigger drag on regional growth than the lack of high-skilled workers (OECD, 2012). In addition, remote rural areas have a greater dependence on local assets and tradable sectors, and thus growth may be more vulnerable to shocks in general or in their sectors of specialisation, including fluctuations in commodity prices (OECD, 2014). Finally, governance challenges such as low levels of institutional capacity at subnational level, lack of a well-designed and implemented regional strategy, and a piece-meal policy approach can also help to explain why certain regions with catch-up potential do not succeed in fulfilling that potential (OECD, 2012).

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# *Chapter 2**

# *Inequalities of income, wealth and well-being*

What lies behind the increase in income inequality in most advanced countries over the last three decades? What is the picture in key emerging economies? Has the growth of income inequality been mirrored by rising inequalities of wealth, well-being and opportunity? This chapter charts the drastic rise of income inequality in OECD countries since the 1980s, examining the key drivers over the short and longer term with a focus on the role of technological change, reforms to labour market institutions and the advance of globalisation. The chapter also considers the more heterogeneous picture found in key emerging economies where overall, despite declines in some places, inequality remains at very high levels. It then goes on to explore trends in inequalities in wealth and such important determinants of well-being as access to employment, education outcomes and health. Finally, the chapter looks at how multidimensional inequalities tend to be mutually reinforcing, as is suggested by their concentration in disadvantaged areas.

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The decline in aggregate productivity growth has taken place against a backdrop of rising interpersonal inequalities of income, along with large wealth and well-being disparities in several OECD economies. In many countries, people have not seen their real incomes rise for several years (in some cases, decades), and the gap between rich and poor has widened, with those at the top capturing the 'lion's share' of the income growth. Part of the rise in income inequality over recent years reflects developments during the crisis and its aftermath, which hit the incomes of those at the bottom hardest. Over the longer-term, however, structural adjustments engendered by skill-biased technological change, increased economic integration, and changes to labour market institutions - alongside several other factors - have also contributed to the rise in inequality. In terms of well-being the picture is starker still, as in just about every area of life - whether it be educational attainment, life expectancy, or employment prospects - success seems disproportionally determined by socio-economic status, wealth and assets, sex, age or the places where people live.

Drawing on recent OECD analysis of trends in inequalities of income, wealth and well-being this chapter argues that:

- Income inequality rose in most advanced economies over the past three decades reflecting long-term structural factors, including technological progress, and changes in product and labour market regulations, institutions and policies.

- Income inequality has continued to increase in many advanced economies over recent years as the incomes of those at the bottom have fallen behind in the wake of the crisis, and the cushioning role of redistribution policies has become weaker.

- In several emerging markets inequality has shown signs of narrowing, albeit from far greater heights than in advanced economies.

- The distribution of wealth is considerably more unequal than that of income, and has likely become more unequal since the crisis in some countries. High wealth inequality may have potentially important consequences for equality of opportunities and for patterns of growth, but further work is required to fully understand these effects.

- There is great divergence in outcomes across a broad range of well-being dimensions in OECD countries. Many of these multidimensional inequalities tend to cumulate with each other in disadvantaged regions.

This chapter is organised as follows. It first examines trends in income inequality and its drivers over the short and longer-term in OECD countries and selected emerging market economies, before considering inequality of wealth (Section 1). It then goes on to examine inequalities of well-being, considering some of their causes and their distribution across regions (Section 2).

## 2.1 Inequalities of income and wealth

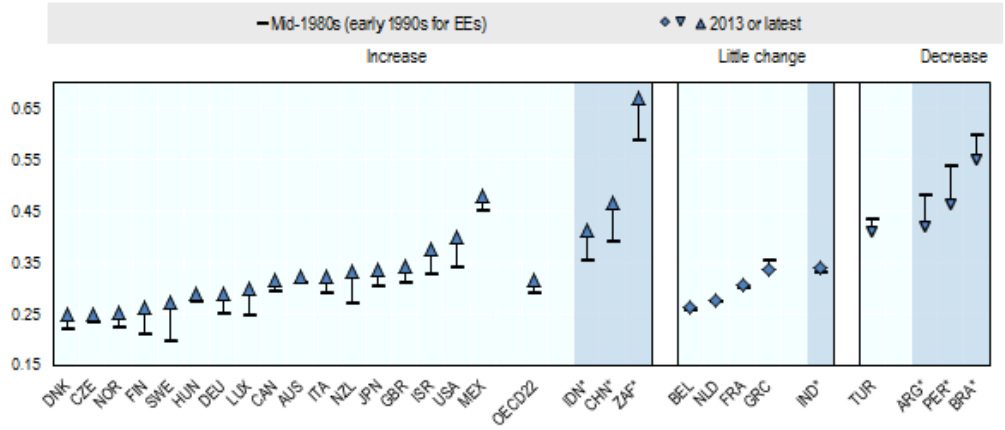
### *2.1.1 Income inequality has risen in most advanced economies, whilst in several emerging markets it has shown signs of narrowing in recent years, albeit from far greater heights.*

Income inequality has risen in a majority of advanced economies over the last three decades. In the mid-1980s, the top 10% of the income distribution in OECD countries earned around seven times the income of the bottom 10%. However, by 2013 that ratio had increased markedly to almost ten times. Over the same period the Gini co-efficient[8] was up by some 10% in the OECD area as a whole, from 0.29 to 0.32 (**Figure 2.1**).

8 This standard measure of inequality ranges from 0 when everybody has identical incomes and 1 when all the income goes to only one person.

**Figure 2.1 Income inequality increased in most OECD countries**

Gini coefficients of income inequality, mid-1980s (early 1990s for emerging economies) and 2013, or latest available year




*Note*: "Little change" in inequality refers to changes of less than 1.5 percentage points. Data year for 2013 (or latest year): Data refer to 2014 for China, 2013 for Finland, Hungary, Netherlands and the United States and India, 2011 for Canada, Chile, Israel, Turkey and Brazil, 2010 for Indonesia, 2009 for Japan, and 2012 for the other countries. Data for Argentina, Brazil, China, India, Indonesia, Peru and South Africa (different background) come from external sources are not strictly comparable with the OECD Income Distribution Database data. The Gini coefficients are based on equivalised disposable incomes for OECD countries, and per capita incomes for other countries except India and Indonesia for which per capita consumption was used. Mid-1990s data for Peru and Indonesia refer to 1997 and 1996 respectively.

Source: OECD Income Distribution Database (IDD), www.oecd.org/social/income-distribution-database.htm, for OECD countries. World Bank, Poverty and Inequality Database for India. Statistics Indonesia (Susenas) for Indonesia. SEDLAC database for Argentina Brazil and Peru. National Bureau of Statistics of China for China. National Income Dynamics Survey, for South Africa.

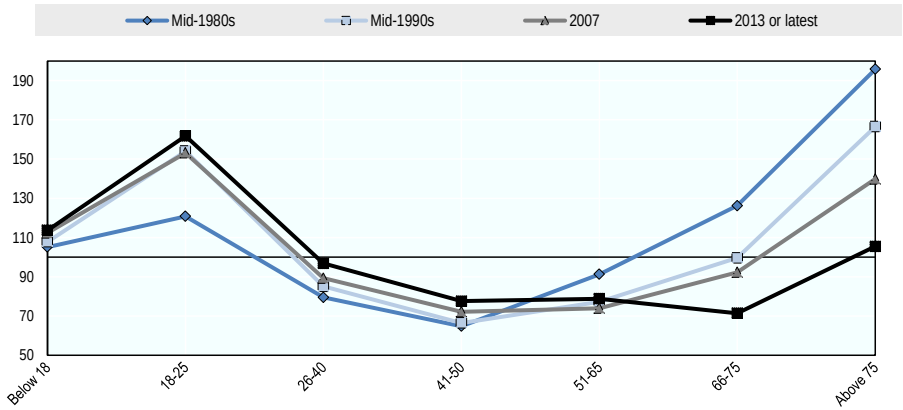
The growth in income inequality over this period was the result of a surge in top incomes accompanied by stagnation at the bottom of the pile. In broad terms, the increase in income inequality was the result of both rapid growth in incomes at the very top of the distribution, particularly amongst the top 1% (OECD 2014), and relatively stagnant income growth - punctuated by occasional periods of decline in real terms during recessions - at the bottom.

Yet, despite the overall increase, the evolution of income inequality was far from uniform across OECD countries. Sweden (with a Gini-coefficient moving from 0.20 to 0.28), the US (from 0.34 to 0.40), and New Zealand

(from 0.27 to 0.32, which, however, mostly happened prior to 2000[9]) all experienced significantly high increases in inequality, albeit from very different starting points. Countries like Belgium (hovering around 0.26) and the Netherlands (from 0.27 to 0.28) and the UK (around 0.34) experienced very little change. The average also conceals the fact that distinct groups fared differently within countries, with the working-age population tending to bear the brunt of increased inequality (consistent with rising unemployment in the last years of the period. The widening of the income distribution has been accompanied by a shift in the age profile of income poverty, with young people replacing the elderly as the group most at risk of relative poverty, a trend which began to emerge in the mid-1980s (**Figure 2.2**).

**Figure 2.2. The risk of income poverty has shifted from the elderly to the young**

Relative poverty rate of the entire population in each year = 100, mid-1980s to 2013, or latest available year




*Note:* OECD unweighted average for 18 OECD countries for which data are available from the mid-1980s: Canada, Denmark, Finland, France, Germany, Greece, Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Sweden, Turkey, the United Kingdom, the United States. Relative poverty defined as having disposable income below 50% of the median income.

Source: OECD Income Distribution Database (IDD), www.oecd.org/social/income-distribution-database.htm.

Capital income became a greater source of household income, but mainly in rich households. In terms of income components, changes in the

9 The post-2000 decline in New Zealand's Gini co-efficient was the result of concerted policy action.

earnings distribution account for most but not all of the trends in household income inequality. The distribution of capital income, in particular, grew more unequal in most OECD countries in the two decades up to the crisis. However, since the capital share in income remained below 10%, on average, the contribution of capital income to overall income inequality remained low when compared with labour earnings (OECD, 2011 and Chapter 3 from OECD, 2016).

The picture is quite heterogeneous in emerging economies. Most EMEs recorded dramatic reductions in absolute poverty in recent decades, but this has not always coincided with a reduction in inequality. The available data[10] on inequality *within* emerging markets show that from the mid-1990s, the Gini-coefficient increased in a number of prominent emerging markets, most notably in South Africa (from 0.59 to 0.67), reflecting a rise in unemployment and wage disparities (Leibbrandt et al., 2010; ILO, 2015); and China (from 0.39 to 0.47), following the progressive transition to a market economy.[11] In contrast, several of the largest economies in Latin America, like Brazil (from 0.60 to 0.55) and Peru (from 0.54 to 0.46), experienced sustained declines over the period, as a result of the extension and better targeting of government transfers and a decline in the gap between high and low-skilled earnings (OECD 2015a).

Even in those emerging countries where income inequality is falling, the levels are high by OECD standards. Regardless of the direction of travel, in almost all cases, the levels of inequality in emerging economies remain considerably higher than the OECD average, above or at best close to the level seen in the most unequal OECD countries. Looking at a selection of emerging countries highlighted in **Figure 2.1**, the most recent Gini-coefficient scores of Brazil, South Africa and China all stand some way above the OECD average, although they are close to the levels observed in

10 It is important to stress that the evidence on inequality in household economic resources in emerging countries is very patchy, and that not all data are perfectly comparable with those for OECD countries. The data for the OECD countries are based on the OECD standardised income concept, while other data for emerging countries are based on different concepts; in particular, those for Indonesia and India are based on consumption, which is likely to underestimate the level of inequality as compared to income data.

11 Although in the case of China, the Gini seems to have peaked around 2008, decreasing slightly thereafter with faster wage growth.

the most unequal OECD countries (for instance in the United States [0.40], Turkey, [0.41]; Mexico, [0.48][12]; and Chile, [0.50]).

### *2.1.2 Growth in inequality has been exacerbated by the crisis and its aftermath which hit the incomes of those at the bottom hardest.*

The crisis hurt those on low incomes most. Real average disposable household income stagnated or fell in most OECD countries between 2007 and 2011. The declines were particularly striking in those countries which were struck most severely by the crisis. In Greece, the average household lost over 8% of its real net income per year[13], and in Spain, Ireland and Iceland, average annual losses exceeded 3.5%. [14]The collapse was due in large part to the loss in employment and, to a smaller extent, to falling wages. In many cases, the groups at the bottom of the income scale were hardest hit. Even in those countries where average income continued to grow during the crisis, half saw the top 10% do better than the bottom 10%. In several countries, including Austria, Denmark, France and the United States, incomes at the top increased in real terms over the period 2007 to 2011 whilst those at the bottom fell (OECD 2015a).

As market income inequality rose during the crisis, the cushioning role of redistribution policies was important. In the early years of the crisis, income inequality before taxes and benefits[15] increased substantially, but out-of-work benefits and other redistribution measures, succeeded in cushioning at least part of the rise, particularly in advanced economies. This reversed a long-term trend which had seen the impact of taxes and benefits in reducing inequality decline (**Figure 2.3**). Subsequently, however, soaring public debt led governments to shift their focus towards fiscal consolidation, limiting public spending and investment. Whilst income inequality before taxes and benefits has continued to rise, the cushioning effect of taxes and benefits has weakened in several OECD countries as a consequence of fiscal consolidation, accelerating the overall upwards trend in *disposable* income

12 In Mexico the tax reform approved in 2013 is expected to help reduce inequality going forward. Before the tax reform, Mexico was the OECD country where the tax and transfer system was doing the least to reduce income inequality.

13 Household equivalised disposable income, deflated by the CPI (http://stats.oecd.org/Index.aspx?DataSetCode=MEI_PRICES)

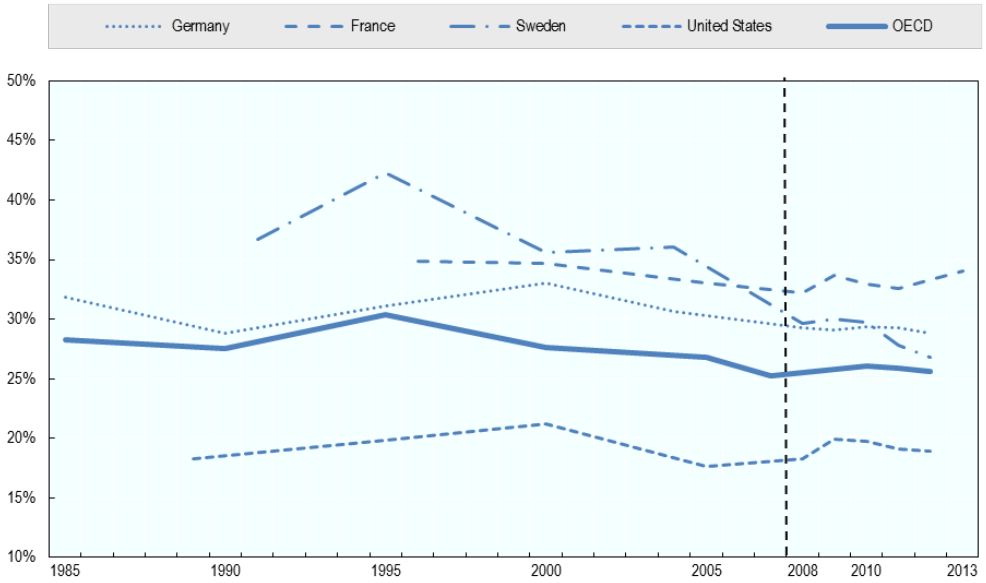
14 Because of data breaks, the comparison for Spain refers to 2008-2012. Due to methodological differences in the income definition and equivalence scale used, these numbers differ from those produced by INE or Eurostat.

15 Or what is usually termed: *market income inequality*.

inequality. In emerging economies, the redistributive cushioning effect of the tax and transfer system is much smaller than the one typically observed in OECD countries (OECD/CAF/ECLAC 2014). Though redistribution policies have been strengthened in many emerging economies, with several countries making their cash transfers more generous and others widening their coverage of unemployment benefits, there is considerable scope to make the tax system more progressive. Most emerging markets also have ample scope to increase tax revenues by promoting formal employment and enlarging the tax base. The level of social spending is also relatively low in emerging economies, though there is large country diversity, with very low spending levels in India and Indonesia, but spending just below the OECD average in Brazil (OECD 2015a).

**Figure 2.3 Redistribution became weaker in most countries until the onset of the crisis**

Percentage difference between inequality (measured by the Gini coefficient) of gross market income and inequality of disposable income, working age population




*Note*: OECD average: un-weighted and based on 10 countries for which data are available at all points (Canada, Denmark, Germany, Israel, Italy, Netherlands, New Zealand, Sweden, United Kingdom and United States).

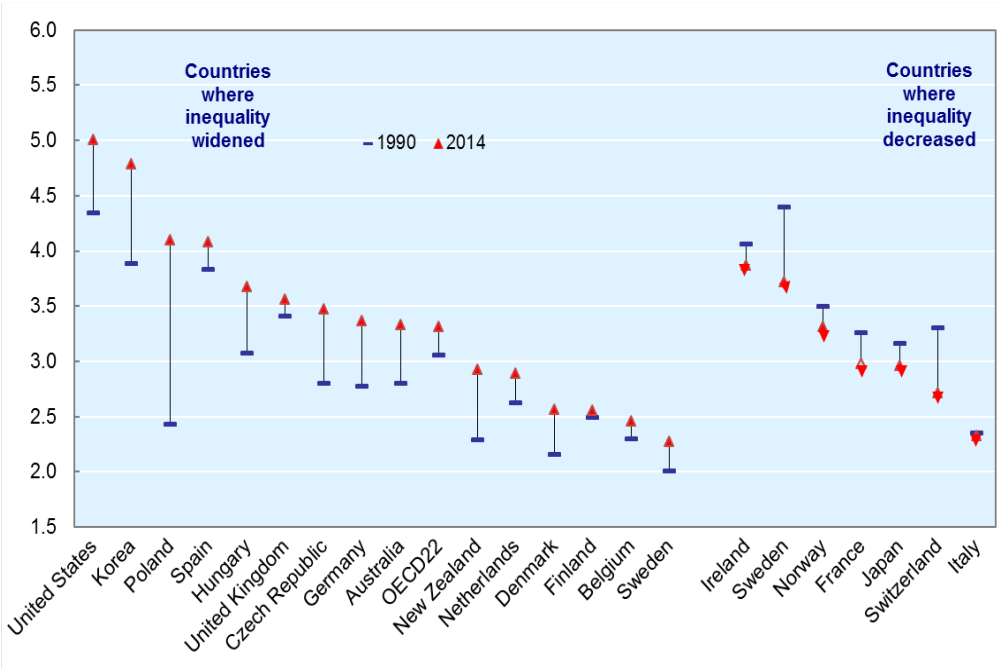
Source: OECD Income Distribution Database, www.oecd.org/social/income-distribution-database.htm.

### *2.1.3. Over the longer-term, growth in income inequality has been driven by a variety of factors, including technological progress and changes in product and labour market regulations, institutions and policies.*

Over recent decades, labour markets have been transformed by the interplay of globalisation, technological change and regulatory reform. These changes have had a major impact on earnings and incomes, as technological progress has shifted production processes in favour of skilled labour – the so called 'skill-biased technological change' hypothesis. If the supply of skilled labour does not increase at the same rate as the demand for it, this leads to increased wage dispersion between high-skilled workers and their lower-skilled counterparts. While technological change has driven increases in productivity, it may have also contributed to growing inequality, including through the reduction in the labour share in income. In an environment, characterised in a number of countries by a weakening of workers' bargaining power, this has been associated with increases in labour earnings inequality (OECD 2011). Overall, earnings dispersion has widened in the majority of OECD countries since the early 90s (Figure 2.4) – with the exception of France, Ireland, Italy, Japan, Norway, Sweden and Switzerland - as the earnings of the top 10% of most well-paid workers increased more than the earnings of the bottom 10% of least well-paid workers.

**Figure 2.4 Earnings inequality has widened in a majority of OECD countries from the mid-90s**

Ratio of the 90th to 10th percentile earnings




1. Earnings refer to earnings of full-time employees. The data shown are consistent over time, but not entirely comparable across countries owing to differences in pay reporting periods and coverage of workers.

2. Unweighted average of countries shown in the figure.

Source: OECD Earnings Distribution database.

The skill-biased technological change hypothesis tells part of the story, but other factors make the picture more complex. There is much talk of 'job polarisation' and the hollowing out of the middle of the job and wage distribution as a growing share of the workforce is working either in high-skill, high-wage jobs characterised by abstract tasks, or in low-skill, low-paid jobs characterised by non-routine manual tasks.[16] New OECD research

16 See Goos, Manning and Salomons, 2009; Fournier et al., 2012; Koske, I., J. Fournier and I. Wanner, 2012; OECD (2015b), *OECD Employment Outlook 2015*, OECD Publishing, Paris, http://dx.doi.org/10.1787/empl_outlook-2015-en.

(Marcolin, et al., 2016) shows that the relationships between globalisation, technology and skills are complex. It suggests that comparatively higher skills are associated with higher employment in both non-routine (NR) and low routine-intensive (LR) occupations. Moreover, employment in all types of occupations, both routine and non-routine, is positively related to innovation, as measured by patents. Taken together, these results point to the existence of complex interactions between the routine content of occupations, skills, technology, industry structure and trade, which do not allow for a neat identification of "winners" and "losers" in the context of global value chains.

Structural changes in the labour market and labour market policies have been a key driver of income inequality trends. The last thirty years have seen major structural changes in employment. This is in part due to the growth in services and knowledge jobs and to a greater use of ICTs, and in part due to reforms of labour market regulations that have created greater flexibility at the "margin" by liberalising atypical labour contacts and thus contributing to labour market segmentation. Collectively these have affected the demand and supply drivers of non-standard forms of work. Temporary, part-time work and self-employment now account for about a third of total employment in OECD countries and nearly half of all jobs created since the mid-1990s (OECD 2015a). Naturally, such non-standard work need not be poor quality, and many workers have benefitted from the associated improvement in opportunities to enter the labour market. Yet, it is also the case that many non-standard workers are worse-off in several aspects of job quality, such as earnings, job security or access to training. In particular, low-skilled temporary workers face substantial wage penalties, higher earnings instability and slower wage growth. Additionally, more than half of non-standard workers are the main breadwinners in their household, so the growth of this type of work can lead to worsening income inequality.

Even prior to the crisis, reforms to tax and benefit systems had reduced their redistributive effectiveness. Taxes and benefits became less redistributive between the mid-1990s and the crisis. At present, cash transfers and income taxes in OECD countries reduce income inequality by slightly over one quarter among the working-age population, down from 30% in the mid-1990s. The main reasons for the decline in redistribution prior to the crisis are found on the benefit side: cuts to benefit levels, tightening of eligibility rules to limit social protection expenditure, and the failure of transfers to the lowest income groups to keep pace with earnings growth, all contributed. This loss in redistributive capacity has been felt most keenly by low-income working-age households (OECD 2011).

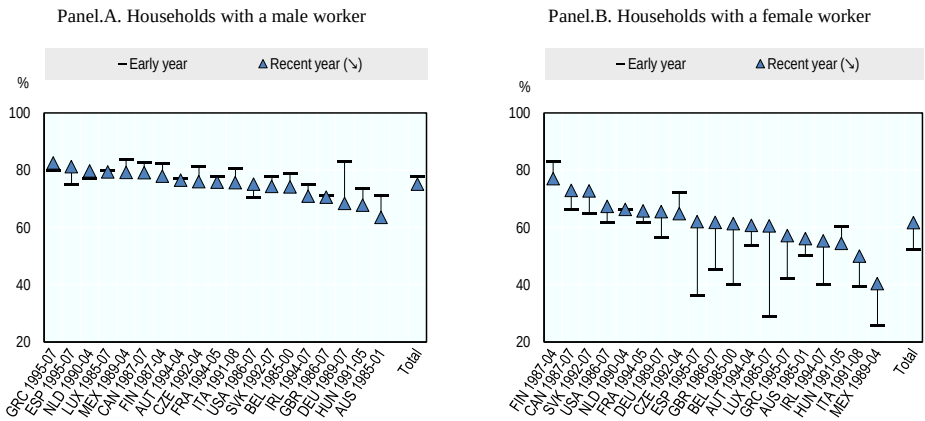
Rising or persistently high inequalities in emerging market economies share many of the same roots as those seen in OECD countries, but also

have specific drivers. The underlying causes of pressures on income distribution and redistribution – technological change, globalisation, structural labour market change, labour market regulations – affect advanced and developing economies alike, albeit via different channels. Some drivers are, however, specific to emerging economies. Despite enormous progress, the size and persistence of the informal sector, the existence of informal labour relations in the formal sector, access to and the quality of education, discrimination based on gender or ethnic origin, or widespread regional divides all weigh heavily on inequality. Another factor contributing to high income inequality in these countries is the limited role of redistribution mentioned above.

In many instances, the rise in income inequality would have been worse were it not for improved access to education and higher female participation in the workforce. The expansion of education and the rise in the supply of skilled workers contributed to offsetting the increase in wage inequality which resulted from technological progress and labour market changes. Raising the skill level of the labour force had a significant positive impact on employment growth. In a similar vein, the increase in women's employment had an equalizing effect on distribution of incomes over the past few decades. If the proportion of households with working women had remained at the levels of 20 to 25 years ago, income inequality would have increased by almost 1 Gini point *more* on average across the OECD (OECD, 2015a). Substantial progress has also been made in narrowing women's education, employment participation, pay and career gaps with men and this has put a brake on rising inequality. Despite this progress the size of the gender gap regarding labour force participation and earnings is still large in many OECD countries (**Figure 2.5**).

**Figure 2.5 Gender gaps decreased, but still persist**

Changes in male/female labour participation among households




*Note:* Sample restricted to households with a working-age head (25-64). A male/female worker refers to someone who is either the head or spouse in a household.

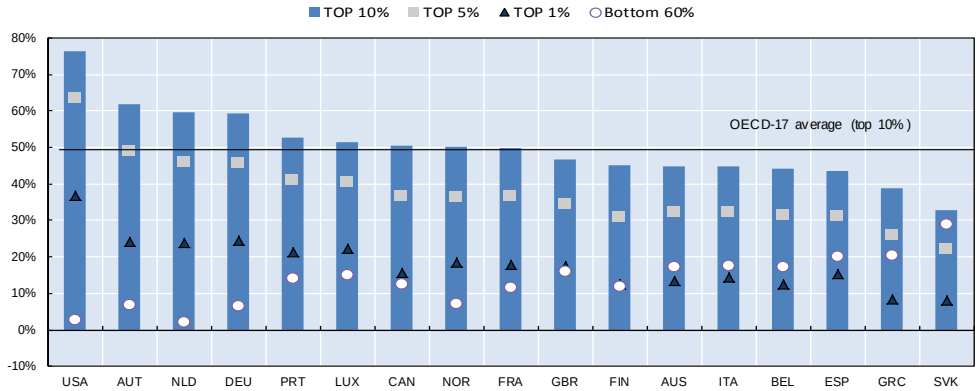
Source: OECD Secretariat calculations from the Luxembourg Income Study (LIS).

### *2.1.4. The distribution of wealth is considerably more unequal than that of income.*

Across the OECD, wealth is much more unequally distributed than income. On average, the top 10% (of households) accounts for about 50% of total household wealth, while the top 10% (of individuals) accounts for about 25% of total household income. Similarly, across those OECD countries for which data are available, the top 5% and 1% wealthiest households own 37% and 18% of total household wealth respectively, while the bottom 60% of the distribution owns only 13% of total household wealth (**Figure 2.6**). Wealth inequality is very large in the United States, Austria, the Netherlands and Germany, where the share of the wealth distribution of the top percentiles is significantly above the OECD average.

**Figure 2.6 The top 10% own around 50% of net wealth on average across the OECD**

Wealth shares of top percentiles of the net wealth distribution 2010 or last available year




*Note:* Countries are ranked from left to right, in decreasing order of shares of wealth owned by the top 10%. The bottom 60% refers to the share of quintiles I, II and III in the total wealth.

Source: Sources: OECD Wealth Distribution Database.

Part of the large differences in household wealth within countries is explained by socio-economic determinants such as education, age and gender. In particular, evidence drawn from the OECD Wealth Database shows that human capital is correlated with higher wealth as well as higher incomes and earnings: households headed by a college graduate have a net wealth that, on average, is significantly higher than households whose head has an upper secondary education, and more than three times higher than those with only a primary education. In terms of age patterns, over-indebtedness mostly affects households with a young head, while both the prevalence and depth of debt are particularly high in the United States, the Netherlands and Norway (OECD 2015a). Finally, single male households hold significantly higher levels of financial wealth than single female households (OECD 2015c).

From a longer-term perspective, there is evidence that both household wealth and its concentration have increased markedly over the last four decades. Household wealth as a share of national income almost doubled in eight OECD countries since 1970, and according to Piketty's estimates, the concentration of wealth[17] has increased markedly in Sweden, the United

17 As captured by the shares of the top decile and the top centile of the wealth distribution. Piketty T. (2014). *Capital in the 21st Century*, Harvard University Press.

Kingdom and the United States over the past three decades. The rise recorded over this period stands in sharp contrast to the long-term decline recorded in the interwar period. Higher prices of shares and housing relative to consumer goods have been one of the main drivers of both higher household wealth and its increased concentration (OECD 2015a). This trend was not reversed by the financial crisis, and in the United States, the Netherlands and the United Kingdom, wealth inequality at the top of the distribution has grown, while smaller changes have been observed in Australia, Canada and Italy.

The distribution of wealth may have important implications for equality of opportunities and economic growth, but further work is required to fully understand these effects. How wealth is distributed is important for equity and inter-generational mobility, as low asset holdings have been shown to affect the ability of poorer and lower middle-class households to invest in human capital; this implies that the outcomes of one generation frame the opportunities of the next. Such inequalities can also be exacerbated by financialisation (i.e. the increasing weight of financial activities and institutions in our economies), as people with higher incomes have benefitted more than their poorer counterparts from credit-financed investment opportunities, (Denk and Cazeneuve-Lacroutz, 2015), leaving lower-income groups with fewer opportunities to invest in housing, education and other assets. At the same time, a high concentration of wealth can also weaken potential growth, by encouraging the under-utilisation of individuals' potential, by discouraging risk-taking and reducing the resilience of the economic system to shocks (OECD 2015a).

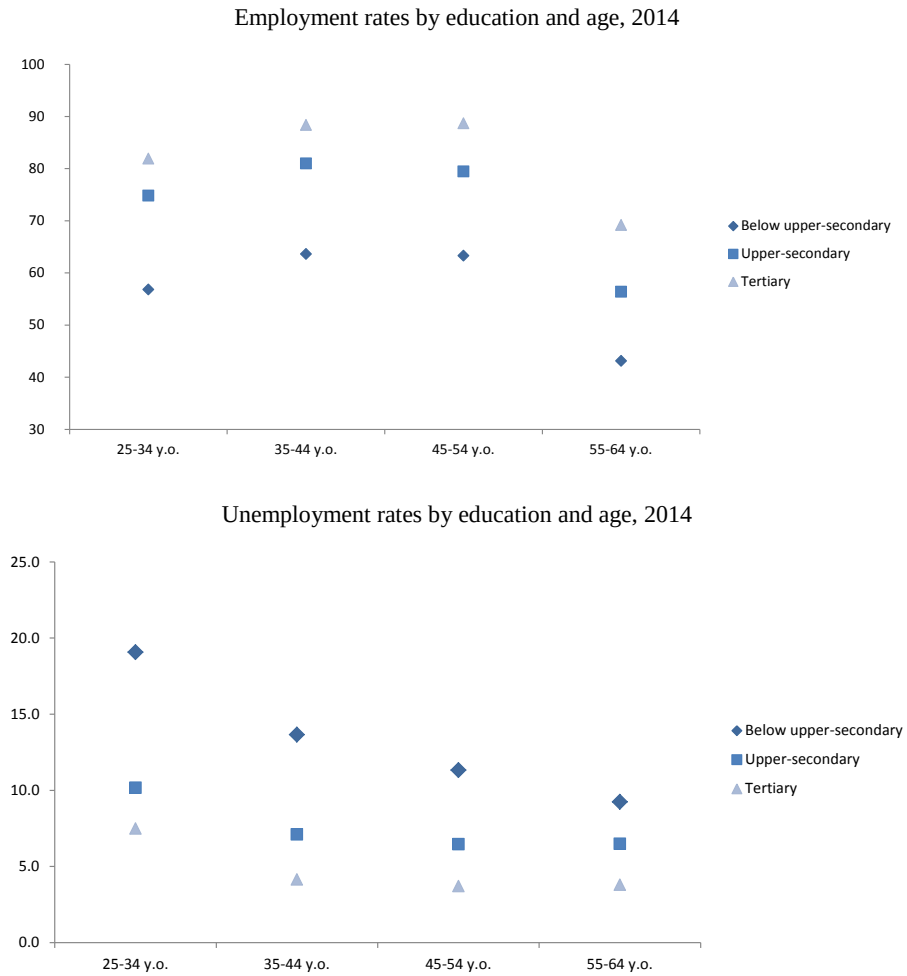
## 2.2 Inequalities of well-being

### *2.2.1 There are large gaps in outcomes across a broad range of well-being dimensions.*

Well-being outcomes, beyond those pertaining to household economic resources, are also unevenly distributed, with evidence of steep social gradients. Living standards, broadly defined, encompass non-income dimensions that matter to people such as health status, access to jobs, skills, social relations, and the degree of exposure to environmental hazards. Large inequalities persist in the distribution of all well-being outcomes across OECD countries. In particular, in all countries, the better-off report better health status, benefit from greater access to training opportunities, and can expect their children to attain stronger educational results. In many other areas too, from access to quality public services, to opportunities to succeed in life, the distribution of most well-being outcomes tends to be correlated with, and compounded by, income inequality.

Access to jobs constitutes a fundamental aspect of well-being, but varies significantly across educational groups and people of different ages (**Figure 2.7**, upper panel). Better educated people display higher employment rates at all ages. Employment differentials between the most educated and the least educated are broadly constant across the four age groups, while the employability premium from upper-secondary to tertiary education is higher among the elderly. Higher education also reduces the probability of being unemployed, although this impact decreases with age (**Figure 2.7**, lower panel). The risk of being unemployed is almost three times higher among low-educated youth than tertiary-educated youth, while this proportion stands at two among the oldest individuals.

**Figure 2.7 Job opportunities vary significantly across educational groups and people of different age**




Source: OECD (2015d), *Education at a Glance* 2015: *OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2015-en.

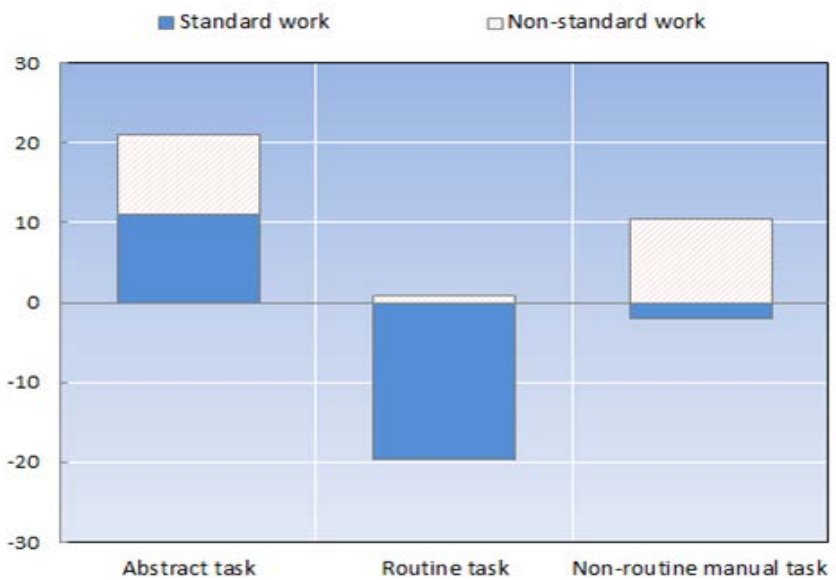
Job quality is also important to well-being, and some groups, like youth and low-skilled workers appear to cumulate many disadvantages on this front. For example, youth and low-skilled workers experience low employment rates and, once employed, low earnings, high job insecurity, and a poor working environment. This demonstrates the need to get both

structural and demand policies right, to enable young people to enter the work force and start on a career path.

The polarisation of jobs and wages and the impact of skill-biased and routine-biased technological change are likely to have increased economic insecurity for low-skilled and low-paid workers. As highlighted earlier, OECD evidence shows that there has been a large decline in the share of medium-skill jobs based on routine tasks, while the shares of both high-skill, high-wage, jobs and low-skill, low-wage, jobs have grown (Figure 2.8) (OECD 2015a). Over the past two decades, most employment losses took the form of standard work (i.e. full-time, permanent jobs), while a substantial share of jobs added were non-standard jobs, especially for the low-wage, low-skill, group.[18] This pattern suggests that the same economic and policy drivers that raise earnings inequality may also increase inequality along other dimensions of job quality.

**Figure 2.8 Non-Standard work contributed to job polarisation**

Percentage change in employment shares by task category, 1995/98-latest available year




18 Non-standard work includes temporary employment contracts which may imply considerable insecurity, particularly for workers who lack advanced skills that are in high demand.

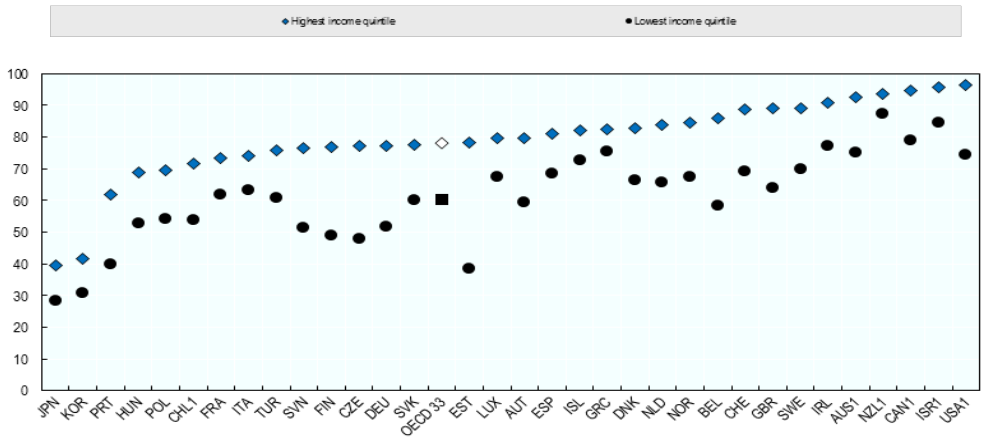
*Note*: Abstract occupations (ISCO88: 12-34); Routine (ISCO88: 41-42, 52, 71-74, 81-82 and 93); Non-routine manual (ISCO88: 51 83 and 91). The overall sample restricted to workers aged 15-64, excluding employers as well as students working part-time.

Source: OECD (2015a),

Large health inequalities are a cause for concern as health has an important impact on people's productivity, income and well-being. A stark social gradient exists for perceived health in OECD countries: while 78% of people with incomes in the highest quintile report being in good or better health, only 60% of those with income in the lowest quintile do so (Figure 2.9). Inequalities in self-reported health status are particularly large in Estonia, the Czech Republic, Finland, Belgium, Germany, the United Kingdom and Slovenia, where the gap in perceived health status between the highest and lowest income quintile is 25 percentage points or greater. By contrast, the gap is less than ten points in New Zealand, Greece and Iceland. At the same time, inequalities in people's ages of death according to their education are similarly striking.

**Figure 2.9 All OECD countries have a substantial gap in perceived heath between low and high-income groups**

Percentage of adults reporting "good" or "very good" health, 2013 or latest available year




Note: Data refer to 2014 for New Zealand; 2011 for Chile; and 2007 for Australia. Adults are generally defined as people aged 15 years and over. Results for countries marked with a "1" are not directly comparable with those for other countries, due to differences in reporting scales, which may lead to an upward bias in the reported estimates. The OECD average is population-weighted.

Source: "Health status", OECD Health Statistics (database).

Adopting an approach centred on multidimensional living standards helps to underline the extent to which different types of inequalities cumulate and reinforce one another. Taking education as an example, experimental OECD work shows that the income gap between people with upper-secondary education relative to those with primary education is on average 15%. Large though this gap is, it fails to capture the full extent of the education premium for those who have completed upper-secondary education relative to their primary-educated peers. Adopting an approach focussed on multidimensional living standards (Box 2.1), an experimental measure of well-being incorporating household-disposable income, longevity, and employment opportunities, the gap is three times larger (Figure 2.10). This suggests that inequality in multidimensional well-being across educational groups is much higher than inequality in income between these groups. While the living standards premium associated with moving from primary to upper secondary education is mostly explained by the effect of schooling on non-income dimensions (with longevity accounting for 28% of the total gap, unemployment for 38% and income for 34%), the gap in multidimensional living standards when moving from upper secondary to tertiary education is mostly explained by the household income gap.

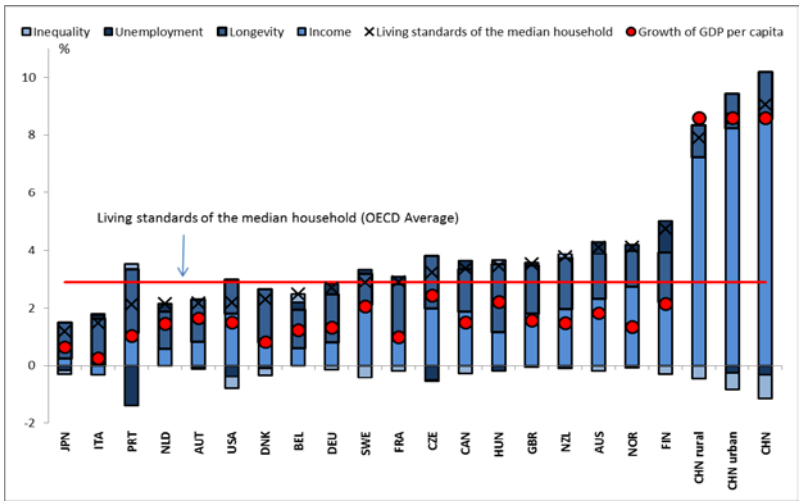
## Box 2.1. Research in Progress: Measuring Multidimensional living standards (MDLS)

Measuring multidimensional living standards (MDLS) is a complex undertaking. The OECD is still exploring robust ways of using the measure for policy purposes. Any inference drawn from the MDLS in this paper is done only for research purposes.

MDLS reflect outcomes in income and non-income components of well-being and their distribution across households. MDLS at aggregate level are computed in three steps: first, one needs to measure *income-based* living standards at the individual level. Second, it is necessary to bring one or several *non-income* dimensions into the analysis and measure these dimensions at the level of individuals or groups of individuals in order to combine them with money income. Lastly, the broader living standard measure is aggregated across individuals.

For measuring the **income dimension** of MDLS, gross household real disposable income has been chosen as the relevant indicator. Then, for **non-income dimensions**, *jobs and of health* were retained, and measured respectively by unemployment rate and life expectancy. Although these do not cover all well-being dimensions, they are highly significant determinants of people's life assessment. The second step entails the valuation of non-income factors using the method of "equivalent income" (Fleurbaey and Blanchet, 2013), which is defined as the *hypothetical income that would make an individual indifferent between her/his current situation in terms of non-income aspects of life and a benchmark situation*. The monetisation of the benefits from non-income components requires the computation of 'shadow prices'. These shadow prices can be based on several methods (see Boarini et al., 2015, for a review and Murtin et al., 2015, for in-depth analysis), but it is possible to reconcile results from various methods and obtain robust estimates that fall in a relatively narrow range. Based on these estimates, a reduction of the unemployment rate by one point is deemed to be equivalent to a gain in household income of 2%, and the increase in longevity by one year to an income gain by 5%. On a third step, MDLS measures are aggregated across individuals through the use of a generalised mean, which is equal to average living standards minus a penalty reflecting the inequality in living standards across individuals. Standard calibration is used to adjust the inequality penalty to the gap between average and median living standards, so that the resulting index of MDLS reflects the situation of the median household. A significant amount of empirical research has already been conducted in the area and continues to ascertain the robustness of results and the expansion of the measure to other dimensions of well-being and their distribution.

**The Figure below** displays estimates of the changes in MDLS over the past two decades for OECD countries as well as China (urban and rural). This figure graph shows that living standards for the median household in China increased by as much as 9% per year, as compared to less than 3% on average among OECD countries, during this period. This gap largely reflects much stronger growth in household disposable income, which increased almost 6 times faster in China than in OECD countries (about 8.6%[1] versus 1.4%). Among OECD countries, MDLS for the median household increased the most in Australia, Norway and Finland due to strong gains in income and longevity and lower unemployment. Overall, progress in longevity accounts for about half of the growth of MDLS for the median OECD household over the period. A similar conclusion is also reached by Murtin (2015) when valuing global progress in health over the 20th century.

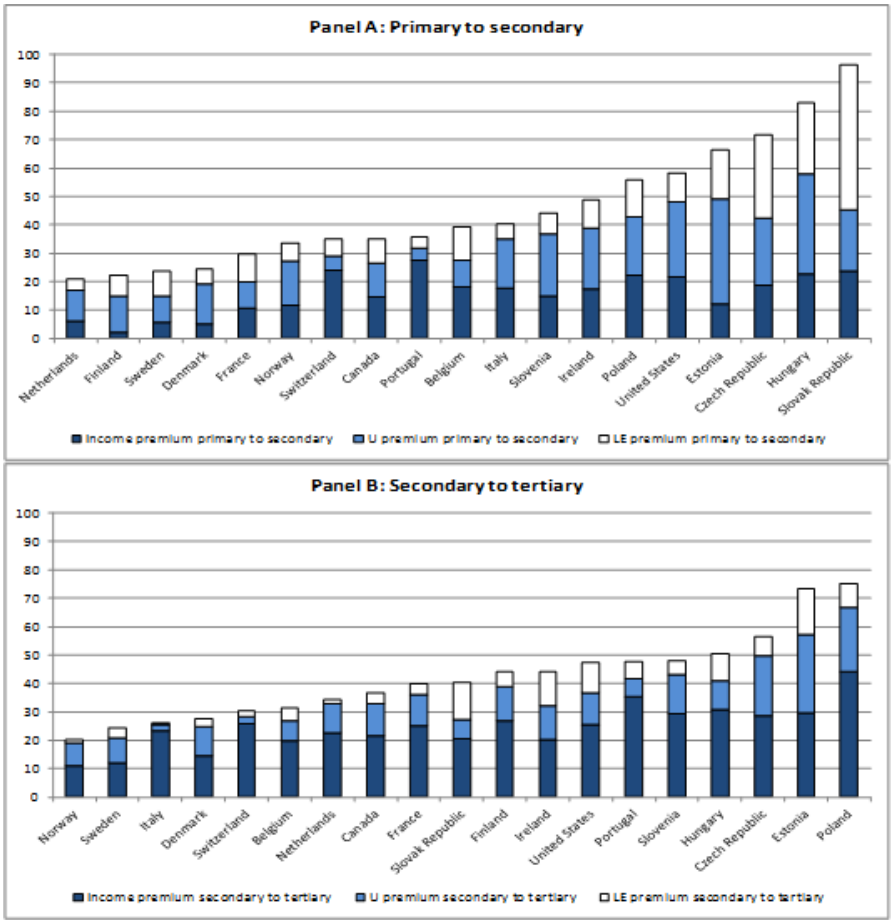



Source: OECD calculations based on Inclusive Growth Database.

Source: Fleurbaey, M. and D. Blanchet (2013). *Beyond GDP*. Princeton University Press; Boarini R., F. Murtin and P. Schreyer (2015), "Inclusive Growth: The OECD Measurement Framework", OECD Statistics Directorate Working Paper No. 64, OECD Publishing, Paris; Murtin F., R. Boarini, J. Cordoba and M. Ripoll (2015), "Beyond GDP: Is There a Law Of Shadow Price?", OECD Statistics Department Working Paper No. 63, OECD Publishing, Paris; OECD (2015e) *All On Board: Making Inclusive Growth Happen in China*, OECD Publishing, Paris; Murtin, F. (2015), *Health and Prosperity*, Palgrave McMillan.

Note: The basic approach towards the MDLS was discussed by the OECD Committee of Statistics and Statistical Policy in 2015 (STD/CSSP(2015)1). Since then, additional robustness tests (on the weights, variables included, model specifications) have been performed and were published in OECD Statistics Directorate working papers (Boarini et al., 2015 and Murtin et al., 2015). A third piece of research is forthcoming ("Multidimensional Living Standards: a Welfare Measure based on Preferences") and also currently subjected to an academic review process. It contains a meta-data analysis as well as a comparison with related empirical results, forthcoming in the American Economic Review (Jones and Klenow 2016) so as to establish convergent validity. Further tests may also be conducted when the measure is used in conjunction with policy variables. In line with academic standards and to ensure transparency and replicability of results, the data set used to derive components and weights of the MDLS is being made available on the OECD website.

**Figure 2.10 Inequality in MDLS across educational groups is much higher than inequality in income between these groups**




Source: Diaz, M. and F. Murtin (2016), Socio-economic Inequality in Living Standards, OECD Statistics Directorate Working Paper, No. 71, OECD Publishing, Paris.

### *2.2.2. Many multidimensional inequalities are spatially concentrated.*

How people fare in the many dimensions of well-being is to a great extent determined by where they live. The difference in the unemployment rate between the best and worst performing subnational entities (or regions) in the OECD area is almost twice as high as the difference between the best and worst performing OECD countries. Many OECD countries also feature

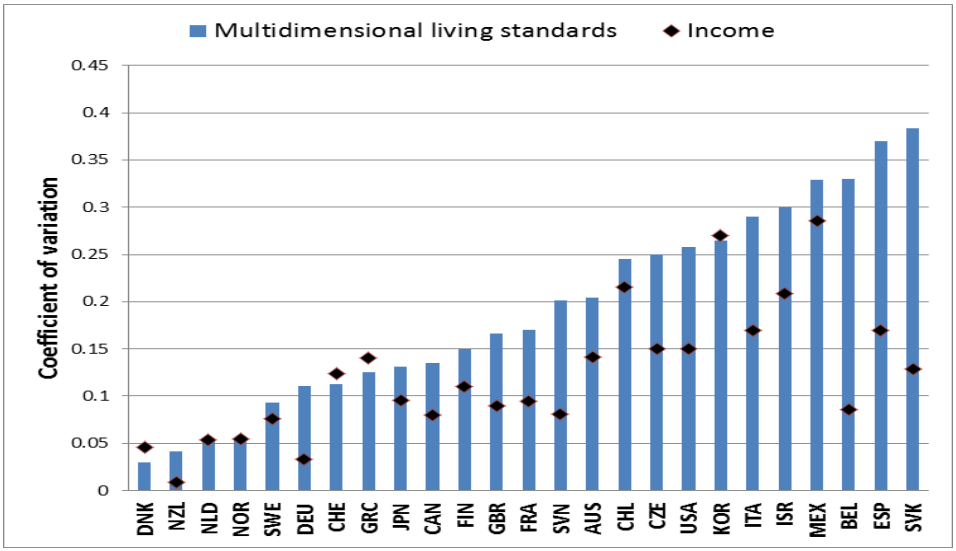
large differences in life expectancy and income levels between the best and worst performing regions. Additionally, the spatial disparities in productivity outlined in the previous chapter may have contributed to higher inter-personal income inequalities, due to limited mobility of the population across regions which in some cases has further declined due to problems in the housing market.

Taking into account the local conditions experienced by individuals is essential, as they affect opportunities to achieve better outcomes throughout life. In the case of education, for example, the availability of good schools for children can shape their future opportunities. Analyses for the United States show that average income in the neighbourhood has a large impact on individuals' future earnings capacity, an effect that is roughly half of that related to parental income (Rothwell and Massey, 2015). Intergenerational social mobility also differs substantially across cities in the United States and it is higher, on average, in less unequal and less spatially segregated cities with better primary schools (Chetty, R., N. Hendren, P. Kline and E. Saez, 2014). The fact that funding for local education relies heavily on local property taxes is probably one reason for such strong effects. Funding education through a "consolidated revenue fund" such as the case in Canada, provides more equal opportunity among children.

Spatial inequalities in multidimensional living standards within countries are much higher than spatial income inequalities. This reflects the correlation of well-being outcomes in space (Veneri and Murtin, 2015) that is depicted in **Figure 2.11**. When looking at regional disparities using the OECD's research on multidimensional living standards in a sample of 26 OECD countries, the highest regional disparities are observed in the Slovak Republic, Spain, Belgium and Mexico. Overall, existing disparities in health and unemployment rates amplify those that would be observed by looking at household income only. Regional disparities in the growth of multidimensional living standards between 2003 and 2012, as measured by the gap between the top and the bottom performing regions, were primarily driven by different trends in income and jobs.

**Figure 2.11 Regional disparities in MDLS are greater than inequalities in household disposable income**

Coefficient of variation (higher values mean larger disparities), 2012

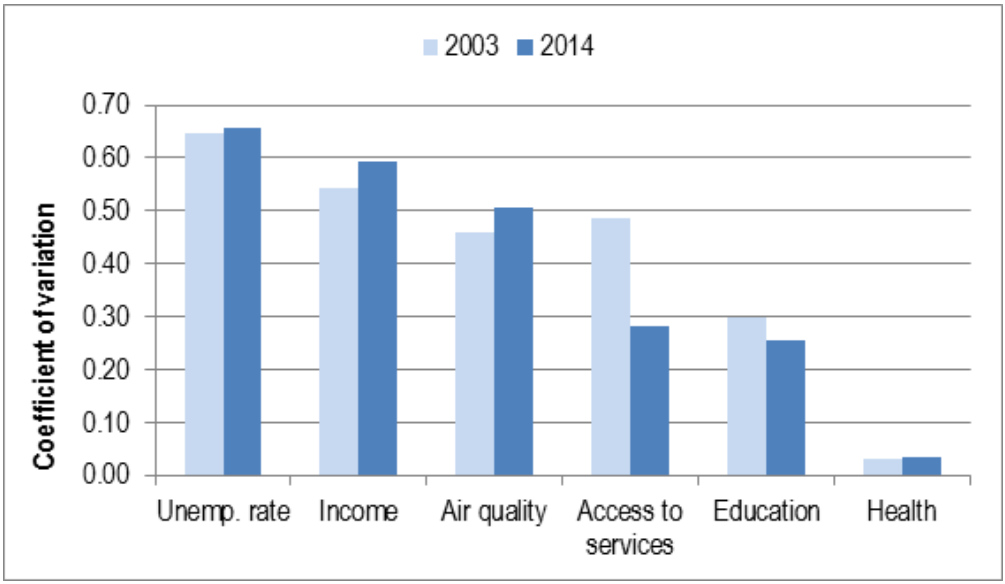



Source: Veneri, P. and F. Murtin (2015). Where is Inclusive Growth Happening? Mapping Multidimensional Living Standards in OECD Regions, forthcoming OECD Statistics Directorate Working Paper. Calculations based on OECD Regional Well-being database and national income surveys.

Over the past decade, regional disparities in the OECD have evolved differently across well-being dimensions. When considering the whole set of regions in 33 OECD countries, the largest regional disparities are those referring to unemployment rates, household income levels and air quality (share of people exposed to PM2.5), while disparities in terms of life expectancy are significantly lower. In terms of the changes in regional inequalities since the early 2000s, regional disparities in access to services and education have decreased, while disparities in household income, air quality, unemployment rates and life expectancy have increased (**Figure 2.12**).

**Figure 2.12 Regional disparities between OECD regions have evolved differently across well-being dimensions**

Regional disparities in well-being dimensions OECD (TL2)




Note: The higher the coefficient of variation, the higher is the level of regional disparities

Source: Elaborations on OECD Regional Database.

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# *Chapter 3*

# *Getting to grips with the Productivity-Inclusiveness Nexus*

Why has the great slowdown in productivity growth played out against a backdrop of rising inequality? Are declining productivity growth rates and increasing inequality linked? Are there policies that could address both trends? Building on existing OECD work, this chapter brings a new analytical perspective and the latest empirical evidence to bear in order to elaborate the potential links between rising inequalities and slowing productivity growth. The chapter explores possible feedback loops between productivity and inequality. It examines how inequalities amongst individuals (and regions) in areas like income, access to education and training, health care, quality jobs and new technologies tend to hinder aggregate productivity growth by reducing human capital accumulation, increasing the under-utilisation and misallocation of resources in the economy, and ultimately slowing the diffusion of innovation.

There is no single 'smoking gun' cause which explains both the slowdown in productivity growth and the increase in inequality, but they could be linked in several ways. More importantly - from the standpoint of recommendations to policymakers - both challenges derive from the same set of policy fundamentals that create the environment in which individuals, firms, regions, and overall economies interact. This Chapter presents the main ways in which the two challenges may interact, with the objective of setting up for Chapter 4, where we consider how better policy coherence among competition and innovation policies; labour market, education, and skills policies; and financial sector policies can yield better outcomes for both productivity and inequality.

In the current context, low income groups accumulate disadvantages, and there is a negative feedback of policy distortions. Because productivity growth depends on human capital, a policy environment that yields the outcome where some people have few resources and find it difficult to get and keep a good job, to save and invest in their own skills, and to support good quality education for their children, is also one where productivity growth is sub-optimal. By the same token, a policy environment characterised by insufficient competitive pressures allows incumbency dominance in labour, finance, and innovation markets, which can make it harder for other firms to contest markets, attract quality labour, and invest and adapt technologies to create new products and jobs. Lower productivity and greater inequality result from low investment in assets, trapped resources and sluggish reallocation and growth. Aggregating up to the regional perspective, regions can fall into a low-skill, low productivity, low growth equilibrium: firms do not invest there because there is no connectivity and no skilled workers; workers, therefore have weak incentives to invest in their own or their children's skills, thus setting the whole area into decline.

Rethinking the *coherence* of basic policy foundations is essential. A rethink to the coherence of basic policy foundations – in areas like competition and innovation, labour and skills, and allocation of financing – is needed to turn the tide of slowing productivity and rising inequality which both undermine social cohesion and multidimensional living standards. Along some dimensions, there is strong empirical evidence of links between the coherence of these basic policies, productivity, and inequality, social cohesion and multidimensional living standards. Along others, further research is needed to confirm the available evidence. However, it is already apparent that coherent policy packages can foster opportunities for individuals, firms and regions, allow investments to flow, enable reallocation and enhance economic dynamics which could tackle high and often growing inequalities, but also contribute to stronger aggregate

productivity growth and more sustainable long-term growth. Some of the preliminary findings set out in this chapter include:

- The effect of inequalities on individual's opportunities (for example, income, education/training health, and access to quality jobs or new technologies) tend to feed on each other and, by reducing labour quality, undermine productivity diffusion, aggregate productivity, and growth – foundations of higher multi-dimensional living standards. The under-utilisation and misallocation of resources in the economy – including workers trapped in low productivity activities and firms that stay too small or are too old to succeed – has contributed to the slow diffusion of innovation, divergent productivity growth rates between frontier and laggard firms, and overall lower aggregate productivity.

- Recent evidence based on micro-data from a few countries (including the United States, Italy, Germany, Portugal and Brazil) suggests that much of the widening of the wage distribution across workers over the past two or three decades can be attributed to increases in the variance of wages between firms rather than within firms (Song et al 2015 and Card et al 2013). Widening wage dispersion may be related to widening dispersion in productivity across firms, although the strength of the relationship is difficult to measure since other factors may also contribute. Future research can help point to the relationship between policy settings and the dynamics around how frontier firms achieve, maintain, and share their rents. If this is related to barriers of entry, or rent seeking behaviour, negating the impact on productivity and inequality is important.

- Further technological progress holds enormous potential for improving people's well-being, notably by improving access to health, finance and education, but policy settings across a broad range of complementary areas need to be adjusted to ensure that these benefits materialise and that they are broadly shared.

- As outlined in the previous chapters, policy settings—with regard to labour market and skills policies; product market competition and innovation policies; and financial sector regulation and conduct policies – point the way to address the twin challenges of reducing inequality and improving productivity, and are the focus of Chapter 4.

This chapter is organised as follows.

- The first section looks at ***negative feedback loops between productivity and inequality***: the effect of inequalities in individuals' opportunities (e.g., income, access to education/training, health care, quality jobs or new

technologies) tend to feed on each other. By reducing human capital or lack of access to finance, these undermine productivity diffusion, aggregate productivity, and the growth-foundations of higher multi-dimensional living standards. Similarly for firms, the under-utilisation and misallocation of resources in the economy – including workers trapped in low productivity activities – contributes to the slow diffusion of innovation, divergent productivity growth rates between frontier and laggard firms, and overall lower aggregate productivity. For regions, lack of quality infrastructure or connectivity prevents them from benefiting from higher levels of investment.

- The second section assesses links between ***technological change, productivity and inequality*.** There are various ways in which productivity-enhancing technological change might increase inequalities in the population; this section reviews the evidence on the different links and considers which of these links can be best addressed by policy. On the other hand, new technologies might act to counter social exclusion though reducing the costs of acquiring skills or gaining access to financial markets.

- The third section considers the relationships between **reallocation *and dynamism, and productivity, and inequality***. It highlights what we already know and where we need to do more research on these relationships, including on how policies may inhibit or enhance the ability of workers and firms to adapt to changing circumstances, whether due to globalisation, technological change, migration, or policy reforms themselves. Resource reallocation is fundamental to productivity growth and the ability of an economy to deliver higher multidimensional living standards. But, reallocation can also incur costs to workers, firms, and economies, including inequality. Policies that inhibit adaptation and transformation can lead to people becoming trapped in low productivity firms, low income jobs and lagging regions. The challenges of the political economy of policy making and the capacities of workers to adapt to new circumstances are both important.

## 3.1 How might inequality affect productivity and growth?

This section considers what evidence there is relating inequality and aggregate productivity growth.[19] The main link is via high income inequalities reducing investments in human capital, which in turn lead to

[19] This section does *not* discuss whether there are policy reforms (e.g. in tackling health inequalities, or gender gaps) which might simultaneously promote both high productivity and lower inequalities. These issues are discussed in Chapter 4 which demonstrates that there are indeed a number of such policies. Instead the focus here is on the relationships between inequality and productivity growth.

diminished prospects for productivity growth. Hence, in referring to the link between inequality and growth, a strong emphasis is put on the impact of poverty and the inequality of opportunity on growth.

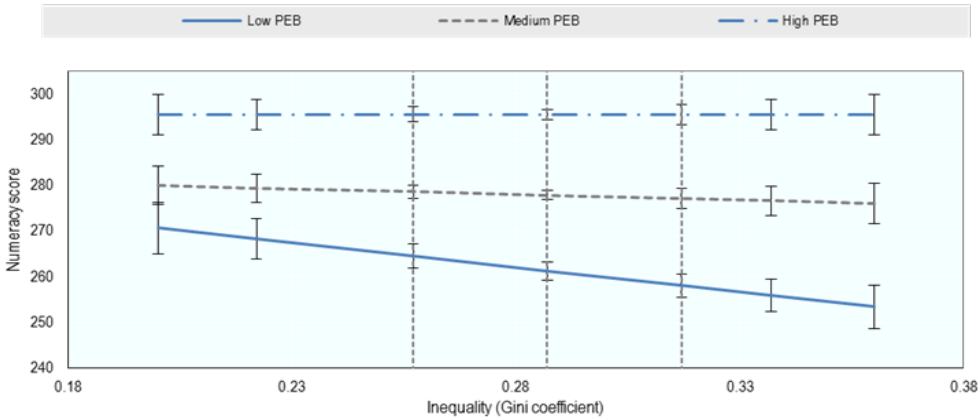
There are many theories about how inequality might affect growth. For example, higher inequality might encourage people to work harder, and - for those with the means - to invest in more education because the rate of return to additional years of schooling is high. Another theory is that poor families may not be able to offer their children the quality education that would give them the same job opportunities and career prospects as children from more privileged backgrounds, thereby harming skill development, and future earnings. Evaluating the policy settings needed to overcome this negative relationship is the object of on-going research, and is clearly complex. In any case, lagging human capital development undermines productivity and prospects for growth.

Recent OECD evidence supports the view that rising income inequality and slow long-term growth go hand-in-hand through their negative impact on employment opportunities and human capital accumulation by low-income families. Research based on data for 31 OECD countries covering the period 1970-2010 finds strong evidence that the long-term rise in inequality of disposable incomes observed in most OECD countries is associated with slower long-term GDP per capita growth, with the key channel being that income inequality limits the opportunities for the poor and lower-middle classes to invest in the education of their children (OECD 2015a). This is particularly likely to be the case when poor families tend to be concentrated in remote regions or neighbourhoods within urban areas that are characterised by limited economic opportunities, poor social services and concentrated poverty.

Intergenerational effects generate persistence in the negative feedback loop. The children of parents with relatively little formal education are less educated and skilled as adults, and this effect is larger in countries where income inequality is more pronounced. (**Figure 3.1**) In other words, it is not just being at the lower end of the income distribution that matters, it is also how the bottom 40%, in terms of income, compare with the well-off in terms of skill levels. Children from poor families in countries with high inequality spend less time in education, but also have lower skills for any given level of education, implying that the quality gap in education is larger than the income gap. At the same time, the relationship between the economic background and educational achievements may differ across countries as it is also conditioned by factors such as the quality of schooling facilities, pre-schooling educational opportunities and how the functioning of the labour market influences the perceived rates of returns on schooling.

**Figure 3.1. Inequality lowers the skills of poor**

Average numeracy score by parent educational background (PEB) and inequality




Note: The graph plots the average predicted numeracy score for individuals from low, medium and high family (educational) backgrounds, as a function of the degree of inequality (Gini points) in the country at the time they were around 14 years old. Low PEB: neither parent has attained upper secondary education; medium PEB: at least one parent has attained secondary and post-secondary, non-tertiary education; high PEB: at least one parent has attained tertiary education. The bars indicate 95% confidence intervals. The vertical dashed lines indicate the 25th, the median and the 75th percentiles of the underlying distribution of inequality.

Source: OECD (2015b)

Effective use of skills is central to productivity and equity. There is ample empirical evidence pointing to the key role that human capital plays for individual earnings and aggregate productivity growth of countries. But beyond the effects on productivity, skills are an important determinant of well-being, with higher levels of skills leading to better jobs, improved health and greater trust in others and institutions. Skills also play an important role in shaping wage inequality across countries. OECD work (OECD 2015b) shows that the distribution of skills within a population affects the extent of wage inequality, with differences in wages tending to be lower in countries where skills are more equally distributed. At the same time, countries that make better use of their workforce's skills tend to exhibit lower wage inequality and higher productivity growth.

Growth and policies that yield more equal employment opportunities improve equity. OECD research finds that policies that enhance employment opportunities of the lower half of the distribution (including both faster growth overall and policy reforms that reduce insider-outsider

labour market outcomes) are important channels to reduce income inequality as well as raise productivity.[20]

## 3.2 Technological change, productivity, and inequality

This section discusses how technological change – which is a key driver of productivity growth – might be linked with changes in inequalities, both across individuals, but also firms and regions. It considers the evidence along four possible channels:

- Persistent digital divide: A lack of adequate skills combined with a lack of access to ICT implies that the digital divide among people may persist. For individuals, even as access to digital technologies has increased strongly, skills to effectively use ICT and drive associated wage increases have both lagged. By the same token, the uptake of ICT and KBC by smaller firms has also lagged, thus contributing to lagging diffusion of frontier productivity. Across regions too, those less connected fair worse in terms of equity and growth.

- Digitalisation and polarisation. What used to be termed skill-based technical change has evolved into a broader concept of how technology affects the demand for skills. Evidence from a number of countries suggests that the demand for labour is *polarising* at the two extremes – high, abstract skills and low, manual skills with a 'hollowing out' of the middle-skilled jobs dominated by intermediate, routine skills. The question is how far and fast this trend could further develop. Ongoing technological changes including developments in artificial intelligence and big data could lead to more dramatic changes than experienced in the past, and in particular, to a further hollowing out of employment and wages. At the same time, these innovations harbour great promise for more robust productivity growth and new jobs that, as yet, have not even been imagined.

- Rents and winner take all dynamics. The slowdown in productivity growth, discussed in Chapter 1, may be exacerbated by the nature of technological change and how firms and policies interact. Companies at today's technological frontier in sectors characterised by network externalities (a type of natural monopoly) could gain a persistent competitive edge with little spill-over of the technological advances to the other firms that come later. Some frontier firms may hence earn more excess returns – rent – that, if not

[20] See Causa, O., A. de Serres and N. Ruiz (2014); Causa, O., S. Araujo, A. Cavaciuti, N. Ruiz and Z. Smidova, (2014); Adalet McGowan, M., and D. Andrews, (2015a); and Adalet McGowan, M., and D. Andrews, (2015b).

competed away over time, can have negative effects on the diffusion of productivity. Apart from increasing capital incomes – themselves a source of inequality – these firms will be able to pay persistently higher wages to their staff, contributing to widening inequalities at the level of individuals. Evidence for these network externality-driven effects is tentative, but new OECD work suggests that it needs to be taken seriously. Further research is needed to evaluate how rents come about (legitimately or supported by policies) and persist, how technology has affected this process, how contestable they are and what prevents laggard firms from increasing their performance, and what policies can best serve to support innovation whilst also ensuring that productivity and wage diffusion take place.

- Financialisation. Technological tools and the expansion of the financial sector have enabled greater financialisation of business and the economy and have altered how firms and individuals behave. At the same time, finance is a core element of how reallocations within an economy proceed, to either enhance or inhibit productivity growth and equity. Poorly performing financial institutions can hold back the reallocation process of exit and entry of new firms, thus reducing productivity growth as well as capturing skilled workers in poorly matched jobs, and hence hindering equity. Individuals that start unequal with respect to income and wealth have greater difficulty accessing credit, thus compounding their situation.

### *3.2.1 A Persistent Digital Divide*

Even as the internet becomes pervasive, it is clear that differences persist in the uptake by individuals and firms. It is plausible that low proficiency in ICT skills will increasingly limit individuals' access to many basic services, to better-paying and more-rewarding jobs, and to the possibility of participating in further education and training. At the national level, if large proportions of the adult population have low proficiency in information-processing skills, the introduction and adoption of productivity-improving technologies and work organisation may be hampered; and that, in turn, could stall improvements in productivity diffusion and living standards. Further research is needed to identify what holds back uptake (for example, income or age of individuals, size or age of firms, regional location) and what the implications of the digital divide are for productivity and inequality, controlling for the aforementioned additional factors.

- Internet usage continues to vary widely across OECD countries and among social groups (OECD, 2015c). In 2014, over 95% of the adult population were accessing the Internet in Iceland, Norway, Denmark and Luxembourg, but only just over half of the population in Turkey and less in Mexico. From 2006 to 2014, many lagging countries caught up thanks to advances in mobile

broadband availability and uptake. Developments in mobile technology have also enabled people to conduct daily personal computing and communications activities "on the go". On average, 70% of individuals in OECD countries connect to the Internet on a daily basis. Differences in Internet uptake are linked primarily to age and education, often intertwined with income levels. Data on Internet access by income quartiles show that the diffusion process has advanced substantially for low-income households (OECD, 2016). In most countries, uptake by young people is nearly universal, but there are wide differences for older generations, especially seniors; with gender differences being relatively small.

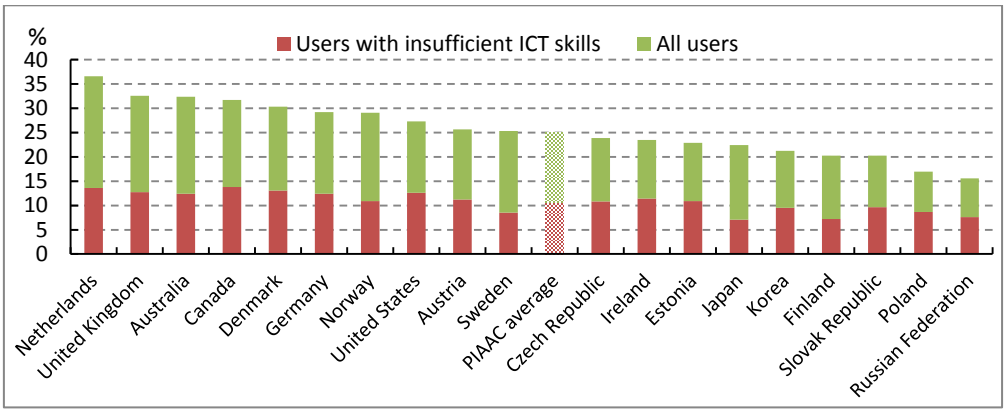
- OECD evidence suggests that despite increasing diffusion of ICTs in business, a large proportion of people in OECD countries do not use ICTs at work or do not have adequate ICT skills (OECD 2015d). On average, only 25% of individuals use simple office software, e.g.: word processors and spreadsheets, every day at work. Among them, over 40 per cent do not appear to have sufficient ICTs skills to use these tools effectively, according to the OECD Survey of Adult Skills (PIAAC) (Figure 3.2).

- Among students the digital divide is shifting from inequality in access to inequality in how the internet is used to support skill development. PISA data show that in most countries, differences in computer and Internet access between advantaged and disadvantaged students shrank in all countries between 2009 and 2012. Generally, the amount of time that students spend online does not differ widely across socio-economic groups, but does appear to differ by use with a students' socio-economic status associated with decisions about what to use ICT for.

- Businesses also are increasingly using the Internet (OECD, 2015c). In 2014, 95% of enterprises in OECD had a broadband connection, although with considerable variation among small enterprises. Remaining cross-country differences in the use of ICT are closely related to the role of smaller firms across countries. As already stressed in Chapter 1, the uptake of ICT and KBC remains low among small firms even for technologies that seem particularly relevant for SMEs, such as cloud computing.

**Figure 3.2. Workers using office software at work every day, 2012**

As a percentage of all workers




Source: OECD (2015d) Measuring the Demand and the Supply of ICT Skills at Work, DSTI/ICCP/IIS(2015)4.

### *3.2.2 Digitalisation and polarisation.*

OECD findings suggest that so far, while leading to restructuring and reallocation, ICT has not led to greater unemployment over time. If adopted successfully, i.e. if combined with organisational changes and good managerial practices (Brynjolfsson and Hitt, 2000; OECD, 2004), ICTs can contribute to increased productivity, which progressively translates into lower prices and/or new products, higher final demand and higher employment, thus compensating for the initial job displacement. There is indeed evidence that ICT has thus far not produced an increase in technological unemployment (OECD, 2015e).

Skill-biased technological change, a manifestation of productivity enhancing technological change, has been a main driver of inequality over recent decades. Most new technologies have required higher levels of skill to use than those they displace. This has been a long-standing trend, going back a century or more. In 2011, the OECD published a major review of the previous studies of the causes of the rise in income inequality and presented new analysis covering OECD and emerging economies (OECD, 2011). It found that, the faster the rate of technological change, the wider the increase in wage dispersion is, and that the greater the increase in the supply of skilled labour is, the slower the increase in wage dispersion is. Further work in needed to round-out the productivity side of the story, since, as we have seen in Chapter 1, technological change does not inevitably increase productivity growth.

However, the skill-biased technological change theory cannot explain all aspects of the rise in inequalities. The SBTC hypothesis is successful in explaining the rise in the employment share of workers in high-skill jobs over the past three decades. For example, in the United States, the employment share of workers in high-skill occupations increased by 11 percentage points from 26% in 1983 to 37% in 2012 (Tuzemen and Wills, 2013). However, a simple version of the SBTC hypothesis suggests that the share of low-skill jobs should have fallen. Instead, the employment share of low-skill occupations rose from 15% in 1983 to 18% in 2012 in the United States. This pattern of an increasing share of low-skilled jobs has been mirrored in other countries. Such trends do not necessarily disprove the SBTC hypothesis – it is possible that some jobs require a higher level of skills than in the past (car mechanics now often need to have ICT skills, for example). Nevertheless, attention has turned to another possible link between technological change, productivity and inequality – the 'hollowing-out' or job-polarisation hypothesis.

Developments in artificial intelligence, unprecedented computer power, the Internet-of-Things and Big Data, among other technological advancements may change the nature of the link between technology and inequality. Some studies suggest that digitalisation makes it possible that, in the near future, a large proportion of tasks or even entire occupations currently carried out by workers could be performed by machines (Frey and Osborne, 2013; Elliot, 2014) enhancing the fear that computers and robots will replace some types of human labour, throwing workers into a "race against the machine" that many are bound to lose (Brynjolfsson and McAfee, 2011). Key research questions are whether digitalisation increases the pace or nature of hollowing-out, with implications for inequality, and to what extent digitalisation might also be manifest in a widening of the diffusion gap between innovation leaders and other firms in the economy.

Those jobs relying on a high proportion of automatable tasks are at high risk of being substituted for by new technology, but only if these technologies are taken up by firms, or firms that do not use the technologies exit. Computers and algorithms mainly substitute for easily codifiable "routine" tasks, which are typically carried out in middle-skilled jobs. "Non-routine" tasks, either at the top end (conceptual jobs) or at the bottom end (manual jobs) of the skill distribution will remain in demand. This could imply that "employment polarisation will not continue indefinitely as there are many tasks that people understand tacitly and accomplish effortlessly, but for which neither computer programmers nor anyone else can enunciate the explicit "rules" or procedures" (Autor, 2015). To the extent that firms overall or within certain regions do not take up the innovations and yet remain in business, then the implications for job change would be less

severe, but the gains to overall productivity would also be limited. Such an outcome would not best enhance the overall capacity of the economy to deliver higher living standards.

The extent and permanence of hollowing-out remains controversial. Some authors (e.g. Frey and Osborne, 2013) suggest that a large share of occupations is at risk of being automated. However, such estimates have been criticised on the basis that rather than occupations it is specific tasks that are at risk of automation, whilst occupations are more likely to evolve – as many have for the past century – to accommodate the penetration of technology rather than face complete substitution (Bessen, 2015). Workers with the skills to adapt to changes in the workplace are less at risk of being left behind. Also, with the productivity gains and the adoption of technology, new direct and complementary jobs are likely to be created (Autor, 2015; Moretti, 2010; Goos, Konings and Vandemeyer, 2015). Overall, however, these studies find evidence that the share of middle wage jobs, characterised by routine tasks, has declined and the wage share of the middle-skilled has also contracted, which has contributed to increased inequality. Evidence of – temporary – job polarisation is also supported by OECD findings (OECD, 2015f) which suggest that in periods where labour demand decreases due to ICTs, the decrease is stronger for medium skilled workers than for their high and low skilled counterparts.

Workers will need different skills, not just more skills. Regardless of the precise number of jobs at risk of automation, continued hollowing-out will disrupt the labour market, yielding further inequalities, unless policy adapts. Up-skilling will be part of the answer – the same policy priority as required to respond to skill-biased technological change. But workers will also need a different sort of skill-set. Data from the Survey of Adult Skills show that, on average across the 22 countries that implemented the Survey, 55% of workers lack basic problem-solving skills in technology-rich environments suggesting weak prospects for these workers, but also for employers' and countries' ability to capitalise on the opportunities offered by a digital economy (OECD, 2013a).

Digitalisation is also changing the way work is organised. The 'platform economy' (referring broadly to the 'gig', 'sharing', and 'on-demand' economies), though still small in scale, is allowing businesses to have access to a larger pool of potential workers and suppliers, with workers increasingly engaged as independent contract workers. This has benefits for some workers, providing them with greater flexibility, and allowing people to earn additional income and access work, sometimes for the first time. At the same time, these jobs rely mostly on non-standard work arrangements (e.g. self-employment and contract work). Even though the platform "sharing" economy is creating job opportunities for people who may have

no access to regular jobs, it may also offer less promising employment trajectories and lower access to social protection or training opportunities. It could also limit worker's access to union representation and wage setting mechanisms. Research on the Future of Work should evaluate how the nature of contract work intersects with employment and wage trajectories as well as institutions and social protection for workers.

### *3.2.3 Rents and Winner-take-all dynamics*

Is innovation in the digital world different? Metcalf's law says that the value of the innovation rises with the square of the users. These network externalities imply that innovations associated with digital platforms, applications, and data are the new version of natural monopolies where one firm can become dominant, and that is the efficient outcome, at least at a point in time. What might be the implication of these new winner-take-all dynamics for productivity and inequality? At this point, there are observations on the phenomenon, but further research is needed to link these observations to productivity and inequality, and to evaluate policy implications.

As highlighted in Chapter 1, there is a big productivity differential between global leaders and other firms. Comprehensive research is still ongoing to assess the impact of slow diffusion and rent outcomes on inequality, and - as detailed below - there are several preliminary indications that there may be some effect.

An increase in wage dispersion. Is this due to winner-take-all outcomes whereby dominant firms capture innovation rents and the diffusion of ideas to other firms lags behind, or are there other reasons for lagging diffusion (as discussed in detail in Chapter 1)? Micro data-based evidence suggests that much of the increase in wage inequality between individuals can be attributed to increases in the variance of wages between firms rather than inside them. While most of this evidence concerns the United States,[21] similar results seem to hold across a number of OECD and emerging economies.[22] Two potentially coexisting explanations are provided for this phenomenon: i) the large increase in the "sorting" of workers across firms, such that the most productive workers increasingly work together and for

21 See Dunne et al. (2004), Barth et al (2014), and Song et al. (2015).

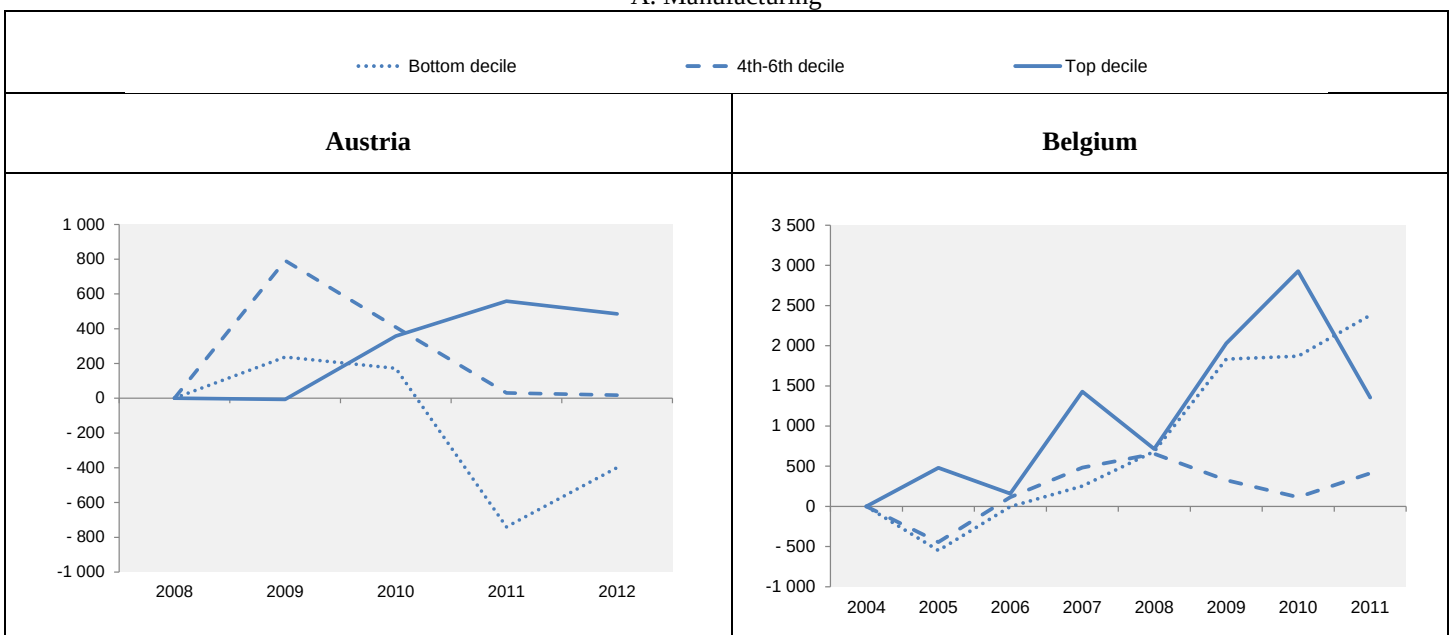
22 See for instance the United Kingdom for the period 1984–2001 (Faggio, et al, 2007); Germany over the 1985–2009 period (Card et al, 2013); Brazil over 1986–1995 (Helpman et al, 2015) and Sweden over 1986–2008, (Håkanson et al 2015). For new evidence and a more detailed literature review see Berlingieri, Blanchenay and Criscuolo (2016).

the most productive firms; and ii) rent sharing, when the most productive firms earn rents that they share with their workers. If the most innovative and productive firms also share their gains with their workers, then presumably this is a positive outcome, so long as markets remain contestable, and innovations diffuse. Comprehensive research is ongoing to assess the foundations of productivity and wage disparity, and how both are related to fundamental policies.

Preliminary OECD analysis suggests that productivity dispersion and wage dispersion at the firm level go hand-in-hand. Preliminary evidence for eleven OECD countries suggests that dispersion in wages and productivity has increased over the last 20 years across most countries (**Figure 3.3**). The evidence suggests that wage inequality between firms with different productivity performance has increased. There are, nonetheless, some important cross-country and cross-sectoral differences in the magnitude of the gap between wages in the most productive firms and wages in the worst performing firms. For instance, between 2005 and 2012, real average wages in Chile's service sector increased by little more than USD 1 200 for firms with the highest labour productivity (top 10%), while they only increased by just above USD 120 for the bottom 10%, a tenfold difference. In Chile's manufacturing over the same period the difference in wage growth between the top and bottom performing firms was only threefold: for firms with the highest labour productivity, real average wages increased by almost USD 630, while they only increased by USD 175 in the bottom 10%. Further work is underway to assess more precisely the drivers of wage dispersion and whether it results from an increase in dispersion within industries or from reallocation of labour to industries with higher dispersion.

**Figure 3.3. Change in real wages in different parts of the productivity distribution of firms**

A. Manufacturing



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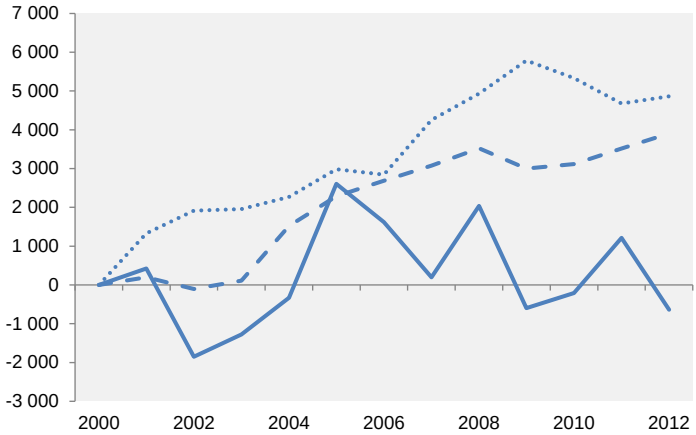
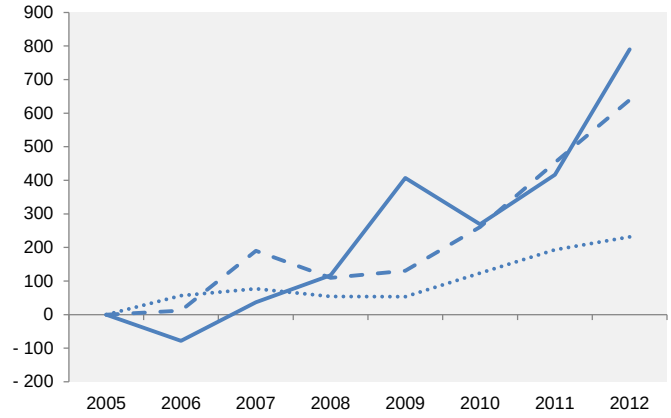
|  |  |

| Denmark | Finland |
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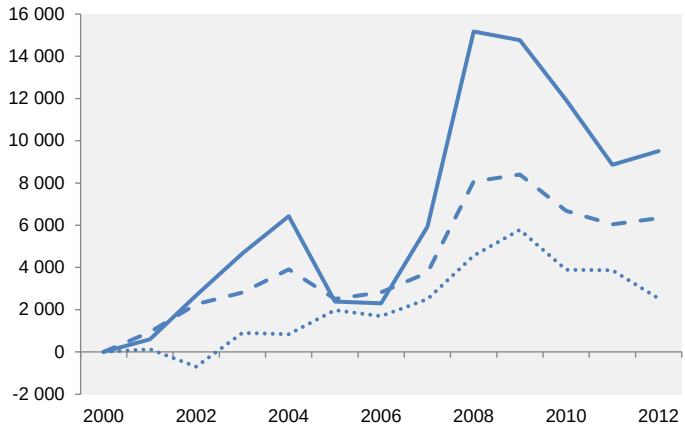
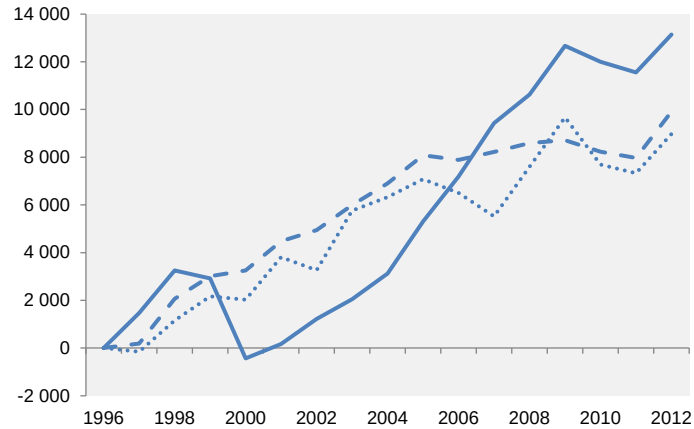
|  |  |

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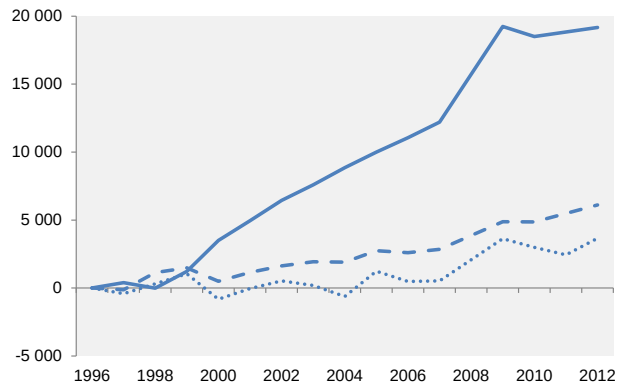
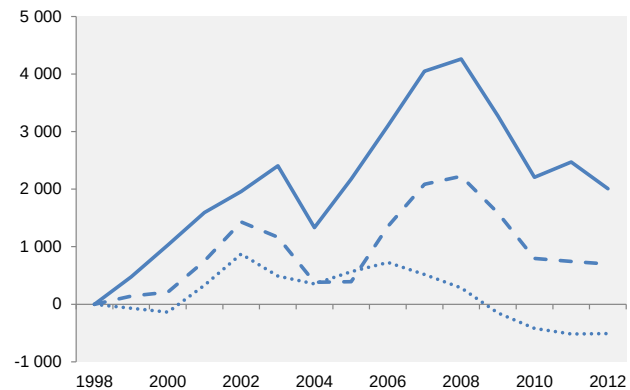
|  |  |

| Italy | Norway |
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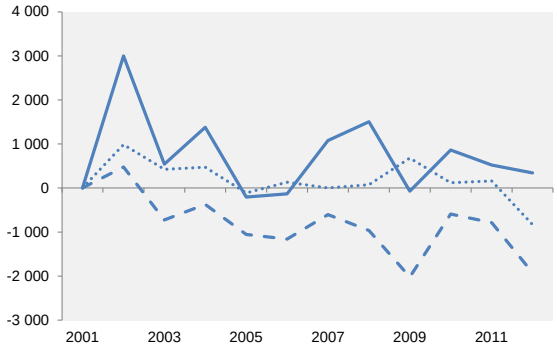
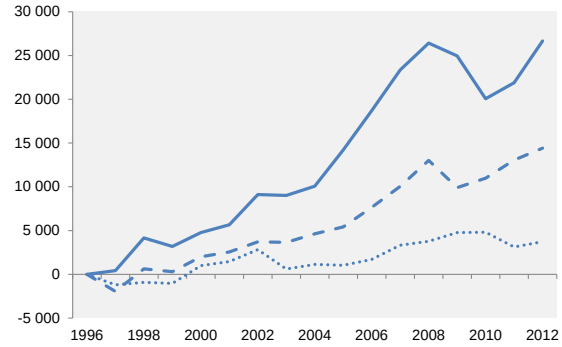
|  |  |

| **Sweden** | |
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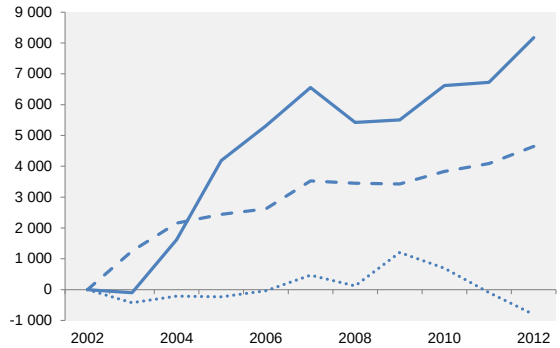
|  | |

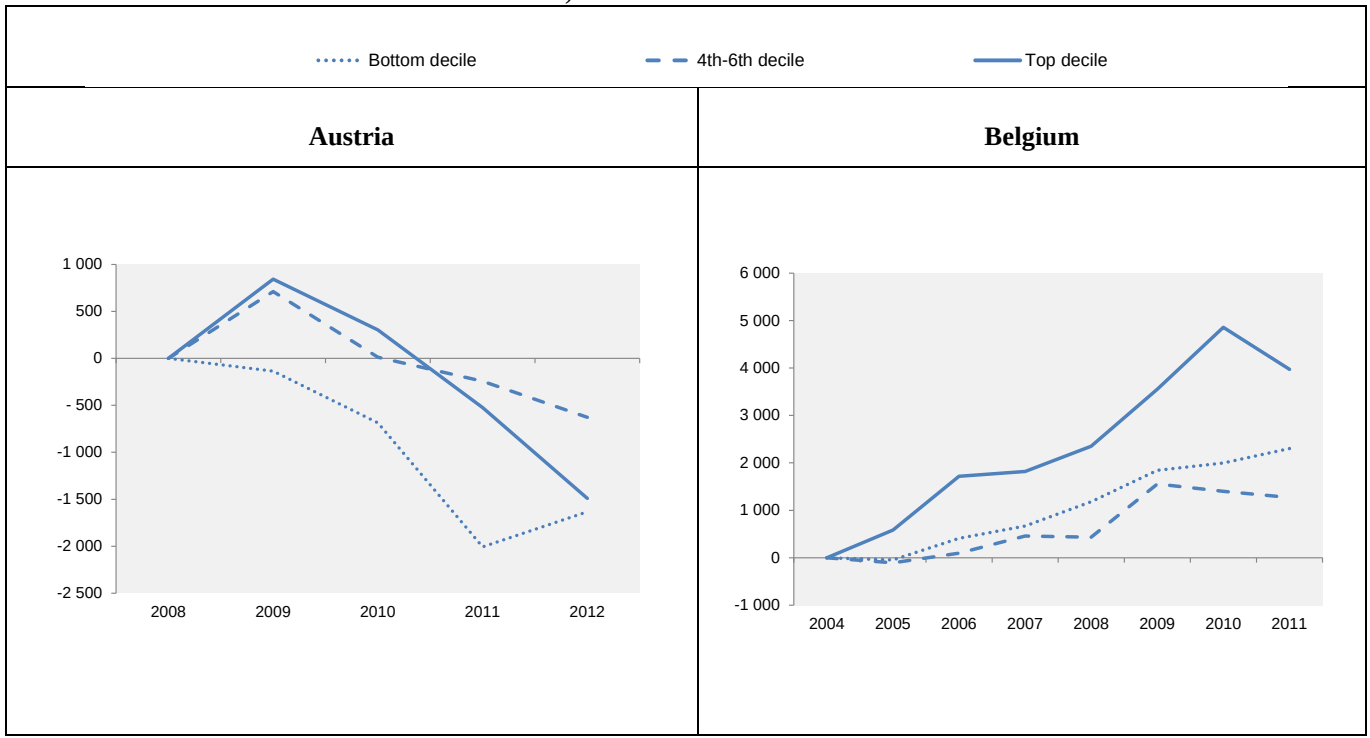


Notes: Each line represents the unweighted average of real wages across firms in a given part (bottom decile, 4th to 6th deciles, and top decile) of the productivity distribution in each year. Thus, "Top decile" represents the evolution of the average wage among the 10% most productive firms of a given year. Within each part of the distribution, wage levels are normalised at 0 in the first available year: in 1996 for Finland, France, and Norway, 1998 for Hungary, 2000 for Canada and Denmark, 2001 for Italy, 2002 for Sweden, 2004 for Belgium, 2005 for Chile and 2008 for Austria. Wages are expressed in 2005 US dollars.

Source: Data from the OECD Multiprod project, preliminary results, April 2016. See http://www.oecd.org/sti/ind/multiprod.htm and Berlingieri, Blanchenay and Criscuolo (2016) for more details.

Disclaimer: estimates are based on micro-aggregated data and they might differ from official national statistics.

B) Non-financial Services



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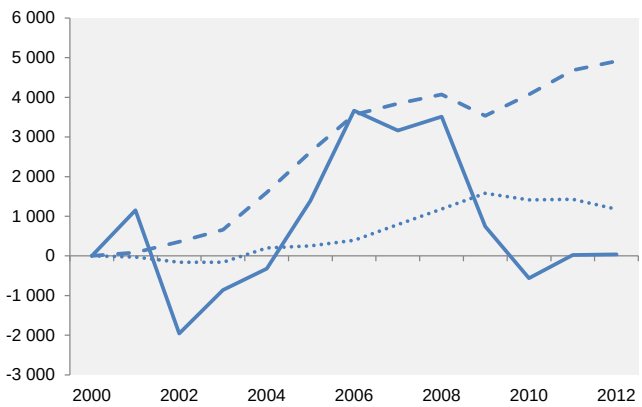
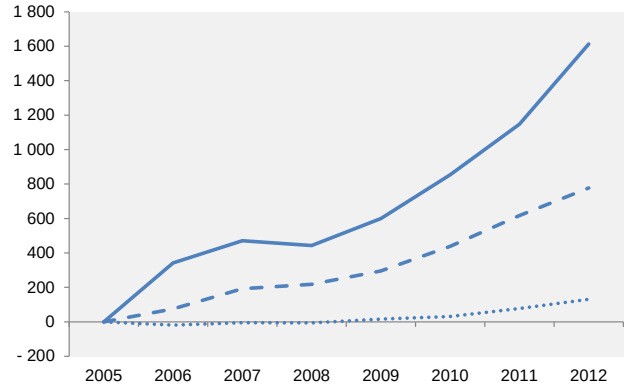
|  |  |

| Denmark | Finland |
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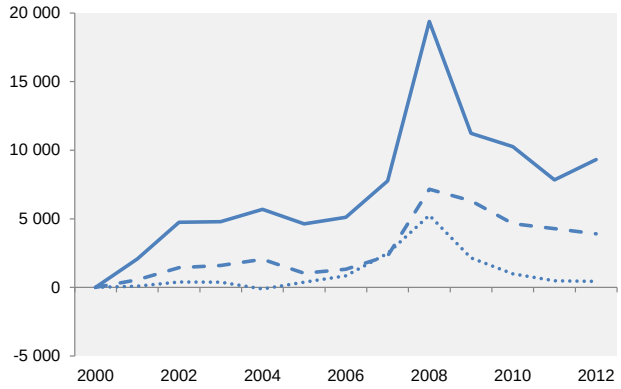
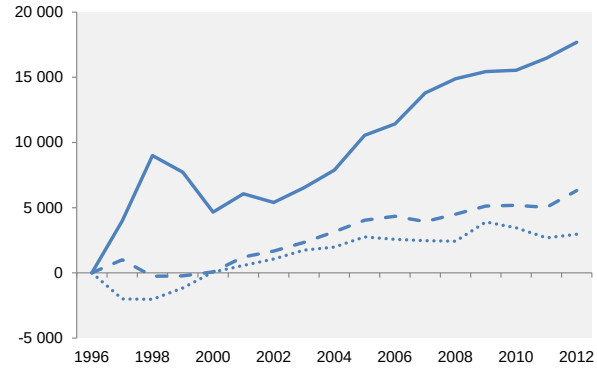
|  |  |

| Hungary | Norway |
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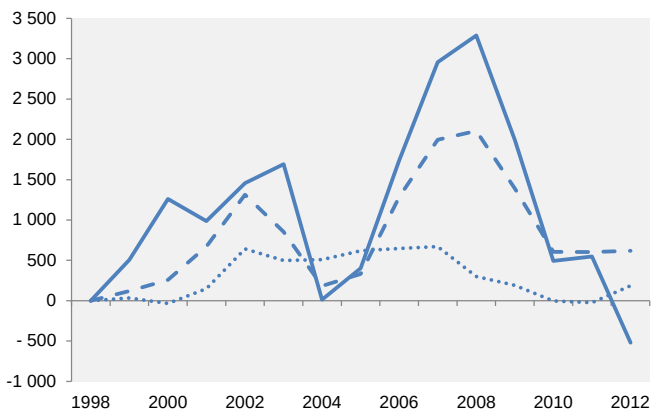
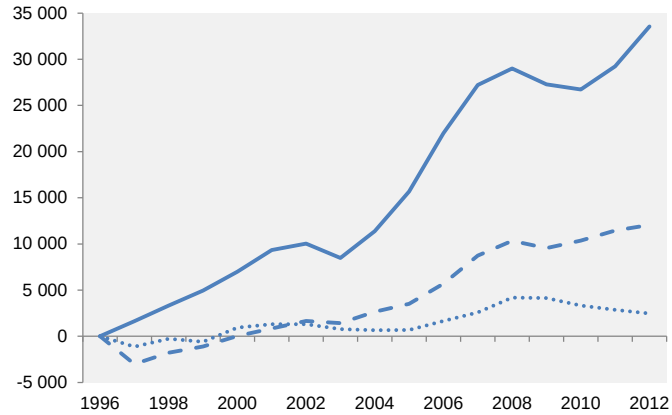
|  |  |

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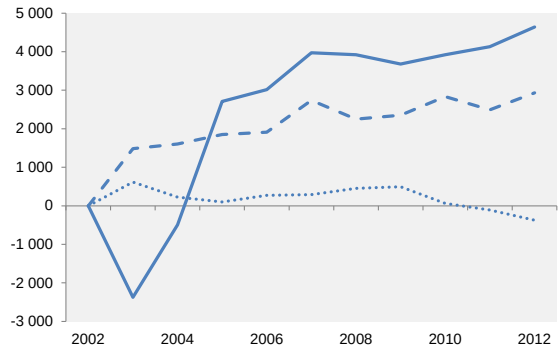
|  | |



Notes: Each line represents the unweighted average of real wages across firms in a given part (bottom decile, 4th to 6th deciles, and top decile) of the productivity distribution in each year. Thus, "Top decile" represents the evolution of the average wage among the 10% most productive firms of a given year. Within each part of the distribution, wage levels are normalised at 0 in the first available year: in 1996 for Finland, and Norway, 1998 for Hungary, 2000 for Canada and Denmark, 2002 for Sweden, 2004 for Belgium, 2005 for Chile and 2008 for Austria. Wages are expressed in 2005 US dollars.

Source: Data from the OECD Multiprod project, preliminary results, April 2016. See http://www.oecd.org/sti/ind/multiprod.htm and Berlingieri, Blanchenay and Criscuolo (2016) for more details.

Disclaimer: estimates are based on micro-aggregated data and they might differ from official national statistics.

The dispersion of wages and the dispersion of productivity both depend on product and labour market institutions. The link between firm-level productivity and wages is expected to be weaker where the effective length, breadth and regional coverage of collective bargaining agreements are very extensive, where intermediate wage bargaining systems are combined with large coverage extension, or where workers are better protected during adverse market conditions. Cross-country differences in these different dimensions could help explain why wage polarisation was more acute in the US than in continental Europe. Research using data from the OECD's *MultiProd* project will provide new insights on how a country's specific policies and framework conditions shape the form of the wage distribution, the way it evolves over time and its relationship with the productivity distribution.[23]

The degree of market power of firms will also affect their ability to maintain rents, which may or may not be distributed to workers. As argued in Chapter 1, policies that reduce competition and protect incumbent firms against competitors weigh on productivity growth and may lead to excessive rent capture by firms and their workers. These policies include competition policies and product market regulation, but also innovation policies and industrial policies. More analytical work is needed to understand the policy settings that favour the development of excessive rents in specific markets and that may, in turn, lower productivity and contribute to higher wage inequality. On the other hand, if innovation leaders generate high productivity, rents and higher wages, then policies to drag down such leaders are not the objective; rather, ensuring a level playing field and the policies to promote diffusion of their knowledge and tools is. It is therefore particularly important to consider the source of the leadership and rents, and whether it is innate superiority or enabled by policies

Research is also underway, but could stand to be deepened, to better understand why average wage gains have tended to lag behind productivity, leading to a decline in the labour share of total income.[24] Evidence suggests that much of the decline in the labour share in many OECD countries over the past decades is explained by factors driving total factor productivity and capital deepening. Not only has ICT created opportunities for unprecedented advances in innovation and invention of new capital and services, but also for fragmentation and globalisation of the production process through global value chains. This rise of GVCs has had an impact on productivity and on the labour share and worker bargaining power (OECD 2015b). In advanced economies, at least 10% of the decline of the labour share is accounted for by increasing globalisation – and in particular by the pressures from the delocalisation of some parts of the production chain as well as from import

23 See http://www.oecd.org/sti/ind/multiprod.htm for further details on the project.

24 Even as the share of total income going to the top earners has increased.

competition from firms producing in countries with low labour costs at the lower end of the global value chain.

### *3.2.4 Financialisation.*

Technological tools have enabled greater financialisation of business and the economy and have altered how firms and individuals behave. Finance is a core determinant of how reallocation proceeds within an economy, thereby playing an important role in either enhancing or inhibiting productivity growth and equity. Poorly performing financial institutions can hold back the reallocation process of the exit and entry of new firms, thus reducing productivity growth as well as capturing skilled workers in poorly matched jobs, and hence hindering equity. Individuals that start unequal with respect to income and wealth have greater difficulty accessing credit, thus compounding their situation.

There is some evidence that the financialisation of the economy has exacerbated inequalities and hit the productive potential of smaller firms and low-income groups. The financial sector plays a central role for inclusive growth by enabling access to finance for firms and individuals. Over the past fifty years, credit from banks and other intermediaries to households and businesses has grown three times as fast as economic activity. However, in many OECD economies, this expansion has reached a stage where it has started to contribute to the slowdown in productivity growth (Cournède et al., 2015). Financialisation has also exacerbated inequalities, as people with higher incomes have benefitted more than their poorer counterparts from credit-financed investment opportunities, especially in European countries (Denk and Cazeneuve-Lacroutz, 2015), leaving lower-income groups with less opportunities to invest in housing, education and other assets. In the United States, by contrast, the financial sector prior to the crisis extended large amounts of poorly checked debt to low-income borrowers, especially in the form of mortgages. Lacklustre income growth among low-income groups in the United States may have explained their appetite for borrowing, suggesting a possible link from rising inequality to the financial crisis (Rajan, 2010). Moreover, through their access to financial leverage, large firms, especially in the financial sector itself, have also been a key beneficiary of the expansion of finance.

The expansion of the financial sector has also contributed to widening wage dispersion, while potentially slowing aggregate productivity. The expanding financial sector has drawn highly talented workers away from sectors with greater productive potential. OECD work has found evidence that the financial sector generally pays its employees more than what workers with similar profiles get elsewhere, and that this higher pay cannot be fully explained by higher productivity (Cournede et al 2015, Denk 2015).

In countries where the financial sector has become particularly large, this has possibly affected aggregate productivity, or at least overall growth, as well as contributed to widening income inequality by offering relatively higher wages compared to other sectors. The support to the sector through the too-big-to-fail policy response at the height of the crisis may have played a role.

## 3.3 Adaptability and dynamism: implications for productivity and inequality.

The restructuring of firms and reallocation of resources is fundamental to productivity growth. However, the pace of technological change and its associated demand for restructuring and reallocation of firms and workers may be faster than the pace of adaptability of individuals, firms, and regions. A period of intensive job destruction could lead to a temporary rise in unemployment, with displaced workers encountering difficulties in finding appropriate new employment, as newly created jobs may require different skills. Some specific types of adaptability and dynamism warrant a closer look and further research into their relationship with both equity and productivity, and it is important to take a careful look at how policies either promote or inhibit restructuring of firms, adaptability of workers, and overall reallocation of resources.

### *3.3.1 Productivity growth and skill mismatches*

Potentially highly productive workers can get trapped in low-productivity activities within the economy rather than moving to sectors and firms (and possibly, regions) that are more productive and pay higher wages. Recent OECD work has pointed to resource misallocation in many OECD economies, including a high level of skills mismatch. It has also identified a number of policies and factors that can hamper the efficiency of resource allocation (OECD, 2015g). If the allocation of resources across firms and sectors is weak and inefficient, and in particular hampered by a combination of product competition, labour market and housing policies, it will perpetuate or durably increase income inequality and unemployment or under-employment. On the other hand, better skill use by employers can also improve productivity performance by reducing mismatch between workers' skills and job requirements.

The continuous reallocation of jobs from low to high productivity firms and industries is a key factor for productivity growth, but the associated worker displacement may have short-term costs for the individual concerned and local communities. The innovations in technology and business organisation that power productivity gains create structural adjustment

pressures in labour markets. Innovative firms expand at the expense of less productive firms, which in turn shed workers. This type of labour reallocation is vital for productivity growth. OECD work (OECD, 2013b) shows that 2-7% of workers with a year or more's job tenure are displaced annually in OECD countries. Research shows that such job churn is associated with higher levels of worker income and satisfaction (controlling for the overall unemployment rate) (Hijzen and Menyhert, 2016). On the other hand, workers who are less mobile or less able to adapt to new job requirements could face insecurity, earnings volatility and unemployment, weakening the potential benefits of reallocation. Ensuring that workers are re-allocated to firms and activities where they are best able to exploit their skills is a major challenge and requires skills and labour market policies that facilitate this transition (see Chapter 4).

Skills mismatch in OECD countries represents a drag on the growth potential of the economy. When reallocation of workers across firms and sectors is inefficient, skills mismatch is likely to ensue. Skills mismatch, which predominantly takes the form of over-skilling, affects one in five workers in the United States and as many as one in three in Italy (Adalet McGowan and Andrews, 2015b). Mismatches between the educational requirements of jobs and educational qualifications are also common. Both forms of mismatch result in lower productivity than could be achieved if workers were all employed in jobs that matched their skills. Simulated gains to moving all countries to the highest level of skill matching observed in the OECD would result in considerable gains in aggregate productivity, for example, a 3% gain in the United States and a 10% gain in Italy. If the full productivity dividend of innovative technologies is to be realised, it is important to ensure that the labour market is able to efficiently match workers with suitable jobs.

High levels of skills mismatch also contribute to wage inequality. Better adapting skill utilisation to the competences of workers could also reduce the insecurity and earnings volatility that innovation can imply for workers and their families. It could potentially reduce wage inequality by lifting wages in the bottom part of the distribution. In many countries there are more jobs requiring low use of skills than there are workers with low skills. For example, wage inequality in the Netherlands could be 8% lower if skills used in the countries better reflected the skills of the workforce. In other words, a 10% decline in the dispersion of skills use in the Netherlands would reduce wage inequality by 1.1% (OECD, 2015b).

### *3.3.2 The challenge of dual labour markets and mass layoffs*

Income inequalities become ever more deeply entrenched in a dual labour market. Some OECD labour markets are particularly characterised by

a divide between workers who are in the core labour market (the "insiders") and those at the margin ("the outsiders"). Workers in precarious jobs tend to receive less training than those who are in well-protected regular contracts, despite the fact that those with temporary contracts are more likely to be low-skilled. In EMEs with large informal markets the divide is even deeper. Overall, part of the economy has only a limited capability to increase productivity, upscale and raise wages, and is increasingly falling behind.

Incomplete reforms of employment protection legislation can contribute to labour market duality, and skill mismatches. Employment protection legislation (EPL), and especially that which affects permanent contracts, plays an important role in shaping the magnitude and efficiency of the reallocation process. Inappropriately designed EPL can have a large impact on aggregate productivity and competitiveness (OECD, 2010), resulting in workers being stuck in jobs for which they are not a good match (and thus are likely to be less productive).[25] The issue is not a simple matter of whether EPL is too rigid or too lax. Several OECD countries have (or, given recent reforms, had) fairly flexible regulations on temporary and other atypical labour contracts, combined with strict regulations for permanent contracts. This leads to a very high turnover among workers on temporary and other atypical contracts – often with precarious employment being interspersed with unemployment and little if any career progression and acquisition of skills – and little reallocation of labour from protected, permanent jobs towards more productive sectors and firms. Those that suffer most from such a 'dual' labour market are the youth and the low skilled, in particular, who get trapped in temporary and precarious employment. This high but concentrated-at-the-margin churning is not conducive to a better reallocation of labour to more productive uses and, at the same time, contributes to inequality in the labour market and skill mismatch.

A number of OECD countries have, over the past five years, undertaken reforms of their employment protection legislation with the aim to reduce the gap in protection across different types of contracts and promote the creation of permanent jobs (OECD, 2015b). While the evidence on the impact of these reforms is still being collected, it is important to combine these reforms with efforts to strengthen the design of social safety nets, job search assistance and active labour market policies, investment in education

25 Forms of labour compensation that are tied to a specific employer, such as health insurance or pensions, can also create a barrier to labour mobility. In such cases, policies may be able to foster increased portability. For example, the 2008 Affordable Care Act in the United States facilitated efficiency-enhancing mobility by reducing the risk that changing jobs results in a partial or total loss of health insurance.

and training opportunities and portable health and pension benefits. These types of measures support displaced workers and insure workers against labour market risk more generally. The re-employment of older and long-tenure displaced workers also proceeds more smoothly if they received tailored assistance (**Box 3.1**). Research shows that money allocated to such tailored ALMP for workers displaced through mass layoffs is twice more effective at shifting such workers to new jobs than AMLP financed for workers who lost their job due to other involuntary reasons (Andrews and Saia, 2016).

### Box 3.1. Rapid response measures for mass layoffs

Older displaced workers who have accumulated many years of experience on their jobs require special help if they are to find suitable new jobs quickly. Along with the shock of losing a stable job, long-tenure displaced workers have not searched for a job in many years and often have little idea how to do so effectively. This group also has difficulty assessing the skills they have acquired on-the-job and how well these skills match job requirements in growing parts of the economy. Another particularity of long-tenure displaced workers is that many receive considerable advance notice that they will be displaced, yet fail to make an early start in preparing for a career change in the absence of timely assistance to do so.

A number of OECD countries offer specialised re-employment services to workers affected by mass layoffs and these "rapid response" measures appear to be highly cost-effective. One of the keys to effectiveness is to begin assisting workers to navigate the adjustment process as soon as they are notified of a pending layoff, rather than waiting until they become unemployed. Often, the public employment service establishes a temporary office at the work site where workers receive both individual and group assistance. These services range from basic counselling (e.g. about how to apply for unemployment benefits, labour market opportunities and vocational training options), to more intensive and individualised services, such as "skills audits" documenting workers' competences possibly combined with a training plan to fill any gaps in their skillset so as to qualify them for job openings in growing occupations. Job fairs may also be organised to put displaced workers in direct contact with employers who are recruiting workers.

In Sweden, employer and union federations have set up Job Security Councils in a number of sectors which organise rapid response measures without any public involvement. Elsewhere, the government plays a more active role, but employer cooperation remains a key to success. Indeed, public rapid response measures presuppose that employers provide workers and public authorities with sufficient advance notification of pending layoffs and allow the public employment service access to the affected workers in advance of their becoming unemployed. Employers can also collaborate with public re-employment support by helping to document the skills these workers have acquired on the job. In Japan, most large employers voluntarily supply outplacement assistance when they displace permanent workers. Recently, the public employment service has made progress in better coordinating public re-employment assistance with these private measures, as in the case of a large layoff at the Sharp Corporation at the end

of 2012. The public employment service in Quebec province in Canada has extended rapid response services to workers affected by individual and small-scale displacements.

Sources: This note is based on information contained in OECD (2015h), OECD (2015i), and OECD (2015j).

Policy packages affect both productivity and inequality outcomes. Recent OECD research shows that the combination of changes in product and labour market policies can yield very different outcomes for workers and for productivity. Increased flexibility in labour markets without a complementary increase in product market competition does not enhance investment or productivity, but hurts workers. Similarly, product market competition without complementary labour flexibility fails reallocation, yielding the same bad outcomes (Egert, 2016).

## 3.4 Promoting social inclusion and economic growth through new technologies

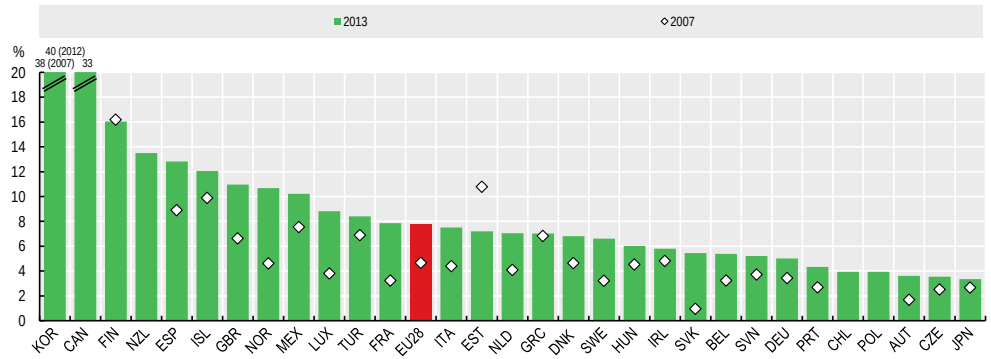
The digital economy has huge potential to enhance productivity, incomes and social well-being. A large part of the discussion of new technology, productivity and inequality focuses on the labour market – will people have the right skills? If they do not, will they be left behind? But new technologies can also affect inequality and productivity directly. Inequality, by definition, means that people do not have the same access to scarce resources, and that some do not have any access. New technologies in some cases can eliminate that scarcity. For example, new technologies can leverage human brain capacities and cognitive skills in similar ways to earlier breakthrough technologies, such as steam power and electricity, that magnified human physical strength. This holds the promise of similar or even greater increases in living standards, considering that digitised information can be reproduced at low cost and used simultaneously thus being far less subject to scarcity.

Digital technologies can also promote social inclusion by creating better access to quality education and offering new opportunities for skills development (OECD, 2014a). Inequality affects access to education, as shown earlier in this chapter. Digital learning environments can enhance education in multiple ways, for example by expanding access to content even to people from low income backgrounds or disadvantaged areas, supporting new pedagogies with learners as active participants, fostering collaboration between educators and between students, and enabling faster and more detailed feedback on the learning process. Recent innovations in

digital education are Massive Open Online Courses (MOOCs) and Open Educational Resources (OER). They provide complete, open-access university courses online to thousands of students at the same time by using some social networking practices (**Figure 3.4**).

**Figure 3.4. Individuals who participated in an online course, 2007 and 2013**

As a percentage of individuals who used the Internet in the last three months




Source: OECD (2014b).

New digital technologies are particularly important to better connect disadvantaged groups (OECD, 2016). For example, mobile connectivity is helping reach remote populations as well as those with lower incomes, due to its low costs. Pantea and Martens (2014) find that low-income users spend even more time on the Internet than the average, browsing websites that deal with education, career opportunities, health and nutrition themes and online sales platforms. Potential benefits for low-income groups also relate to improved access to free or very low cost knowledge and information; services that allow consumers to negotiate better prices for products (as well as identify better quality products); as well new consumption opportunities offered by Internet-based platforms that facilitate access over costly purchases.

Open digital learning resources could promote social inclusion, but positive evidence is limited. Such open digital learning resources could promote social inclusion by helping to contain the public and private costs of education and by breaking down boundaries to the distribution of high-quality resources across countries and between formal and informal education settings. They can also reduce barriers to learning opportunities easing requirements of place, time and pace of learning; and they can promote a continuous improvement in the quality of educational resources

by more rapidly and flexibly reflecting new knowledge developments and learning theories (OECD, 2015k). However, OER at large and MOOCs in particular have yet to find effective mechanisms for integrating in institutional frameworks for quality assurance, accreditation and recognition by employers. Seizing the educational opportunities from digital technologies requires a process of institutional learning, where actors – teachers, students, parents and educational institutions - are given sufficient scope to experiment with new tools and approaches and systematic assessment of outcomes leads to select the most effective practices. Evidence on the impact of technology in learning outcomes has so far been mixed at the system level (OECD, 2015b).

Technological innovations in the financial sector can promote social inclusion. Digital payments systems and mobile banking, for example, can reach the "unbanked" and households in remote areas who have had difficulties in accessing financial services such as money transfer services, and insurance and credit. Digital lending innovations and innovative financing like peer-to-peer lending and crowdfunding platforms have the potential to fill a bank lending gap and improve access to finance for both households and small enterprises, allowing for the participation of small investors. Financial innovations will, however, require an appropriate regulatory and legal framework ensuring transparency and accountability. Tailored financial education programmes can help enable individuals and small businesses to make use of these new opportunities and help them make informed choices.

## 3.5. A new approach is needed

The expected potential benefits from new technologies will require policy action to ensure that everyone can benefit, including workers, firms, and regions. As shown in this chapter:

- Inequalities themselves prevent people from investing in skills, leading to low income families and their children being marginalised from the benefits of new technologies and higher productivity.

- Technological change offers both promise and peril and to make the most of it the key will be to ensure that skills and potential are developed and used. Although it is not yet clear how many people will be affected, there is evidence, in a number of countries, that the labour market is being hollowed-out with even skilled jobs being lost to new technologies, if they are routine. This means that not just up-skilling, but different sorts of skills, such as problem solving, will be needed in the new world of work.

- Conduct, incumbency, and the market power of firms at the frontier of productivity are important ingredients in the diffusion of productivity growth and dispersion of wages. Policy needs to address how more firms can adopt high productivity technologies and work practices, yielding greater diffusion of innovations, and higher aggregate productivity growth.

- New technologies can bring substantial benefits for social inclusion by enabling easier access to learning and training opportunities, by easing the access to finance and credit, and by lowering prices of financial services, thus contributing to higher productivity and growth while at the same addressing some of the root causes of increasing inequality. But this will not happen without policy interventions to ensure that everyone can benefit from such developments.

Further research is required to clarify the policy foundations of both productivity and inclusiveness, so as to better inform policy choices in order to kick start productivity growth, while also ensuring that the resulting benefits are widely shared. The policy foundations include product market competition and innovation, labour market and skills policies, and financial institution capabilities. These policies interacting with one another create the environment in which firms and workers meet and match, equally or unequally, to yield both productivity and equity outcomes. Upcoming research threads include:

- Probing more deeply into how these fundamental policies may yield differences in productivity performance across firms and translate into dispersion in earnings and income - including the gap between the wages of different workforce groups and advances in productivity.

- Considering how the rapid emergence of new technologies – including ICT-enhanced robotics – is changing labour demand, employer-employee relationships, and worker-wellbeing, and thus the need to enable workers to acquire the skills needed in the new emerging tasks and to move from declining to growing parts of the economy.

These research questions will feature prominently in the further development of the Inclusive Growth initiative, the implementation of the *OECD Skills and Innovation Strategies*, the new analysis that will be undertaken to develop the *new OECD Jobs Strategy*, including the *Future of Work* project, as well as the *Digitalisation of Economy and Society* project.

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# *Chapter 4*

# *What does this mean for policy?*

How can policy-makers address the Productivity-Inclusiveness Nexus? What is the best way to promote synergies between faster productivity growth and greater inclusiveness? How can compensatory measures be employed to deal with trade-offs? This chapter sets out the beginnings of a policy framework to address the multiple interactions between inequalities and productivity and how these interactions play out across countries, regions, firms and between individuals. The overarching aim of the chapter is to provide guidance for policymakers on how to ensure that all individuals, firms and regions are empowered to both contribute to and benefit from improved productivity growth. It begins by examining how policy can support individuals as they strive to fulfil their productive potential, before looking at how policy can help all firms to become more productive whilst also promoting inclusive growth. It then goes on to consider how changes to policy-making at the local and regional levels can make a difference, before finally exploring the need for strong public governance, including a whole-of-government approach to avoid piece-meal policymaking and unintended consequences.

To deal with the challenges posed by declining productivity growth, widening inequalities and large disparities in well-being outcomes, policy makers need to adopt a broader, more inclusive, approach to productivity growth. Addressing the trends in slowing productivity growth and rising inequalities (outlined in chapters one and two), whilst accounting for the complexity of the potential linkages between the two trends (as discussed in chapter three) and the impact of evolving policy settings, will necessitate the adoption of a new more systemic approach to policy making. Adopting such an approach, centred on the unifying objectives of reducing inequalities and promoting productivity growth, will better enable policy makers to deploy coherent policy sets covering a range of areas: from product market regulation, to innovation and competition, to labour market regulation, skills, and finance. It will also ensure that policy levers are, ex-ante, coherently aligned to harness self-reinforcing, synergies between policy domains, whilst providing a clear indication, ex-post, of how compensatory measures can best be enacted when trade-offs occur.

Further work is needed to spell out the full implications of the nexus for policy making, but in many instances it is already clear how policies can be aligned to promote both inclusiveness and improved productivity growth. Ultimately, when it comes to navigating the *Productivity-Inclusiveness Nexus*, further work will be needed to advance a crosscutting research agenda on the systemic interactions between slowing productivity growth, increased inequalities, and evolving policies sets, with a view to exploring the possible upshots in individual country contexts, and the potential for cross-sectoral - and even cross-country - spill-over from prospective policy interventions. However, in many instances it is already clear how policy sets can be aligned to create win-win outcomes and much meaningful advice can already be proffered on a policy by policy basis, with - in many cases - clear indications as to a given policy's likely effects on productivity and inclusiveness.

This chapter considers how policies targeted at individuals, firms, and regions can be focussed on the twin objectives of promoting improved productivity growth and reducing inequalities, and how such measures can be supported by reforms to governance. In practice, setting in motion a virtuous cycle of improved productivity growth and greater inclusion means targeting those policy areas that can have the greatest effect in terms of positive spill-overs, whilst avoiding, or taking compensatory action to address, those that impose excessive costs, either in terms of hindering productivity growth or worsening inequality. The key policy messages to come out of this are:

- Achieving stronger productivity growth and reduced inequality requires action to better ensure that all individuals have the skills to obtain rewarding and

productive employment and that these skills are fully used. In unequal societies, low income households are less able to invest in education and take advantage of opportunities than their better-off neighbours. A productivity strategy that just focuses on businesses and innovations, or that relies on a race to the bottom - via low wages, dismantled social protection, or unacceptable working conditions - to increase the competitive advantage of firms and regions, whilst assuming that eventually everyone will benefit, will ultimately be less effective than a strategy that also addresses the disadvantages that hold people back from contributing to a dynamic economy. This suggests policies to ensure that individuals, and particularly those from lower income groups, are well equipped to fulfil their productive potential. Besides redistributive measures and active labour market policies, policy action should focus on: supporting the "Bottom 40%" in accessing quality education; in ensuring that training opportunities are also offered to low skill individuals and firms; and addressing barriers that disadvantaged groups face in important areas like access to digital technologies, innovation, finance, and entrepreneurship, and also simply in accessing good quality jobs. In a context of budgetary constraints, it is the prioritization that matters, rather than changing the entire policy framework.

- Businesses need an environment that allows them to prosper, and to upgrade or close down when necessary, that supports both innovation and experimentation at the frontier and its diffusion throughout the economy. They need an environment that ensures a level playing field for incumbents and challenger firms, that does not allow market power to result in excessive rents, but rather enables small innovative companies to access finance, technology, individuals with high quality skills, and ultimately to grow. Creating such an environment will require policy action in many areas, including: skills, labour markets, competition, product market regulation, financial regulation, innovation and government support for the corporate sector.

- While many productivity-promoting policy interventions are "spatially blind", others have an important place-based dimension. Policies concerned with improving information about labour-market conditions, better matching, training and/or subsidies to employers are likely to be better designed at regional or local level (or, at the least, with substantial scope for adaptation to particular places), since information about local conditions can be crucial to the effectiveness of such efforts. For similar reasons, economy-wide policies aimed at increasing skill levels must often undergo local adaptation to the characteristics of the local communities. At the same time, regional and urban policies can do much to reduce or remove the barriers that limit access to opportunity. Housing segregation by race or income and poor public services, in areas like health and transport, can lock individuals and groups into low-

productivity traps. Housing and transport policies play a key role in determining whether and to what extent disadvantaged groups can easily avail themselves of training or labour-market opportunities.

- Achieving this may require changes to the policy making process and the conduct of public governance, and greater co-ordination at the international level. Countries vary in their experience and success in designing and implementing policy packages that require different government departments, agencies and ministries to work together to achieve shared goals and deliver joined-up outcomes. Some countries have established modes of communication, negotiation and accountability that need little or no adjustments; while others may need to work hard to create such modes. Policy coherence among different areas is a crucial element in this design. Policy coherence is also needed at the international level. In an increasingly interconnected world, the spill-over effects of domestic policies in the rest of the world cannot be ignored. Dealing with the policy issues that arise from the *Productivity-Inclusiveness Nexus*, whether it is ensuring that MNEs do not seek economic advantage and improved productivity growth by ignoring labour rights, working conditions, or environmental concerns, or establishing that each individual and company should pay their fair share in taxes, will require some form of international cooperation.

The chapter is organised as follows: section 1 reviews how policy can support individuals as they strive to fulfil their productive potential. Section 2 examines how policy can help all firms to become more productive, whilst also promoting inclusive growth. Section 3 is devoted to the changes to policy making required at the local and regional levels, whilst section 4 discusses implementation, emphasising the importance of a whole-of-government approach, and the need to get political economy right to avoid piece-meal policymaking leading to both unfilled promises and unintended consequences.

## 4.1 Empowering individuals to fulfil their productive potential

1. **For individuals to contribute to - and benefit from - stronger productivity growth, policy needs to ensure that everyone not only has access to opportunities, but is also ready to take advantage of those opportunities when they come along**. This suggests a number of focusses for policy to ensure that all individuals have the opportunity, are equipped to, and supported in, fulfilling their productive potential throughout their lives. This also suggests avoiding policies that lead to excessive labour protection or burdensome regulations that ultimately mostly benefit certain groups of the population at the expense of the most disadvantaged and may

prevent the reallocation of resources to more productive activities. These efforts should include the provision of high quality education and life-long training, and measures to improve the use of skills and talents in the economy. and labour market policies that help people into higher quality more productive jobs. Such an approach must empower all of society, but focus particularly on connecting disadvantaged groups with opportunities, including in regions that have fallen behind, and reducing the barriers that they face in important areas like innovation, finance, and entrepreneurship, but also in simply accessing good quality jobs..

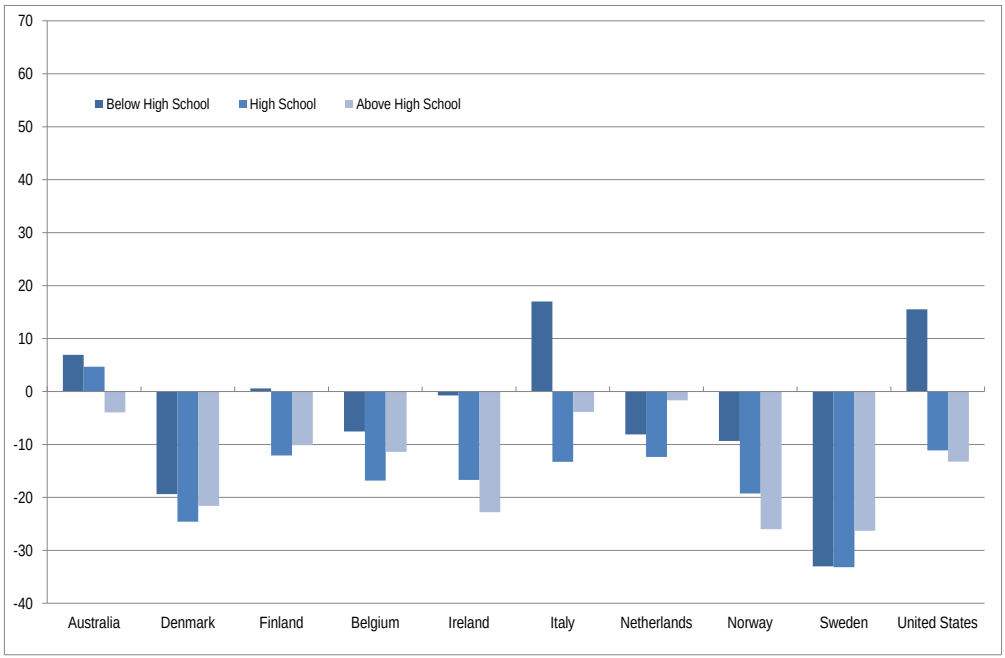
### *4.1.1. Ensuring that all individuals are furnished with better and more relevant skills is vital for expanding the productive base of an economy.*

To help individuals fulfil their productive potential, policies need to both increase the quality of education at all levels and life-long learning systems and improve the use of skills in the economy. Although there has been significant progress in increasing the levels of educational attainment in many countries over recent years, in some countries this has been achieved at the expense of quality, leading to a decrease in the levels of basic skills acquired for each level of educational attainment (**Figure 4.1**). As a consequence, the pool of people with very low skills remains substantial and includes individuals with relatively high formal educational qualifications. Given the increase in the demand for highly skilled workers, driven by the rapid pace of technological change, the smaller differences in levels of educational attainment that remain, as well as considerable differences in the quality of education, are likely to have a greater impact today than ever before on employability, wages, and well-being. On the other hand, education outcomes are still closely related to the socio-economic status of students in many OECD countries.

Going forward, we need to harvest the knowledge base developed by PISA to understand how to level the playing field, and how, by focusing on disadvantaged groups, countries can improve the performance of the population as a whole. However, we can already say that both breaking the link between socio-economic status and outcomes, and improving the level of skills in the economy at large, will call for continuing efforts to improve access to higher levels of education for more disadvantaged communities as well as action to strengthen the quality of education at all levels. In addition, there seems to be a growing divide between what people learn from the education system and what employers demand, creating the need to integrate new sets of horizontal skills in education systems, such as critical thinking, complex problem solving, innovation and team work. More research is required to assess the level of skill mismatch and the policies to address it.

**Figure 4.1. The level of basic skills acquired for each level of educational attainment has decreased**

Changes in Literacy proficiency from IALS to PIAAC by level of educational attainment




*Source*: International Adult Literacy Survey (IALS) 1994-1998, and Survey of Adult Skills (PIAAC) 2012 (see OECD 2014a).

The most effective way to improve the quality of education is to focus on capacity building for schools in areas like: school leadership; the ability to train, support and retain high-quality teachers; and the capability to put in place effective classroom learning strategies. For instance, strong and effective leadership policies need to find the right balance between school autonomy, i.e. the degree of responsibility and the type of decisions that school leaders can make, and accountability. Attracting the best candidates to the teaching profession, supporting them and retaining high quality teachers are also important. It involves providing initial training, supporting teachers' professional development throughout their careers and promoting peer learning networks, as well as putting in place the right incentives in terms of working conditions and salary. Equipping students with the new sets of skills needed for the future, implies a profound transformation of the methodologies used in the classroom. This represents a huge challenge and requires training the teachers who are used to more traditional approaches.

Moreover, to ensure that all students develop their full potential it is necessary to evaluate their performance from very early on, so that additional support can be provided to students lagging behind.

A special focus on the disadvantaged groups is essential, as PISA analysis has shown over the years. All the factors and policies mentioned above are particularly important for disadvantaged students who tend to have a more difficult starting point. Schools with a larger proportion of disadvantaged students can only overcome the challenges they face if they are provided with the resources needed, the most important being the quality of the teachers. Often schools in poor neighbourhoods struggle due the lack of resources and the poor quality of the teachers. Countries which make an effort to provide additional support to these schools by sending high quality teachers and good leaders are able to reverse the trend and give these children a real opportunity to perform well in school and in life.

Education and training systems have to be oriented towards furnishing individuals with relevant skills for the labour market as well as to function in life more generally. Better policies will require integrated education and labour market reforms, with the aim of improving the quality of education systems, incorporating new horizontal skills, and achieving a better match between the needs of the labour markets and what students learn. In the case of tertiary education, for instance, this will require universities to build bridges with the labour market in order to teach the sets of skills which are useful for their students' professional careers. In areas like vocational training, systems tend to be better aligned with the labour market and have shorter cycles which make them easier to adapt, but in many instances such systems are in great need of modernisation to reflect the development of new industries, such as those related to the digital economy. Another key element of vocational training is ensuring that it equips students with the basic skills needed to cope with the transition of moving from one job to another.

Policies need to address the waste of productive potential that occurs when women are discouraged from pursuing careers in STEM subjects. Women are highly underrepresented in Science, technology, engineering and mathematics (STEM) careers despite the fact that girls perform about as well as boys in high school science. It goes without saying that there are innumerable valuable career paths outside of STEM subjects, but science, technology, engineering and mathematics are important sources of innovation and productivity, and they are integral to the success and progress of modern economies. Talent and productivity are lost when young people, particularly women under-engage in STEM training and jobs, particularly given the persistent labour shortages in the STEM field in many countries. In attempting to explain this mismatch between abilities in school

and later entrance into science-related jobs, "intangibles" like self-confidence are important determinants. Girls report being less confident in their maths and science abilities than boys, but these gender disparities in self-belief are greater than actual gender differences in performance. To address these differences, and encourage more girls to enter productivity-enhancing STEM fields, parents and teachers should be trained to be aware of their own gender biases, and schools should engage in helping students understand the potential careers ahead of them – particularly those in science, technology, engineering and mathematics (OECD 2015a).

Individuals who have already left the education system can benefit from high-quality life-long learning programmes. This is particularly important for retraining workers exiting declining industries and upskilling those in fast-moving sectors, who risk being left behind by technological advances. High-quality life-long learning programmes can improve and expand the skills of current workers, and allow them to receive training whenever needed, to help them change fields or as part of efforts to improve the quality of their jobs. However, rolling out such programmes on a large scale is a major challenge, given the large pool of low-skilled workers, and the difficulties of reaching the people who need training most. In many countries life-long programmes already exist, but incentive systems – for employers offering training and individuals participating – do not encourage the participation of the low-skilled. Consequently, the design of such programmes including ease of access and the incentives for provision on the part of employers and participation on the part of employees will be key.

Support to enhance the skills of SME workers and new entrepreneurs is necessary. SMEs are particularly affected by the issue of lifelong learning, as they are less likely to have their staff participate in continuing formal vocational education and training than larger firms, which suggests that there is a need for specific solutions focussed on SMEs.[26] OECD work (OECD 2013a) suggests several avenues that can be pursued, such as measures to support formal training like the introduction of dual training schemes and in-work training subsidies. In addition, the role of formal recognition for employee skills (particularly in knowledge-intensive service activities) is key. Finally, it is also important to support the acquisition of entrepreneurship skills through training, coaching and mentoring to help more people create their own jobs and improve their chances of developing sustainable businesses. Entrepreneurship policy has to combine the practical

26 In Europe the share of employees participating in employer-financed continuing vocational training in 2010 was only 25% in enterprises with 10-49 employees, against 34% in enterprises with 50-249 employees and 46% in enterprises with at least 250 employees (Cedefop, 2015).

skills needed to start and operate a business with other support, such as financial assistance or business counselling. All of these policies should include, as a matter of course, better provision of information about labour market prospects to students and workers, including foresight exercises examining future labour market needs.

Everywhere, skills policies need to be complemented with specific measures focussed on tackling the growing digital divide. The rapid evolution of knowledge and pace of technological change implies that education systems should integrate new sets of skills which equip individuals with the ability to keep up throughout their professional and personal lives in this rapidly evolving ecosystem. Moreover, given the large economic and social externalities of digital technologies, governments should put in place measures to make ICT adoption and use affordable for everyone. As competition generally brings about more investment, better quality, greater supply, and lower prices, the creation of a competitive framework is the single most important initiative that authorities can take to increase affordability. Yet, even with a perfectly competitive market, a proportion of the population may not be able to afford some services deemed as essential to participate in economic and social activities. This requires explicit intervention from the government, for instance, through universal service policies.

### *4.1.2. Efforts need to be taken to reduce skills mismatch in the labour market.*

Policies to improve the skills of the labour force need to be complemented by measures to foster a better allocation of skills within the economy and encourage their effective use in the workplace. The potential for better skills for more individuals to result in improved well-being and higher productivity gains will only fully materialise if workers and firms make full use of these skills. To be successful, productive firms need to be able to hire workers with the right competencies, while avoiding trapping workers in jobs that are not the right match for their skills. On average across OECD countries, roughly one-quarter of workers report a mismatch between their existing skills and those required for their job – i.e. they are either over or under-skilled. OECD estimates suggest that a better use of human talent in countries where skill mismatch is very high, such as Italy and Spain, could be associated with an improved level of labour productivity on the order of 10% (Figure 4.2). The growing gap between education qualifications and the actual level of skills mentioned above means that when employers use qualifications as a proxy for skills, this may lead to placing people in the wrong jobs. This problem is particularly acute among young people looking for their first job. Reducing the skills mismatch

requires a combination of policies that include labour market, education and product market regulation measures.

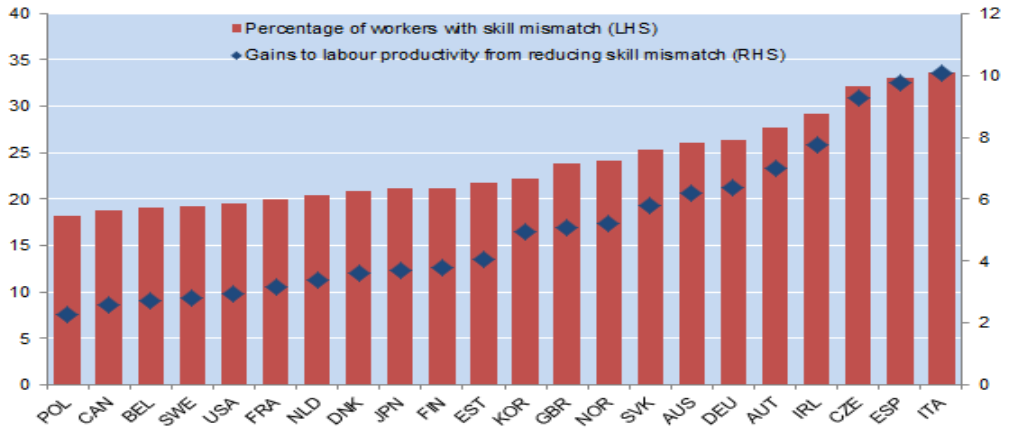
Skills mismatch can be reduced through good labour market information on skills needed by employers and making education and training systems and the learning choices of individuals more responsive to current and emerging skill needs. This requires good co-ordination between the key stakeholders in the planning of the exercises, the data collection, the sharing of the results and their use to inform policy in several different areas ranging from employment to education and training to migration policy. Moreover, successful skills policies based on this information require effective governance spanning both the worlds of education and work. A survey by the OECD of country practices in achieving these objectives finds that some countries do better than others. For instance, the strength of Norway's skills assessment and anticipation exercises is based on the joint involvement of the employment and education authorities in the design and development of the forecasts carried out by Statistics Norway, which ensures that they understand the outputs and use them for policy making (OECD 2016a, forthcoming).

Better matching of skills and jobs can be facilitated by higher participation in lifelong learning. As noted above, adult learning policies that encourage investment in the development of skills which complement technological progress are central to boosting productivity at the individual level, and when specifically tailored they can also contribute to better matching of skills and competencies to jobs. OECD estimates suggest that increasing participation in lifelong learning programs from the low level in Italy to the median level in Estonia is associated with a 6 percentage point decrease in mismatch (Adalet McGowan and Andrews, 2015a).

Addressing skills mismatch requires new management practices. Better evaluation by employers of the actual level of skills of their employees rather than relying on educational qualifications as a proxy for their skills, and, more generally, adopting appropriate work organisation and management practices can help bridge the gap between the skills possessed and skills used at work. The way work is organised – the extent of team work, autonomy, task discretion, mentoring, job rotation and applying new learning – influences the degree of internal flexibility to adapt job tasks to the skills of the workforce. Some management practices – bonus pay, training provision and flexibility in working hours – provide incentives for workers to deploy their skills at work more fully. Such practices are common in the countries that make better use of their human capital (OECD, 2016b).

**Figure 4.2. There is plenty of scope to boost productivity by reducing skill mismatch**

Skill mismatch and labour productivity

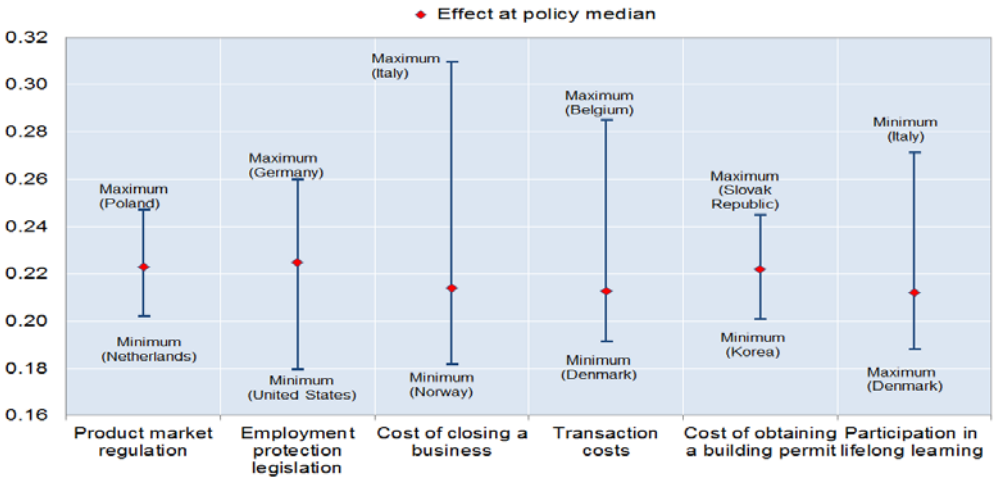



The figure shows the percentage of workers who are either over or under-skilled, and the simulated gains to allocative efficiency from reducing skill mismatch in each country to the lowest level of mismatch. Under - (over-) skilled workers refer to the percentage of workers whose scores are higher than that of the min (max) skills required to do the job, defined as the 10th (90th) percentile of the scores of the well-matched workers in each occupation and country. Source: Adalet McGowan and Andrews (2015a).

Labour market and housing reforms that increase labour mobility can also improve the allocation of skills. Policies that reduce excessive stringency of employment protection legislation for regular employees can also help to reduce the skills mismatch: OECD estimates show that a reduction from the maximum level (in Germany) to the median level is roughly associated with a 3 percentage point reduction in skill mismatch (**Figure 4.3**). As discussed in Chapter 3, EPL that encourages a 'dual labour market' of insiders and outsiders can be particularly unfortunate in its effects on skills mismatch. Housing policies also can also increase residential mobility by removing housing supply restrictions (i.e. stringent land-use regulations) or by reducing the transaction costs affecting the buying and selling of dwellings. OECD estimates (Adalet McGowan and Andrews, 2015b) suggest for instance that reducing transaction costs from the highest level (Belgium) to the median level (Finland) is associated with a 7 percentage point reduction in mismatch.

**Figure 4.3. Policy reforms can help reduce skill mismatch**

The probability of skill mismatches and selected policies




Notes: The dot is the average probability to have mismatch evaluated at the median level of the policy and individual characteristics, which include age, marital and migrant status, gender, level of education, firm size, contract type, a dummy for working full-time and working in the private sector. The distance between the Min/Max and the median is the change in the probability of skill mismatch associated with the respective policy change. See Chart 4.2 for the definition of skills mismatch.

Source: Adalet McGowan and Andrews (2015b)

Policies that facilitate both business entry and exit can also help reduce skill mismatch. High rates of skill mismatch often occur when an economy has a high proportion of long-established, unproductive firms that tend to use high-skilled labour less effectively. The creative destruction of unproductive firms to free up scarce resources and improve skills allocation can be encouraged through policies that facilitate both business entry and exit. For instance, Adalet, McGowan and Andrews (2015b) show that reducing the stringency of bankruptcy legislation from its most restrictive level in Italy – where mismatch and the share of old and small firms are very high – to the median level in Canada is associated with a 10 percentage point decrease in skill mismatch. Skills utilisation across the economy could also be increased by policies aimed at promoting training and the use of 'learning organisation' work practices in SMEs (OECD, 2013a; Lorenz and Potter, forthcoming).

### *4.1.3. Labour market policies need to help people move into higher quality jobs, whilst ensuring that no one slips through the cracks.*

Appropriately-designed unemployment benefits combined with comprehensive activation policies can help people move into new jobs. Benefit systems raise labour market security, help people transition into new employment, and reduce inequalities - notably during deep recessions when the risk of long periods of joblessness is substantial and loaded with the potential to leave deep scars on future career prospects.[27] There is also some evidence that unemployment benefit generosity has a positive impact on worker mobility in OECD countries.[28] This is because the extra income gives workers the opportunity to spend more time finding a job that better matches with their skills. However, the longer a spell of unemployment lasts, the more existing skills weaken. However, there is a balance to be found between a benefit that is sufficiently high that people are able to take time to find an appropriate new job, and ensuring that this does not take so long that their employability is damaged. Higher benefits can be paid when income support for job losers is accompanied by policies that place a strong emphasis on activation, like job search or training requirements, ensuring that matches are found quickly and skills do not degrade.

Improving work-life balance can help support efforts to keep productive workers in their jobs. Childbearing and child-raising years largely coincide with years that are critical to career development. Productivity suffers when trained workers permanently quit their jobs, but social support can help parents stay in the labour market. When parents have paid leave and job security after the birth of a child, they are more likely to return to employment and to the same job (Adema, Clarke, and Frey 2015). After leave periods end, affordable access to early childhood education and care (ECEC) is perhaps even more important for enabling parents of young children to engage in paid work (Thévenon 2015).

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27 Recent OECD work suggests that unemployment benefit systems play a considerable role in smoothing income fluctuations for vulnerable workers, reducing earnings volatility[27] by 15%, on average across the OECD, among those workers most exposed to unemployment risk and low-paid employment (OECD, 2015b). However, the estimated effects vary greatly across countries, from more than 30% in Finland, Denmark and Belgium to less than 3% in Italy and Turkey, suggesting that there is scope for countries to learn from the experience of others.

28 A ten-percentage-point increase in the average replacement rate – a large reform from a historical perspective – is estimated to increase, on average, gross worker reallocation by about 1 percentage point (OECD, 2010a).

In many countries, demand for ECEC outstrips supply, which inhibits parents (typically mothers) from working full-time. Childcare issues continue when children enter primary school, and out-of-school-hours support is important for ensuring that parents who want to work full-time are able to do so. Flexible work arrangements are also useful for enabling parents to remain in work while raising children. Additionally, strong evidence has been found regarding the equalising function that early childcare services render to those at the bottom of the income distribution. This is one of the most important investments that countries can make in order to address both current inequality, and support future sources of productivity growth. When confronted with resource allocation decisions, alongside the education system, investing in child care facilities is one of the most promising areas.

In emerging economies, curbing informality and hence the incidence of both low-productivity and low-quality jobs should be pursued. Governments can help promote formalisation of labour relations by improving regulations in product and labour markets, strengthening the design of simplified and presumptive tax regimes as well as tax enforcement, improving the quality of public services delivered to formal sector workers, and by strengthening the link between contributions and benefits in social protection schemes. In Chile, for example, the government incentivised workers to join the formal sector through the introduction of individual unemployment saving accounts, demonstrating how the costs of formalisation can be clearly linked to its benefits. In addition, steps can be taken to lower the costs of formality for employers and the self-employed. Simplified tax and administrative systems, streamlined registration processes and a reduction in red tape are crucial steps in this direction.

### *4.1.4. Promoting better health provides people with a platform to fulfil their productive potential.*

Unpacking the mechanisms by which socioeconomic factors affect health can help shape suitable policies to improve individuals' health and ultimately have beneficial effects on productivity. People in ill-health are less able to take part in productive activities, but people working in poor labour conditions are also more likely to find themselves afflicted by ill health. Early results from OECD analysis show that income, lifestyle choices and the environment are all significantly associated with gains in life expectancy (James, Devaux et al 2015), which indicates that policies aimed at improving health should look beyond the health sector alone. Persistent poverty has particularly adverse health effects, and falls in income have a larger health impact than income gains, with the unemployed suffering worse mental and physical health outcomes. The quality of

employment is also crucial, with the biggest factor in this regard being good management that provides clarity, support, feedback, and adequate recognition of work to the worker. Education also confers health gains not only from lifestyle choices, but also by enabling people to access and use suitable health services.

Addressing the determinants of population health and health inequalities will require investment across multiple sectors and close collaboration on policies amongst stakeholders who do not necessarily work together on a regular basis. For example, the integration of health, education and social services, as in Scotland's *Early Years Collaborative* programme, demonstrates the possibilities for achieving better quality, person-centred care and improving population health outcomes (OECD, 2016c). In the area of public health, interventions aimed at tackling obesity have been shown to be more effective when adapted to social, cultural and environmental contexts (Sassi, 2010). The private sector also has a role to play.

Public-private collaborations are increasingly used by countries for public health purposes. For example, the food industry has been involved in obesity prevention strategies through self-regulation of food adverting to children and voluntary schemes for food labelling. Such voluntary arrangements have worked in some cases but have often failed: a vital element for ensuring that they are not just superficial public relations exercises is independent evaluation of their effectiveness and a strong commitment by the public sector that they will intervene with other measures if the voluntary schemes are no successful (OECD 2015c). There is also close collaboration between fiscal authorities and the health sector in OECD countries regarding the implementation of sin taxes targeting alcohol, tobacco and unhealthy food consumption, such as the sugar taxes in Hungary, Finland and Mexico (WHO, 2015; Colchero et al, 2016).

Integrating health concerns into housing, education and social protection policies can help maximise the health effects from such policies. Collaboration across sectors is particularly important for mental ill-health, requiring concerted action in health, youth, labour market and social policy areas. In Belgium, the Flemish Public Employment Service funds a special programme developed in co-operation with the mental health and welfare sectors, designed for jobseekers with severe psychological and psychiatric problems. This programme showed positive health responses with increased screening, and improved employment outcomes (OECD, 2015d). All of these policy fields should seek to achieve a shift in the timing and the modalities of policy intervention and in the actors involved in accomplishing change. This is the purpose and subject of the 'OECD Recommendation on Integrated Mental Health, Skills and Work Policies' which aim to promote a process of mutual learning on policies to support people living with mental

illness and provide guidance to national policy development in a complex field that is essential for achieving better social, education and labour market outcomes and thereby more inclusive growth.

## 4.2 Helping all firms to become more productive and support Inclusive Growth

Individuals have little chance of being able to fulfil their productive potential if firms are not empowered to fulfil theirs. Indeed, businesses have a crucial role to play in making productivity growth more inclusive. Businesses are uniquely situated to provide employment opportunities, contribute to skills development and engage in knowledge and technology diffusion, particularly for emerging economies. But this requires a business environment that allows them to do so, and also that ensures a level playing field. At the same time, it is also important that such a business environment fosters responsible business behaviour engendering respect for labour rights and the environment, whilst also ensuring that firms pay their fair share in taxes.

Creating an environment that enables the business sector to achieve stronger and more inclusive productivity gains will call upon governments to find a balance between three different important objectives. Policy makers need to deploy a range of policies that: enable the most innovative firms to invest in frontier innovation and access skilled workers, finance, and markets; support the diffusion of innovation throughout the rest of the economy and across the world, thus enabling all firms to benefit from these innovations and grow; and facilitate the exit of the least productive firms which can serve to free valuable resources, including workers, from being trapped in unrewarding environments. Achieving these three policy objectives will require policy changes in many areas from competition and product market regulation to innovation and financial policies.

### *4.2.1 A level playing field for all firms increases productive potential and under most circumstances will reduce inequality.*

Competition and robust business dynamics – entry, growth, decline and exit of firms – are key for the diffusion of innovation, helping to reduce the persistence of rents, and increasing the share of resources in higher productivity firms. Stronger productivity growth depends on strong business dynamics, where new innovative firms are able to enter the market and flourish while less productive businesses, operating well behind the frontier, are encouraged to either upgrade or exit the market. There is strong empirical evidence that competition supports productivity growth by allowing firms with new business practices to enter and disrupt the market,

incentivising existing firms to adopt better technologies and practices and to improve managerial performance, whilst also resulting in a more rapid turnover of firms.

Efforts to boost the productive potential of firms need to be pursued in unison with - and in a manner that complements - policies to promote inclusiveness. In order to ensure that a dynamic business environment leads to both greater productivity gains and more inclusive growth, the policy levers which affect firm entry, growth and exit must complement those which relate to labour markets, and thus the employment decisions of firms. For example, the provision of unemployment benefits combined with policies that place a strong emphasis on "activation" can ensure that unemployment duration is reduced, avoiding depreciation of human capital, as noted in Section 4.1, but can provide the most productive firms with the supply of skilled labour needed to grow.

There are several areas in which even the most effective OECD competition regimes could be improved. Even where countries have strong competition laws, regulatory barriers often still allow for the existence of monopolies. Such regulatory barriers are particularly damaging in the service sectors, which play a key role in the productivity of downstream sectors and enable countries' participation in global value chains. Redesigning overly rigid regulations thus ought to be a priority, so as to ensure that they can still achieve their social purpose without impeding competition. The OECD Competition Assessment Toolkit can help governments to identify and revise these anti-competitive regulations. In addition, more could be done to ensure competition law is respected by enterprises, notably in the case of mergers, cartels and abuses of market power by dominant companies. Greater international co-operation is also needed as law enforcement is national (or EU-wide) while the biggest businesses are global. More joined-up work on cross-border cases could make competition law more effective and improve enforcement against enterprises that violate competition laws. Encouraging FDI by removing barriers to cross-border investment would also increase competition pressures.

Innovation challenges competition policy-makers and tests the tools they use for assessing market power and its abuse. The task of competition policy-makers is complicated by rapid technological change, and especially that associated with the digital economy. Innovative products are sometimes so different from incumbent products that they do not 'compete' in the incumbent's market, but rather disrupt it from outside (as lightbulbs did to candles). New market structures – including inter-platform competition, two-sided markets, and strong network effects – may also complicate the enforcement of competition law (OECD 2013b). The timing of any

intervention can be especially tricky: although it is necessary to act before dominance is entrenched, competition enforcers should be wary of intervening too readily in still-competitive markets. Their challenge is to keep digital markets open and innovative without inhibiting the process of "creative destruction" that has driven much of the technological progress in these markets.

New approaches are needed to avoid regulatory capture. The extent to which incumbents are able to influence the policy and regulatory framework is cause for concern.[29] Avoiding regulatory capture in favour of the commercial or special interests that dominate in an industry or sector requires use of evidence based decision-making processes, taking better account of impact assessment, transparency and use of public consultations to give each of the interests a chance to be heard and reflected can help reduce the risk regulatory capture. Alternative methods of regulation, such as co-regulation and self-regulation are increasingly used in some countries. While OECD governments have been making progress in this area, constant vigilance and appropriate governance mechanisms are required.

### *4.2.2 Efforts need to focus on generating better business dynamics.*

Policies that promote efficient firm entry and exit are essential. Pushing out the frontier requires enabling experimentation with radical new technologies and business models. Since new firms are often the vehicle through which new technologies and business practices enter the market, the policy framework should be conducive to firm entry and framework conditions which foster competitive markets are a necessary condition for ensuring that innovative new firms can get a foothold in the market. Based on evidence presented in Calvino et al (2016) it is found that start-ups are systematically more exposed to the policy environment and national framework conditions than incumbents. Unfortunately, in some cases policies and regulations can unintentionally serve as barriers to the entry of new technologies and business practices. For example, in the case of driverless vehicles, the Geneva Convention mandates the presence of drivers in a vehicle, and could thus be an obstacle for new business opportunities.[30]

The policy environment should not only encourage the entry of new firms and enable them to grow, but it should also encourage unsuccessful firms to close down. In this vein, an enterprise failure needs to be recognised

29 See Calvino, Criscuolo and Menon, (2016) and Aghion et al. (2015).

30 There is, however, some ambiguity as to whether the Convention only covers cross-border travel. See Geneva Convention on Road Traffic, with Annexes & Protocol, Dated at Geneva Sept. 19, 1949; T.I.A.S. No. 2487 (Mar. 26, 1952).

as an opportunity for the entrepreneur to learn and rebound, finding new opportunities which lead to more rapid growth, and thus to new employment opportunities. This in turn facilitates more effective knowledge diffusion. In practical terms, this calls for a number of measures, notably bankruptcy legislation that does not excessively penalise business failure.

Subsidies to certain sectors need to be phased out as they hamper the reallocation process. In many sectors, regulatory protections or government subsidies allow less competitive firms to remain in the market, blocking the entry and growth of more successful firms. The energy sector is a case in point, with adverse implications for both the economy and the environment. There are 550 measures supporting coal, oil and gas production and use across the 34 OECD countries, representing an annual cost of USD 55-90 billion between 2005 and 2010. This support effectively "locks in" less productive and higher polluting technologies and firms. A similar problem exists in the steel and shipbuilding sectors, which have been plagued by excess capacity, and are sectors in which policy distortions play an important role.

Policies need to ensure that companies invest in productive activities. Data analysis of 11 000 of the world's largest companies has shown that there is a misallocation of capital that needs to be improved in order to foster productivity growth and long-term value creation that can allow for inclusive growth. Promoting competition and putting protected state-owned enterprises (SOEs) on a level playing field with the private sector can support such efforts and also limit unproductive concentration of profits and wealth.

Governments need to ensure that the stringent environmental policy settings required to make the necessary transition to a low-carbon economy encourage new investments and do not unduly favour incumbents. It is important that environmental policies do not inhibit market entry or competition, give established firms advantages over new entrants in the market, or drive up administrative costs unnecessarily. The widespread prevalence of 'vintage-differentiated" environmental regulations has a similar effect as subsidies, with new plants subject to more stringent regulations than incumbents, effectively discouraging new investment and the exit of plants which are less efficient and generate more pollution (Johnstone et al. 2015). Albrizio et al (2014) shows that stringent environmental policies can be implemented with minimum barriers to entry and competition, as is the case in Austria, Netherlands and Switzerland. To ensure environmental policies promote productivity and competition as well as strong environmental outcomes, governments should to the extent possible, use flexible policy instruments that enable firms themselves to choose the most efficient way to innovate and adjust in response to new

environmental policy measures. Market based instruments tend to provide firms with greater flexibility in reducing environmental impacts (*i.e.* by allowing them to choose either most suitable technology solutions, or the timing of adjustments).

### *4.2.3. Innovation policies need to be recalibrated to support innovation without privileging the position of incumbents and adapt to the increasingly global nature of innovation.*

Well-intentioned policies designed to boost innovation may inadvertently give an edge to incumbents at the expense of innovative start-ups. While recent evidence indicates that more innovative economies have greater upward mobility (Aghion et al. 2015), ensuring that this is generally true is dependent upon policy conditions. In particular, tackling rent seeking behaviour and ensuring a level playing field is not just about competition policy and product and financial market regulation, but also concerns IPR protection (including copyright systems), and research and development (R&D) incentives that may give too much support to incumbents rather than also enabling challengers.

Patent systems should not unduly create obstacles to entry. In some sectors where the innovation process is typically fragmented (e.g. software), the patent system may unduly favour incumbents at the expense of young firms (Cockburn, McGarvie and Muller, 2009), thus undermining productivity. Improving the transparency of the patent system is essential to ensuring that patents do not become a significant obstacle to entry and further technological development. In addition, improving disclosure and dissemination of the information contained in patent applications could boost the impact of patented inventions on subsequent technological developments.

Innovation support needs to be carefully reviewed. Continued and effective public funding of research is crucial for moving the global frontier and compensating for the inherent underinvestment in research due to the partial appropriability of the resulting discoveries. It is however also essential that such support is targeted to activities that have positive spill-over effects, is cost-effective, and does not create unintended distortions. R&D incentives should be designed so as to be equally beneficial to incumbents and new firms. For instance, provisions for immediate cash refunds for R&D tax credit or allowing firms to carry associated losses forward to deduct against future taxable income can help ensure that young innovative firms, that typically make losses in the early years of an R&D project, can benefit equally from such tax support. For example, in the

United Kingdom, loss-making SMEs - which have no liability for corporation tax - can claim a 14.5% payable tax credit.

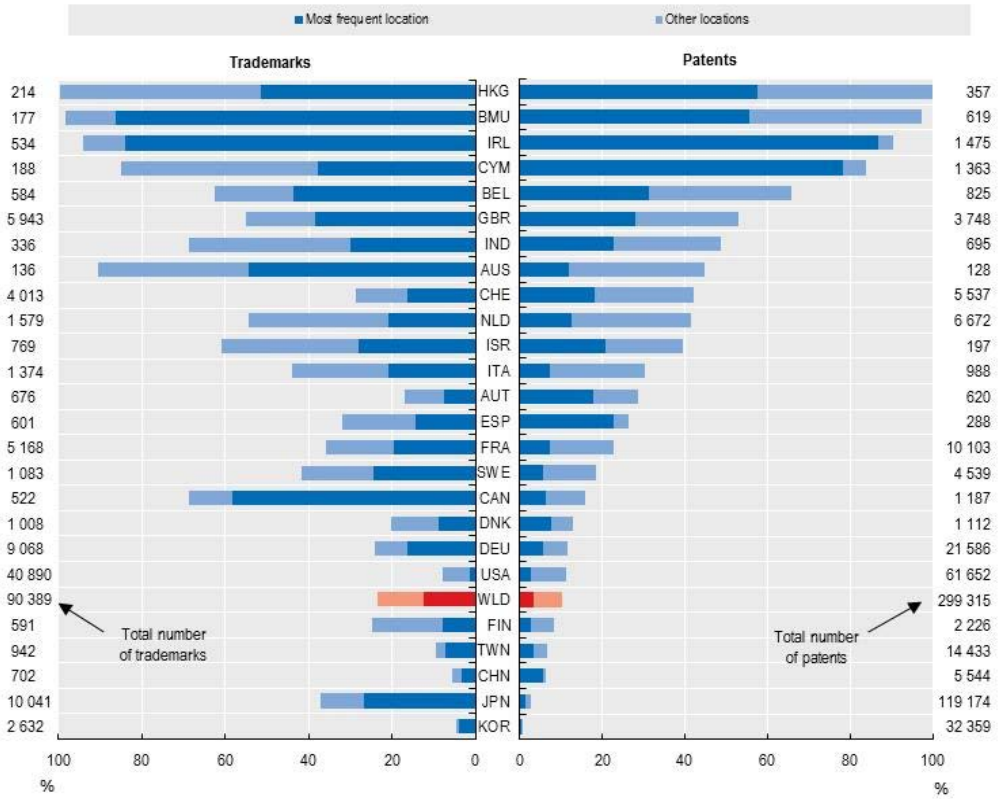
The global nature of frontier firms also suggests a need to co-ordinate R&D fiscal incentives and to ensure a global coherence of intellectual property right (IPR) regimes to provide a level playing field. Rising international connectedness and the key role of MNEs in driving frontier R&D imply that the benefits from public basic research and support to private R&D will become more widespread globally. This may weaken incentives for national governments to support these activities (Braconier et al., 2014) while at the same time pushing them to compete to attract mobile investments by multinational enterprises (MNEs). Thus, global mechanisms to support basic research – i.e. joint funding and mechanisms to facilitate cross border and cross-field collaboration – will become increasingly desirable in the future (OECD, 2012a). A global coherence of intellectual property rights (IPR) regimes – e.g. via the continued international harmonisation of national patents systems and subsequent enforcement of these measures – may also need to be fostered.

The globalisation of innovation puts added pressures on the level playing field. The increasingly global nature of innovation also creates greater opportunities for shifting intangible assets from high-tax rate to low-tax rate countries, putting pressure on national tax systems and the need for a comprehensive and internationally coordinated revision of the international tax rules. The latest evidence on IP filings by affiliates located in countries other than the headquarter country (Figure 4.4), illustrates this phenomenon. While such filings may be undertaken for a variety of reasons, the increasingly global nature of innovation, and the rise of global supply chains and knowledge-based assets has resulted in greater opportunities for multinational enterprises using cross-border tax strategies to shift profits generated by knowledge based capital (KBC) across countries (OECD, 2015e). This may lead to unintentionally high levels of total tax benefits for R&D and place domestic 'stand-alone' firms that perform R&D at a competitive disadvantage.

Cross boarder approaches, such as that embodied in the OECD/G20 Base Erosion and Profit Shifting (BEPS) Project shows the way forwards. The BEPS project proposes changes to the Transfer Pricing Guidelines that will ensure that the transfer pricing of MNEs, particularly in the area of hard-to-define intangibles, better aligns the taxation of profits with economic activity (BEPS Explanatory Statement 2015). Recent OECD work on the BEPS project highlights the potential benefits of international co-operation to limit unintended tax relief for R&D stemming from cross-border tax planning (OECD, 2015e).

**Figure 4.4. The increasingly global nature of innovation has resulted in greater opportunities for shifting intangible assets**

IP filings by foreign affiliates of top R&D corporations, by location of the headquarters, 2010-12




*Note:* The figure refers only to IP (patents and trademarks) filed by affiliates at USPTO and EPO/OHIM. The bars show the percentage of IP accounted for by foreign affiliates of R&D corporations by location of the headquarters

Source: OECD, STI Micro-data Lab: Intellectual Property Database, http://oe.cd/ipstats, June 2015.

### *4.2.4. Action to promote more inclusive financial markets is central to ensuring that SMEs have access to the requisite financing.*

It is essential to ensure adequate financing for different economic activities, including for innovative and growth-oriented small businesses. Small businesses and particularly new and innovative SMEs, often face the consequences of market failures in accessing external financing, limiting their ability to invest, innovate and contribute to productivity growth.

Access to both traditional banking and diverse non-traditional financing instruments and channels should be strengthened.[31]

Efforts to improve banks' capacity to lend to SMEs should be pursued. Bank credit remains the main source of external finance for most small businesses. Risk mitigation measures should be strengthened, making use of new technologies and mechanism for underwriting risks, including credit scoring models. Effective and predictable insolvency regimes should ensure creditor rights, while supporting healthy companies and offering a second chance for honest entrepreneurs. Greater transparency, including through strengthened information infrastructure for credit risk assessment, could help overcome the obstacles to access and uptake of debt and non-debt instruments by young and small businesses.

New forms of financing to increase the availability of risk capital, including by institutional investors, need to be promoted. There are several new forms of financing that could be further developed to facilitate the financing of innovative businesses including seed and early-stage equity finance, such as venture capital and angel investment. Hybrid instruments, which combine debt and equity features, may also serve both young and established companies that seek expansion capital, but which are not suitable for public listing or do not want the dilution of control that would accompany equity. At the same time, the public listing of SME equity through primary and secondary issuance has the potential to provide funding for firms' growth and can support subsequent debt financing, although markets are currently small. Crowdfunding, which is still in the early stages of development as a source of business finance, is also expected to play an increasing role in the future, and could be harnessed to finance innovative SMEs. At the same time, SMEs' awareness and understanding about these alternative financing instruments needs to improve as does the quality of their investment projects and their ability to deal with investor due diligence requirements.

The use of patents and other intangibles as collateral is another promising avenue for small innovative firms, but this requires improvements in Intellectual property (IP) markets. Some young firms have untapped resources in the form of IP, which – if it can be properly valued and if markets for IP-based financing are functioning well – could be used to persuade lenders and investors to provide financing. A substantial body of empirical work has found that young, high-growth firms with IP assets receive more financing than similar firms without IP. Nevertheless, IP-based finance is significantly under-used, especially by SMEs that are most in

31 See the G20/OECD High-Level Principles on SME Financing, November 2015.

need of it because of the lack of opportunities to sell IP in secondary markets and, in some countries, a lack of effective IP enforcement. Promoting the use of patents and other intangibles as collateral requires greater transparency of IP ownership and transfer information as well as new IP market infrastructure. Government agencies and development banks can also help manage the risks associated with collateralising IP through risk-sharing mechanisms.

### *4.2.5. Regulation needs to ensure that the financial sector is supporting access to finance for all.*

Regulatory approaches will need to find the right balance between not stifling useful financial innovations too early while keeping risks in check. While financial innovations can improve financial intermediation and allow retail investors and borrowers to reap the benefits of a widening choice of instruments, financial consumer protection, and - when needed - regulation, will have to be strengthened to address risks that arise from innovations that may be harder to assess and have the potential to create vulnerabilities especially at the retail level.

Policymakers should implement measures to reduce explicit and implicit subsidies to too-big-to-fail financial institutions and reduce the tax bias against equity. Guarantees to too-big-to-fail financial institutions are not only likely to raise financial sector pay – a "financial sector wage premia" that contributes to inequality (Chapter 3) – but also to result in more and cheaper 'subsidised' bank lending from which well-off households tend to benefit relatively more. Likewise, reducing the tax bias against equity would also help to reduce inequalities in financing.

### *4.2.6. Several policies can be deployed to help promote financial inclusion.*

Facilitating access to finance for entrepreneurs from disadvantaged and under-represented groups is vital component of financial inclusion. Access to finance in one of the largest barriers prospective entrepreneurs face, but policy can help. Key instruments used to facilitate access to finance for entrepreneurs from disadvantaged and under-represented groups include microfinance, grants, and loan guarantees. These tools have succeeded at providing incentives to the private sector to lend to these groups. Welfare bridge schemes, which pay an allowance or unemployment benefits for a fixed period of time to cover social security contributions and living

expenses during business start-up, have also proven to be successful when well-designed (Box 4.1).

### Box 4.1. Bridging Allowance, Germany

The objective of the Bridging Allowance is to give unemployed individuals an alternative option to re-entering work through business creation. Subsidies are provided to unemployed individuals in order to provide an income while they are starting their business. The individual receives the same amount they would have from unemployment benefits, with an additional EUR 300 for social security contributions. The benefits are guaranteed for 6 months, with the option to extend it for an additional 9 months (provided the individual carries on with their self-employment initiatives). To receive this allowance, the individual must have been eligible for unemployment benefits for at least 150 days and have produced a business plan that has been approved by a chamber of commerce or similar institution.

Survival rates for start-ups 56 months after creation ranged between 55-70%, depending on cohort and region, which is slightly above the rates for the normal business population. 40% of recipients had at least one other employee in their business. In addition, approximately 20% of users found regular, gainful employment after the programme. Those in the programme spent 20 months longer in employment and had higher labour incomes on average than unemployed individuals who started their business without any support.

Policies intended to reduce barriers to access of appropriate financial products (such as savings, credit and insurance) should be designed taking into account the circumstances and vulnerability of the financially excluded. In particular, there is growing evidence that the financially excluded also have lower levels of financial literacy. Analysis of financial literacy and financial inclusion among adults in 12 countries showed a correlation between higher levels of awareness of different types of financial product and financial literacy scores (Atkinson and Messy, 2013). Similarly, the OECD PISA assessment shows that on average 15-year-olds who hold a bank account have higher levels of financial literacy than other students (OECD, 2014c). The correlations do not prove causality, but they provide a compelling argument that the financially excluded have a pressing need to access financial education alongside financial products.

Demand-side approaches to financial inclusion therefore need to address widespread financial illiteracy whilst also ensuring a robust and responsive financial consumer protection framework. Such a framework should in particular cater to the needs of new and potential consumers as they navigate the fast evolving financial landscape. When authorities struggle to reach at risk groups like women, migrants or youth (OECD, 2013c; OECD, 2014b; Atkinson and Messy, 2015), existing environments (such as the workplace or schools) and trusted intermediaries or networks with access to the target group may be better placed to deliver financial education and provide information about appropriate financial products. This approach requires

that the goals of the intermediary and networks are aligned with the financial education goals, and that the staffs are properly trained and incentivised to provide financial education.

## 4.3 Taking a regional perspective

A better understanding of the regional (and spatial) dimensions of policies is necessary to enhance productivity growth and social inclusion. The design, delivery and effectiveness of productivity and inclusion enhancing policies depends in part on the type of region (urban, rural) and its characteristics, such as population density, established sectors and the quality of public infrastructure and services. In rural areas the quality of education tends to be lower than in urban areas, which implies that in these areas the level of skills may be more limited. Individuals, particularly the low-skilled, are less mobile than the high-skilled; therefore effective urban planning and transport investment is essential to better match existing workers to jobs. There are also many place-based factors that affect job accessibility that warrant local action. Geographic proximity helps certain elements of the innovation diffusion process; therefore regional-level policies can accelerate innovation diffusion, particularly to SMEs. National economy-wide policies also need to be complemented by spatial policies, to account for the circumstances of particular places - in areas like labour markets, skills policy and product market regulation - and also to address barriers to opportunity that many groups face as a result of inadequate access to high-quality public transport systems and housing.

### *4.3.1. National policies to boost productivity and foster inclusiveness need to take into account the spatial dimension*

Agglomeration economies give advantage to metropolitan regions and their productive capacity through a variety of channels. Generally the co-location or agglomeration benefits are due to more specialised service providers, better labour market matching and knowledge spill-overs.[32] Metropolitan areas also gather a diversity of firms in close proximity, above and beyond the density of firms, a phenomenon that also can lead to more innovation.[33] The concentration of highly educated workers further boosts

32 The benefits of agglomeration have been discussed for a century, starting with Alfred Marshall. See Duranton and Puga (2004) for a review of the drivers of agglomeration benefits. For a recent review of agglomeration and innovation, see Carlino and Kerr (2014).

33 The concept of Jacobian diversification externalities was popularised by the urbanist Jane Jacobs.

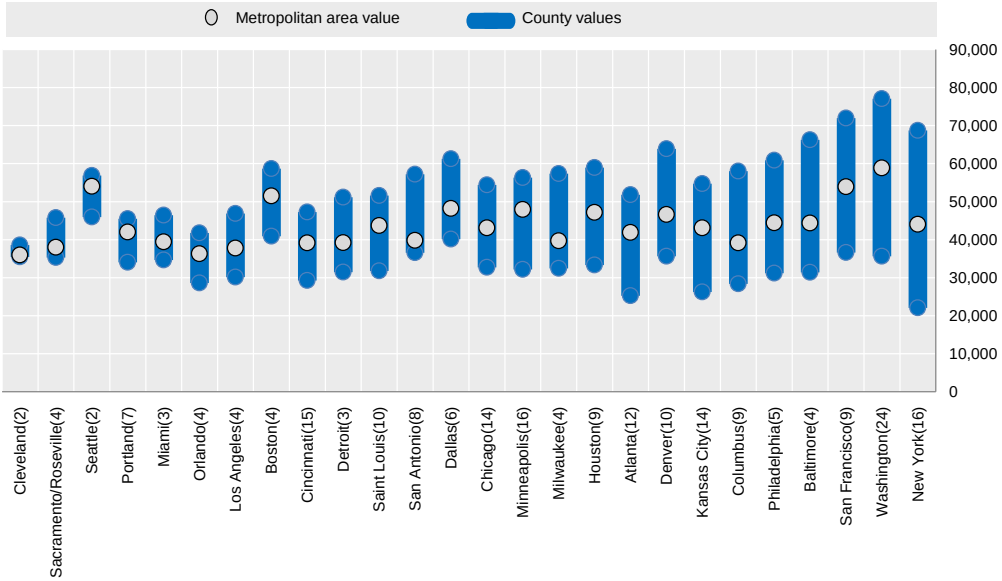
productivity. Human capital spill-overs allow individuals to benefit by virtue of being co-located with others that have a higher level of education. For a 10 percentage point increase in a city's share of university graduates, the productivity increases by about 3% (Ahrend et.al, 2014). In addition, knowing that there are greater returns to education provides an incentive for further investment in one's education.

However, the same forces that bring productivity benefits to individuals in metropolitan area may also contribute to greater income inequality among them, calling for complementary measures to support inclusion. While average levels of income may be higher in metropolitan areas, the dispersion of income (wage and total) in them is also generally higher. Metropolitan areas tend to bring together both the highest earners but also workers for many low-skilled jobs (e.g., banking versus cleaning services). Metropolitan areas also tend to attract immigrants, whose skills may be under-valued in the market for various reasons, including lack of qualification recognition. As a result, within a city or metropolitan area, there are often stark inequalities generated by spatial sorting (segregation) that contribute to differences in individuals' ability to access opportunities (**Figure 4.5**). Higher cost of living in large cities can reduce the higher wage benefits associated with higher productivity, and thus reduce some aspects of well-being. Housing segregation by income or social background and poor public transport, in particular, can lock individuals and groups in low-productivity traps.[34] As a result, policies to address inclusion need to consider not only the distribution in income across individuals, but also the disparities generated by segregation according to income level or other socio-economic factors.

34 For example, in the Chicago Tri-state metropolitan area, school districts record high school graduation rates range from a low of 57% in the city of Chicago to over 95% in suburban areas (OECD, 2012b). In Aix-Marseille, the share of the working-age population without a diploma ranges from 39% in neighbourhoods in northern Marseille to 14% in Aix-en-Provence (OECD, 2013d). In Puebla-Tlaxcala, Mexico's fourth-largest metropolitan region, peripheral areas exhibit lower education levels than the metropolitan core; in some census tracts, more than 65% of the population has not completed secondary education, compared to incompletion rates of less than 20% in the core (OECD, 2013e).

**Figure 4.5. Average household income varies significantly across locations in a metropolitan area**

County-level variation of household disposable income in U.S. large metropolitan areas in 2014; constant 2010 prices USD




Note: The figure includes the 26 largest American metropolitan areas according to the OECD definition of functional urban areas. Data come from American Community Survey; 2014. Metropolitan areas are ordered by increasing value of the difference between the maximum and the minimum county values. Numbers in parenthesis after the metropolitan area's name indicate the number of counties included in a metro area.

Source: Boulant, J. M. Brezzi, and P. Veneri (forthcoming) "Estimating income levels and inequalities in metropolitan areas: a comparative approach in OECD countries". *OECD Regional Development Policy Working Papers*.

It is important to consider the impact of structural policies on lagging regions and take appropriate measures when trade-offs emerge. For example, product market regulations in the wholesale and retail trade area appear to have particularly negative impacts on the productivity growth of lagging regions (those farthest from the leading region of the country in terms of GDP per worker levels). Moreover, more rigid employment regulations can hurt the lagging regions more than the leading regions, as lagging regions tend to have smaller (thinner) labour markets with fewer higher-skilled workers and are less able to cope with more rigid labour market regulations (D'Costa *et al.*, 2013). Furthermore, the benefits of structural reforms may require additional measures than the reform itself.

For example, reducing the rigidity in employment regulations may not have the desired impacts if there is not sufficient internal mobility within the country or workers in a metropolitan area have a transport impediment to reaching jobs.

To be effective and inclusive, labour markets and skills policies need to take into account the local dimension. Measures to improve information about labour-market conditions, matching, training and/or subsidies to employers tend to be better designed at regional or local level — since information about local conditions can be a crucial factor in their effectiveness. For similar reasons, economy-wide policies aimed at increasing skill levels and reducing skills mismatch are often most effective when adapted to the characteristics of local labour markets. To effectively address regional variations in the supply and demand of skills, local actors need to be equipped with the right tools and resources to develop innovative employment strategies tailored to local conditions. Partnerships are being used across the OECD to better connect local leaders, who can leverage their resources, expertise, and knowledge to develop place-based responses to structural adjustment, local economic development, and productivity. These partnerships require a degree of flexibility in the implementation of national policies to be successful; although, more flexibility at local level should not be pursued at the expense of alignment with national policy goals, efficiency in service delivery and full accountability.[35]

In the same vein, policies can boost productivity diffusion across regions by building on regional innovation dynamics. Typically, innovation activity is concentrated in a few regions, generally advanced metropolitan areas, often close to major universities and research centres, which creates a link between innovation and urban/regional development policy. Despite the dramatic changes that ICT has brought to connect individuals and firms, geographic proximity continues to matter in the innovation process. International collaboration for innovation continues to rise, particularly for highly specialised science-based innovation. However, the importance of geographic proximity and face-to-face interaction for innovation persists and, in some cases, has increased. Firms, R&D labs and highly educated workers tend to cluster in particular regions and cities. For instance, venture

35 A number of different policy mechanisms can allow for greater differentiation in the utilisation of programmes and services locally, while continuing to meet national policy goals. Management by objectives systems can be used to achieve this, notably, by allowing for targets to be negotiated between the central and the local level, with the national level verifying that the sum of all local targets meets national policy goals. Local capacities also need to be considered when granting additional flexibility to local employment and training agencies.

capital funds are important for scaling up firm size and the impacts of possible innovations but their investments are notably concentrated in space. Other research explores knowledge spill-overs - knowledge benefits that firms, researchers and other agents receive by being co-located (OECD 2013b). Spill-overs are typically measured by patent citations and the distance decay associated with citations in the same technology areas (i.e. after a particular distance, citations are significantly less likely, commonly found to be within a 150-200 km radius).[36]

Regional innovation policies can complement national efforts to strengthen the diffusion of technology and knowledge. The common instruments used to support diffusion include physical infrastructure such as science or technology parks, incubators, or in some cases research infrastructure. More systemic initiatives such as clusters, networks or competence centres, support to specific types of firms (start-ups or existing SMEs) and innovation vouchers or brokerage systems to help firms access consulting services and knowledge are also used (OECD, 2011). The quality and impact of these instruments depends on their design and implementation. In some cases, both a national and regional government are active in the same type of instrument. This may be due to duplication or a difference in target groups, with the national policy typically focusing on the high-technology firms/sectors and regional efforts focused on firms further from the productivity frontier. National and regional governments will need to work better together to meet this diffusion challenge. Many countries have therefore put in place tools to better align and co-ordinate innovation diffusion actions across levels of government in this regard, such as national networks of regional development agencies, contracting arrangements, joint financing, and consultation fora.

### *4.3.2. Spatial policies play a major role in facilitating the efficient allocation of resources in the labour market and improving access to opportunities and essential services.*

There is a double dividend for some urban policies in terms of productivity benefits and inclusion objectives. Land use planning and transport, along with housing and commercial development policies, help shape the location decisions of individuals and firms; they play a key role in determining whether and to what extent disadvantaged groups can easily avail themselves of training or labour-market opportunities, access services and amenities. This underscores the role of urban planning and the provision

36 Jaffee et. al (1993) pioneered the concept of studying the distance decay between the location of a patent and the location of the citations of that patent in new patent applications.

of transport infrastructure in facilitating labour market matching: these are highly complementary policy fields that, if not well co-ordinated, can both hurt productivity and inclusion, in terms of income and wider measures of well-being. If housing policy gives incentives for workers to live far from jobs and public transport systems are not adapted, there is an increase in individual transport likely to generate more congestion, pollution, and higher commuting costs that reduce productivity and well-being.

Providing accessibility to efficient and affordable transport systems helps determine the size of the effective labour market and thus can contribute to both productivity and inclusion. The time and monetary costs of public transport influence the distance at which workers can readily reach jobs. The larger the labour market, the greater the opportunity for more optimal job matching. However, public transport policy does not always reflect that fact, with many public transport services failing to offer equal access to all parts of a metropolitan area.

Rural areas generally experience a higher cost for offering the same degree of services relative to cities, with different solutions to help reduce this service gap. Amongst other things, provision challenges typically include a lack of economies of scale, higher travel costs to reach the service, greater periods of unproductive time, and greater communications costs. Many countries and regions have identified strategies for overcoming these challenges, such as: IT-based solutions; mobile service delivery consolidation, co-location or merging similar services; alternative service delivery mechanisms; and bringing services to users.

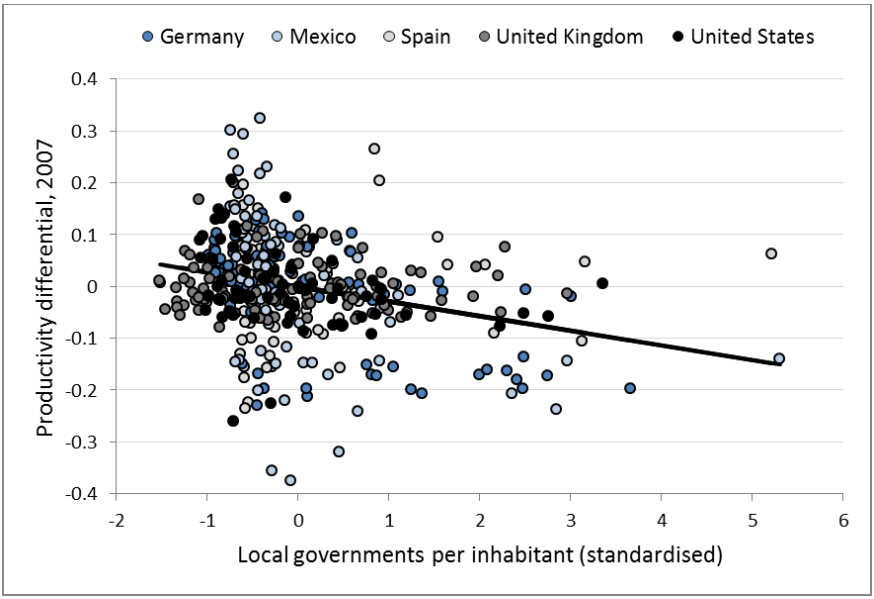
### *4.3.3. Systems that govern metropolitan regions can either support or hamper productivity and inclusion*

Administrative fragmentation within regions can hurt productivity and inclusion, but metropolitan governance and rural-urban partnerships can help overcome these challenges. Co-ordination across municipalities or regions can be used to improve the cost-effectiveness of public services, the quality of those services, and coherence of overall planning, among other rationales. The need for inter-municipal co-operation is often particularly acute in large metropolitan areas.[37] A lack of co-ordination across such a large number of jurisdictions reduces the magnitude of agglomeration benefits such as productivity (Figure 4.6). The fragmentation penalty, when

37 The metropolitan area of Paris, which consists of 1,375 municipalities, might be an extreme case, but out of 275 OECD metropolitan areas, more than 200 metro areas contain more than 10 local governments and over 60 contain more than 100 within their boundaries. See OECD Metropolitan Database.

comparing a metro area that is twice as fragmented in terms of the number of municipalities than another one, is around 6%. That fragmentation penalty is halved when the metropolitan area has a governance body (Ahrend, Gamper and Schumann, 2014). Many countries have, or are putting in place, metropolitan governance arrangements, which typically focus on regional development, transport and spatial planning (Ahrend et al, 2014). It should be noted that a given level of municipal fragmentation has a greater negative impact on growth in urban regions due to the greater density of interactions than in rural areas (Bartolini, 2015). Nevertheless, there are many reasons to promote rural-urban partnership arrangements for economic, environmental or public services purposes.

**Figure 4.6 Municipal fragmentation is a drag on productivity growth**




Fragmentation is the number of municipalities per 100,000 inhabitants. Productivity differential refers to the wage premium of workers controlling for individual characteristics.

Source: Ahrend et al., 2014

## 4.4 Improving public governance to ensure better policy coherence and efficiency

Achieving Inclusive Growth may require changes to the policy making process and the conduct of public governance. Countries vary in their experience and success in designing and implementing policy packages that

require the different government departments, agencies and ministries to work together to achieve shared goals and deliver joined-up outcomes. Some countries have established modes of communication and accountability that need little or no adjustments, while others may need to work hard to create such modes.

### *4.4.1 Government capacity for joined up action.*

Delivering multidimensional outcomes starts with setting a vision that charts the way and helps align the public sector, but also the society at large around shared goals. Such a vision requires a whole-of-government approach that begins with a strong, compelling narrative of what the challenges and opportunities are, and what the desired outcomes should be.

Several mechanisms can also help reinforce governments' capacity to design and implement more balanced, mutually-reinforcing, policy packages (OECD 2015g). The success of multidimensional policy packages depend on the ability of government to align action across sectors and administrative organisations (e.g. centre of government) to deliver joined-up outcomes. A range of mechanisms can be used to help align government action behind the shared goal of productivity and inclusiveness. First, in terms of policy design, ex ante impact and assessments can address distributional concerns. Second, key policy objectives must be accompanied by both technical capacity and political capital to monitor implementation. In addition, specific tools such as the monitoring of performance, the management of the senior executives in the civil service towards the achievement of broad policy outcomes, and policy evaluation can all help to strengthen policy design.

Such an approach also requires multidimensional policy impact assessments. Conventional analysis looks at the effects of policies on selected outcomes separately. Instead, attention to multidimensionality and distributional considerations addressing the productivity-Inclusiveness nexus requires a broader approach to the evaluation of policy impacts. Governments can use a variety of instruments, including regulatory impact assessments (RIA), forecasting or cost-benefit analysis, and short and longer-term goals, including sectorial and/or regional strategies and medium-term expenditure frameworks. Further analysis on the interaction of policies is needed to better guide these approaches. These tools clarify the effects and the trade-offs of government actions for decision-makers and stakeholders alike and - when used systematically - provide strong levers for governments to identify and target social inclusiveness goals. Governments will also need to focus on the impact polices will have on different social groups. Multi-level analysis guided by empirical analysis using micro-data that allow place-based, income-based, and gender-based considerations that

may drive inequalities should be conducted. Governments should also strive to ensure more inclusive engagement mechanisms to integrate feedback on policies in the design, implementation, and assessment phases.

### *4.4.2. Institutional structures need further reinforcing.*

Strong institutions are needed to foster balanced development to push the productivity frontier and reduce opportunities for corruption and rent-seeking activities. Good public governance is vital for social cohesion, public expenditure efficiency and prevention of corruption. In turn, integrity in public governance ensures that public policies are designed in the public interest and that redistribution policies actually reach their target populations. Corrupt practices create barriers to markets, trade and politics, enforce cartels, and are instrumental in vested interests capturing political and administrative decision-making processes for narrow benefits, harming the public interest. When rents accrue to elites only, few incentives are provided for regular businesses to thrive and to invest into productivity-enhancing activities. Vested interests in the status quo are also likely to oppose reforms towards more openness and inclusiveness. At another level, corruption in the public administration can lead to the exclusion of parts of the population from basic public services. In a number of developing countries, evidence has shown that overall corruption can fuel inequality as elites use corruption to maintain their power and interests (You & Khagram, 2005), and because access to markets and public services are restrained and disadvantages perpetuated (Gupta et al, 2002). There is empirical evidence of the negative impact of corruption on sustainable development at large (Aidt, 2011) and on productivity (Lambsdorff, 2004 and Salinas and Salinas, 2007). Besides corruption, activities such as lobbying have the scope to create policy bias and have been found to limit the diffusion of productivity gains (Aghion et al. 2015).

Governments also need to avoid policy capture. A situation in which the interests of one narrow group dominates the interests of all the other stakeholders to the benefit of that narrow group, can lead to the erosion of democratic governance, and undermine productivity, economic growth and social cohesion and increase inequality of opportunities. Policy areas that involve large volume of fiscal spending such as infrastructure and urban planning are particularly vulnerable to the risks of capture. Policy capture can result from a lack of inclusiveness in stakeholder engagement processes, unregulated lobbying, conflicts of interests for public officials, and inadequately regulated financing of political parties and election campaigns as highlighted in the report on Financing Democracy (OECD, 2016d). Securing unbiased and inclusive policy making requires greater reliance on evidence-based policy and regulation-making, better transparency and

inclusiveness in engaging with stakeholders as part of the policy-making process, increasing transparency and integrity in lobbying, better management of conflicts of interest, and balanced political finance.

The OECD provides policy options and tools to strengthen the rule of law, reduce corruption and secure the public interest in decision-making. The OECD has a series of recommendations and guidelines[38] aimed at strengthening an overall institutional framework so that decisions defining policy needs are not skewed towards inefficient and unnecessary projects that only benefit a few, that draft regulations reflect public interest and not the interest of a particular industry (OECD 2015h), that access to public services and justice is granted to everybody equally, and that the criteria to award contracts when procuring goods and services is value for money and not connections or bribes.

### *4.4.3. Better international cooperation is needed.*

Another challenge for policy makers is the need for stronger and better international policy cooperation. While the BEPS is a case in point, as pointed in the sections above better coordination is also called for in the areas of product market regulation and innovation. In particular the impact of policies for innovation depends heavily on their governance and implementation (OECD, 2015i). For instance as pointed in section 3 the global nature of frontier firms implies that to provide a level playing field R&D fiscal incentives and intellectual property rights regimes may need to be better coordinated at the international level. In the same way more joined-up work on cross-border cases could make competition law more effective and improve enforcement against global enterprises that violate competition laws. The newly-created OECD Global Forum on Productivity could both help to better understand the benefits of co-ordination in different areas, as well as facilitate co-ordinated strategies across Member countries.

38 See, for example, the Recommendation of the Council on Principles for Transparency and Integrity in Lobbying [C(2010)16] and the Recommendation of the Council on OECD Guidelines for Managing Conflict of Interest in the Public Service [C(2003)107].

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