International Labour Organization

Global Wage Report 2016/17

Wage inequality in the workplace

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Global Wage Report 2016/17

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Global Wage Report 2016/17: Wage inequality in the workplace

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Preface

The United Nations 2030 Agenda for Sustainable Development identified decent work for all women and men, and lower inequality, as among the key objectives of a new universal policy agenda. The issues of wage growth and wage inequality are central to this agenda. Sustainable Development Goal (SDG) 8 calls for "sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all", and highlights the importance of achieving equal pay for work of equal value. SDG 10 seeks to "reduce inequality within and among countries", emphasizing income growth of the bottom 40 per cent of the population, the elimination of discrimination and the adoption of fiscal, wage and social protection policies to progressively achieve greater equality. The labour income share of GDP, which reflects the relationship between the growth in average wages and in labour productivity, has been identified as a crucial indicator in this area. Concern about inequality has also been expressed by the G20, which identified widening inequality as posing challenges for social and political cohesion and having significant costs for economic growth.[1]

This new ILO *Global Wage Report* – the fifth in a series that now spans over a decade – contributes to this agenda by making comparative data and information on recent wage trends available to governments, social partners, academics and the general public. These trends show that global real wage growth dropped sharply during the post-2008 economic crisis, recovered in 2010, but has since decelerated. If China, where wage growth was faster than elsewhere, is not included, wage growth fell below 1 per cent in 2015. As I emphasized at the World Bank and IMF annual meetings in October 2016, rekindling growth requires an increase in consumer spending and in turn sustainable wage and social protection policies.[2] Improving wages and decent work opportunities will be essential to breaking out of the slow-growth trap in which the global economy currently finds itself.

While the previous report in this series examined wage and income inequality from the perspective of households, this year's *Global Wage Report* turns to enterprise-level dynamics. More specifically, the report analyses the extent to which overall wage inequality is the result of wage inequality *between* enterprises and wage inequality *within* enterprises. The analysis builds upon innovative recent economic literature that has been made possible by new data sets which provide detailed information on both workers and the enterprises in which they work. This literature shows that in many countries, changes in wage inequality between enterprises have been key drivers of overall trends in wage inequality. The findings of

1. http://g20.org.tr/wp-content/uploads/2015/11/G20-Policy-Priorities-on-Labour-Income-Share-and-Inequalities.pdf.

2. http://www.ilo.org/global/about-the-ilo/newsroom/statements-and-speeches/WCMS_531665/lang--en/index.htm.

this report demonstrate that the extent of wage inequality within enterprises – and its contribution to total wage inequality – has perhaps been underestimated in the past. Wage inequality within enterprises, particularly the large ones, has become very substantial as the top 1 per cent in those enterprises leave others increasingly far behind. These findings have important policy implications, which are discussed in the concluding part of the report.

A further issue raised by this year's report relates to the importance of social dialogue and collective bargaining as essential factors to promote inclusive growth. Evidence shows that broad collective bargaining coverage contributes to a narrower distribution of income and more stable growth. Tripartite cooperation between government and social partners can play an important role in creating the conditions for effective collective bargaining by ensuring that the appropriate framework is in place. ILO tripartite constituents have also repeatedly emphasized that the first principle of minimum wage fixing is the full consultation and, in so far as possible, the direct participation, on a basis of equality, of the social partners at all stages of the establishment and operation of minimum wage systems.[3]

I trust that this report, much like its predecessors, will stimulate important policy debates and provide useful material for social dialogue around the world.

Guy Ryder
ILO Director-General

3. See, for example, the 2014 Outcome of the discussion by the Committee on the Application of Standards of the General Survey concerning minimum wage systems

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"It is wrong to see today's high inequality as the product of forces over which we have no control." – Anthony B. Atkinson, *Inequality: What can be done?* (2016)

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Specific contributions

Part II of the report is based on a research project which included data analysis and contributions from Flor Brown, Tobias Haepp, Asier Mariscal, Roxana Maurizio, Zulfan Tadjoeddin and Nada Trifkovic. The technical peer review for Part II, carried out in addition to the general peer review of the report, was undertaken by Andrea Regoli and Antonella D'Agostino (Parthenope University of Naples). We also thank Natalia Volkow Fernandez and the Instituto Nacional de Estadísticas y Geografía (INEGI) for allowing access to the data laboratory at their headquarters in Mexico City, as well as Flor Brown and Isalia Navas for their support in the quantitative analysis of the data from Mexico.

Global and regional estimates in Part I of the report are based on the same methodology (described in Appendix I) as in earlier editions of the *Global Wage Report*, and were formulated in collaboration with the ILO Department of Statistics, on the basis of a proposal by Farhad Mehran (ILO consultant). The methodology was peer reviewed in 2011 by Yves Tillé (Institute of Statistics, University of Neuchâtel), Yujin Jeong and Joseph L. Gastwirth (HEC Montréal and George Washington University, Washington, DC), and Joyup Ahn (Korea Labor Institute).

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Data sources

Part of the report is based on data from Eurostat's Structure of Earnings Survey, 2002–10. We thank Eurostat for providing these data under contract number RPP 252/2015-SES-ILO. Another part of the report is based on data from Eurostat's EU Statistics on Income and Living Conditions, 2003–15 inclusive. We thank Eurostat for providing these data under contract number 52/2013-EU-SILC. The responsibility for all conclusions drawn from these data lies entirely with the authors.

Executive summary

Part I. Major trends in wages

The context

Over the past few years there has been a growing recognition of the need to monitor wage trends and implement sustainable wage policies that prevent wage stagnation, raise the levels of pay for the millions of working poor around the world, ensure fair distribution, reduce excessive wage and income inequalities, and buttress consumption as a key pillar of sustainable economies.

Lower wage growth globally

Part I of this year's *Global Wage Report* shows that in the wake of the financial crisis of 2008–09, global real wage growth started to recover in 2010, but has decelerated since 2012, falling from 2.5 per cent to 1.7 per cent in 2015, its lowest level in four years. If China, where wage growth was faster than elsewhere, is not included, real wage growth has fallen from 1.6 per cent in 2012 to 0.9 per cent in 2015.

Lower wage growth in emerging and developing economies

During most of the post-crisis period global wage growth was driven to a large degree by relatively strong wage growth in emerging and developing countries in Asia and the Pacific, most notably in China, as well as in some other developing countries and regions. More recently, this trend has slowed or reversed. Among emerging and developing G20 countries real wage growth fell from 6.6 per cent in 2012 to 2.5 per cent in 2015. Looking at regional wage growth, the report shows that in 2015 real wage growth remained at a relatively robust 4.0 per cent in Asia, declined to 3.4 per cent in Central and Western Asia, and was tentatively estimated at 2.1 per cent in the Arab States and at 2.0 per cent in Africa. In 2015, real wages dropped by 1.3 per cent in Latin America and the Caribbean (mostly due to falling wages in Brazil), and by 5.2 per cent in Eastern Europe (mostly due to falling wages in the Russian Federation and Ukraine).

Higher wage growth in developed countries

In contrast, wage growth increased in the developed countries. Among developed G20 countries, real wage growth went from 0.2 per cent in 2012 to 1.7 per cent in 2015, the highest rate of the last ten years. In 2015, real wage growth rose to 2.2 per cent in the United States, 1.5 per cent in Northern, Southern and Western Europe, and 1.9 per cent in the countries of the European Union (EU). Faster wage growth in the United States and Germany explains an important part of these

trends. It is as yet unclear whether such wage growth will be sustained into the future or whether developed countries will return to their previous pattern of wage stagnation. In an economic context in which risks of deflation have increased in many countries, falling wages could themselves become an important risk factor, potentially leading to deflationary wage–price spirals.

Globally, the recovery in Northern America and some European countries was not sufficient to offset the decline in emerging and developing economies. The lower differential in wage growth between developed and developing countries also implies a slowdown in the process of wage convergence between the two groups of countries.

Mixed trends in labour income shares

Trends in real wages are influenced by economic factors such as GDP growth and price inflation, but other factors also come into play. There is now a large literature showing that in a majority of countries across the world wage growth in recent decades has lagged behind the growth of labour productivity, leading to a fall in the labour share of GDP. This is likely due to a combination of factors including globalization, skills-biased technology, the weakening of labour market institutions, and the growing pressure from financial markets to shift surpluses generated by large businesses towards investors. This year's report shows that, after some expected countercyclical upward movement in the labour share in many countries during the years 2007–10, the labour share has resumed its long-term decline in a small majority of countries during 2010–15. Exceptions include China, Germany and the United States, but even in these countries the labour shares remain far below their peak levels.

Wage inequality and minimum wages

Average wages do not tell the story of how wages are distributed among different groups of wage earners. It is a well-established fact that during recent decades wage inequality has increased in many countries around the world. While some level of inequality reflects differences in workers' individual and productive characteristics, growing concerns have been expressed about the adverse social and economic consequences of excessive inequality. The report highlights the frequent correlation between greater wage inequality, greater household income inequality and declining labour shares.

In the most recent years, many countries have adopted or strengthened minimum wages, as one way of supporting low-paid workers and reducing wage inequality. Recent evidence shows that, when set at an adequate level, minimum wages can raise the income of low-paid workers – many of whom are women – without significant negative effects on jobs. The setting of minimum wages, however, is a balancing act; it should be evidence-based and done in full consultation with social partners and, where appropriate, with their direct participation on an equal footing. The report provides some comparative figures on the level of minimum wages relative to median wages in a range of countries.

Gender pay gaps

Within the overall wage distribution there are also pay gaps between different groups of workers. One of these is the gender pay gap, the percentage shortfall in the average wage of women relative to the average wage of men. Various studies have shown that across most countries for which data are available, the gap has generally narrowed over time but has not been closed. The report provides the most recent available estimates of the hourly gender pay gap for a wide range of countries, showing its huge variation across countries, from about zero to almost 45 per cent.

Part II. Inequality at the workplace

Wage inequality gets steep at the top

Wage inequality in a country can be measured in different ways. Ranking all of a country's salaried workers in ascending order of their wages and dividing them into ten groups (deciles) or 100 groups (centiles), the report shows that in most countries wages climb gradually across most of the wage distribution and then jump sharply for the top 10 per cent and, especially, for the highest-paid 1 per cent of employees. In Europe, the highest-paid 10 per cent receive on average 25.5 per cent of the total wages paid to all employees in their respective countries, which is almost as much as what the lowest-paid 50 per cent earn (29.1 per cent). Although the data are not strictly comparable, the share of the top 10 per cent is even higher in some emerging economies, for example Brazil (35 per cent), India (42.7 per cent) and South Africa (49.2 per cent). In South Africa and India, the lowest-paid 50 per cent receive, respectively, just 11.9 per cent and 17.1 per cent of all wages paid out.

Worker characteristics fail to explain a substantive part of the wage distribution

The report shows that wages and wage inequality are not determined only by the skills-related characteristics of individuals (such as level of education, age or tenure) but that a host of other factors also play crucial roles: these include, for example, gender, enterprise size, type of contract and the sectors in which workers work. Descriptive statistics for a sample of both developed and developing countries document that a university degree does not necessarily guarantee a highly paid job; that the real estate and financial sectors are over-represented among top-paid workers; and that the proportion of women continuously declines as one moves towards the higher-paid deciles. In Europe, for example, women make up on average 50–60 per cent of workers in the three lowest pay deciles; this share falls to about 35 per cent among the best-paid 10 per cent of employees, and further to 20 per cent among the highest-paid 1 per cent of employees. In some emerging and developing countries, the contrast is even greater. The report also runs a standard model which seeks to explain wages on the basis of individual skills-related characteristics such as the level of education, age and tenure, but this model fails to explain a substantial part of the observed variation in wages. Indeed, there are

large – sometimes enormous – differences between individuals' actual wages and those predicted by individual skills-related characteristics.

The role of inequality between enterprises[1]

The failure of classical skills-related arguments to explain a substantial part of the observed variation in wages has triggered an interest in the workplace as a determinant of wage inequality. Recent literature shows that increasing inequality *between* enterprises (as measured by differences in average wages among enterprises) has played an important part in the increase in US wage inequality between 1981 and 2013, as well as in the fall in Brazilian wage inequality between 1996 and 2012. In the United States, the higher inequality between enterprises has been mainly attributed to growing polarization, with high-skilled workers clustering in some enterprises and low-skilled workers clustering in others, consistent with the trend towards restructuring and outsourcing peripheral activities to subcontractors or franchisees. In Brazil, a large share of the decline in inequality between enterprises has been attributed to a higher minimum wage.

How high is inequality between enterprises?

Our report shows that in many countries there is indeed some level of correspondence between a low level of wage inequality among individuals and a low level of wage inequality between enterprises (such as in Sweden or Norway), or a higher level of inequality of both types (such as in the United Kingdom or Romania), though in some countries there is a large difference between the two types of inequality. Inequality between enterprises tends to be greater in developing than in developed countries. While in developed countries the average wages in the top 10 per cent of enterprises tend to be two to five times as high as those in the bottom 10 per cent, this ratio goes up to eight in Viet Nam and even 12 in South Africa. We also show that Norway has a high proportion of enterprises which pay middle-of-the-range average wages, compared to the United Kingdom, which has a higher proportion of enterprises with either low or high average wages. Reflecting structural differences, developing countries tend to have a large gap between a majority of low- and medium-paying enterprises, and a minority of enterprises with much higher average wages.

The role of inequality within enterprises

While inequality between enterprises has played a crucial role in recent wage trends, it is not always the largest contributor to total wage inequality. It has been documented previously that in the United States, a larger share of total wage inequality can be attributed to inequality *within* enterprises than to inequality *between* enterprises. And, although the latter accounts for much of the recent rise in wage inequality, among workers of "mega-firms" employing more than 10,000 workers both types of inequality have increased considerably, by roughly equal magnitudes.

1. In this report the terms "enterprise" and "establishment" (or "firm") are used interchangeably.

The wage inequality pyramid in Europe

In Europe in 2010, wage inequality within enterprises accounted for almost half of total wage inequality. Ranking enterprises by their average wages and looking at the minimum and maximum wages they pay, our report documents that in Europe there is considerable wage inequality, particularly within enterprises that register relatively high average wages. When comparing the wages of individuals to the average wage of the enterprises in which they work, we find that most people (about 80 per cent) are paid less than that average wage. At the very low end of the curve, some workers earn wages far below the average wages of the enterprises in which they work, pointing towards large inequality within such enterprises as a cause of unduly low pay. At the very top end of the curve, the top 0.1 per cent of individuals are paid €211 per hour, while the enterprises in which they work pay on average €45 per hour. In the report we illustrate by means of graphics how the payment of extremely high wages by a few enterprises to a few individuals leads to a "pyramid" of highly unequally distributed wages, highlighting the extent and degree of wage inequality not only between enterprises but also within enterprises. While it would be desirable to undertake this analysis for both developed and emerging economies, in practice few "matched" data sets (that is, data sets that have information on both workers and the enterprises in which they work) are available for the latter group.

Gender pay gaps in the workplace

In our report we also calculate the gender pay gap, using "matched" data for Europe. We find that the gender pay gap declined from 2002 to 2010 but remains positive – and is higher at the top than at the bottom or middle of the distribution – in a large majority of European countries. While the overall hourly gender pay gap for Europe is about 20 per cent, in the top 1 per cent of wage earners it reaches about 45 per cent. Among CEOs, who are among the best-paid 1 per cent of wage earners, the gender pay gap is above 50 per cent. The gender wage gap is wider in enterprises that pay higher average wages. In the 1 per cent of enterprises with the highest average wages in Europe, the gender pay gap is almost 50 per cent. The report also shows that the gender pay gap is present in the labour market from an early age but increases substantially for workers who are above 40 years old.

Part III. Summary and conclusions

The need for policy coordination at the global level

Stagnating average wages and a declining labour share can have both social and economic consequences. On the social side, the disconnect between economic growth and wage growth means that workers and their families do not feel that they are receiving a just share of the fruits of economic progress, which fuels their frustration. On the economic side, low wage growth dampens household consumption, which can reduce aggregate demand, particularly when wages stagnate in many large economies at the same time. In this respect, the higher wage growth

seen in 2015 in various countries has had positive economic effects beyond their borders. Where economically feasible, higher wage growth should be sustained or further encouraged. This cannot be the case in every single country, as in some countries higher wage growth may increase labour costs in a way that is not sustainable for enterprises and jobs, and may result in significant reductions in exports or investment. Differentiated country-specific approaches are thus needed.

Previous editions of the *Global Wage Report* called for global-level policy coordination to avoid either the simultaneous pursuit by too many countries of wage moderation policies, or competitive wage cuts with a view to increasing exports, either of which could lead to a fall in regional or global aggregate demand or deflation. In this respect, the inclusion of wage policies on the agenda of recent G20 meetings has been a positive development. In 2016 the G20 called for the implementation of macroeconomic policies to achieve substantial wage and productivity growth, and for sustainable wage policy principles in which strengthened labour market institutions and policies – such as minimum wages and collective bargaining – could help wage increases to better reflect improvements in productivity growth.

Areas for possible country-specific policy measures

Vigorous and ambitious action is needed to implement at every level policies that ensure sustainable wage growth and a just share of the fruits of progress to all. These policy responses need to take into account longer-term trends as well as recent developments. Above all, adequate policy responses must address the specific factors that drive wage developments and wage inequality in a positive or negative direction. In that light, national policies should be based on the patterns and drivers in each economy, while recognizing that many trends have a broad effect across countries at similar levels of development.

- ***Minimum wages and collective bargaining.*** Minimum wages and collective bargaining have the potential to simultaneously reduce inequality between and within enterprises. But differences in the way collective bargaining is organized have different effects. When collective bargaining takes place at the national, industry and/or branch level in multi-employer settings with coordination across levels, a larger proportion of workers are covered and inequality is likely to be reduced both within and between enterprises. The extension of collective agreements by governments to all workers in a particular sector or country can reinforce these effects**.** When the collective bargaining system is narrow, taking place at the company or workplace level, the effect is restricted to wage inequality within these enterprises. The ILO has international labour standards on collective bargaining and minimum wages, and has recently published policy guides on both subjects, also pointing to the complementarity of minimum wages and collective bargaining as policy tools.
- ***New initiatives by employers and workers to reduce inequality through collective bargaining.*** New proposals and initiatives have been put forward in recent years to address the growing inequality between enterprises, particularly between buyers and their subcontractors, aimed at ensuring the inclusion of all parts of the supply

chain in collective bargaining agreements. At the international level, some enterprises have highlighted the difficulty of raising wages at the enterprise level in a competitive environment where buyers can shop for the lowest prices. One interesting move in this respect is the decision of some major global brands to start a joint initiative with manufacturers and trade unions to promote multi-employer collective bargaining at the industry level in garment-producing countries.[2]

- ***Top salaries: enterprise self-regulation or more regulation?*** Given the magnitude of wage inequality within enterprises documented in this report, it is clear that enterprises have their own role to play in self-regulating to keep wage inequality within socially acceptable bounds. Many CEOs effectively determine their own pay, and shareholders have often been unable to ensure fair executive remuneration in line with social values or even with company performance. The ILO considers that "sustainable enterprises engage in social dialogue and good industrial relations, such as collective bargaining and worker information, consultation and participation. These are effective instruments to create win–win situations, as they promote shared values, trust and cooperation, and socially responsible behaviour" (ILO, 2007, p. 5). Initiatives to regulate top wages have focused in the past on the transparency of remuneration and on shareholders' "say over pay". Now there are also questions as to whether more regulation is necessary to discourage compensation packages based on short-term shareholder value rather than long-term enterprise performance.
- ***Productivity growth for sustainable enterprises.*** Given that differences in average wages between enterprises are an important determinant of overall wage inequality, promoting productivity growth among sustainable enterprises may simultaneously permit higher average wages and reduce wage inequality. There need not be a trade-off between growth and inequality. Yet if growing inequality between enterprises is due to polarization and outsourcing, there may be little scope for improving productivity at the low value added segment. More generally, the 2007 ILO *Conclusions concerning the promotion of sustainable enterprises* recognize that inequality and discrimination are incompatible with sustainable enterprise development, and emphasize the importance of an environment that is conducive to the creation and growth or transformation of enterprises on a sustainable basis. Such an enabling environment combines the legitimate quest for profit, which is one of the key drivers of economic growth, with the need for development that respects human dignity, environmental sustainability and decent work.
- ***Addressing unequal wages between groups of workers, including women and men.*** Labour market institutions and wage policies will be truly effective in reducing inequality only if they include and protect groups that are vulnerable, disadvantaged or subject to discrimination. Gender pay gaps – differences in average wages between men and women – remain a global concern. The report highlights the fact that although gender pay gaps are found in all types of enterprises, they are particularly large among enterprises with high average wages. This suggests

2. See the ACT initiative at http://www.ethicaltrade.org/act-initiative-living-wages.

that enterprise-level job evaluations remain an essential complement to legislation guaranteeing the right to equal wages for work of equal value, effective enforcement of this right by governments, and effective access to justice for workers to claim this right. Measures to keep CEO pay within certain boundaries are also likely to narrow the wide pay gap between men and women CEOs documented in the report.

Other measures to reduce inequality

The measures just discussed are not, of course, the full story of how inequality can be reduced. In this regard it is worth recalling that the *Global Wage Report* is published every two years and that the previous edition examined the relationship between wages, household incomes and broader inequality, suggesting a number of other policy measures to reduce inequality.

Fiscal policies, in the form of taxes and transfers, to address wages and inequality. In many developed economies taxation systems have become less progressive in recent years, amplifying the inequality that arises in the labour market. Reforms that address corporate and individual tax avoidance and offer targeted tax relief for low-income households can restore some of the lost progressivity to tax systems. Steeper and more progressive taxation may also contribute to lower executive pay, reducing incentives for CEOs to demand higher compensation. It is also essential that fiscal policy addresses inequality through transfers where payments are made to lower-income households, whether directly, as cash, or in the form of public employment opportunities or employment guarantees, or else as subsidized food. Although many countries have expanded their social protection systems, a large share of the world's population still remains without health insurance and old-age benefits, and an even larger proportion lives without child and family benefits and protection in case of unemployment, disability, work injury or maternity (ILO, 2014b).

Policies that affect wages and wage distribution indirectly as important elements of a comprehensive response. These include access to quality education, ongoing programmes to improve the skills of the workforce, and better matching between jobseekers and jobs. They also include policies to address wage differentials often incurred by workers in non-standard forms of employment (particularly temporary and temporary agency workers), which are on the rise in many industrialized countries and tend to grow in developing countries in segments of the labour market previously associated with standard jobs. Measures to be adopted should seek to extend to workers in non-standard forms of employment protections that are enjoyed by workers in "standard" arrangements as well as better aligning the protections available through different employment arrangements. This would lead to the implementation of the principle of equality of treatment between workers, avoiding discrimination based on occupational status as well as reducing indirect gender-based discrimination and ensuring that non-standard work is not used only with the aim of lowering labour costs by offering worse remuneration and working conditions to particular groups of workers (ILO, 2016b).

PART I Major trends in wages

1 Introduction

Over the past few years there has been a growing recognition of the need to monitor wage trends and implement sustainable wage policies that prevent wage stagnation, raise levels of pay for the millions of working poor around the world, ensure fair distribution, reduce excessive wage and income inequalities, and buttress consumption as a key pillar of sustainable economies.

Wages matter for several different reasons. First, they represent a vital source of household income and consequently have a huge influence on people's living standards. The previous *Global Wage Report* (ILO, 2015a) calculated that in developed economies wages usually represent about 70–80 per cent of total pre-tax and post-transfers income for households with at least one member of working age. For the middle classes in these countries, the share of wages in total income is frequently above 80 per cent, whereas for low-income households social transfers play a more important role in complementing incomes from wages. In emerging and developing countries, the contribution of wages to household income is smaller, ranging from 50–60 per cent in Argentina or Brazil to about 40 per cent in Peru and 30 per cent in Viet Nam; and self-employment incomes usually contribute a larger share of household income than in developed countries. Even so, where incomes have grown and income inequality has been reduced, this has frequently come about as the result of a combination of more jobs in paid employment for low-income households and a more equitable wage distribution. The role of labour markets and wages in reducing poverty and inequality has also been highlighted in the first edition of the World Bank's annual flagship report, *Poverty and shared prosperity* (World Bank, 2016).

Second, wages matter for economic and political reasons. At the level of enterprises, the wages of paid employees represent a cost. But at the macroeconomic level, sustainable wage growth is central to maximizing aggregate demand. While excessive wage growth may lead to price inflation and declining exports or investment, weak wage growth can represent a drag on household consumption and domestic demand – a prospect that is particularly relevant in the current global economic context characterized by slow growth. Excessive inequality tends to contribute to lower economic growth and less social cohesion (Ostry, Berg and Tsangarides, 2014; d'Hombres, Weber and Elia, 2012). It can also lead to political polarization: a recent IMF report pointed out that in some countries the nature of political discussions had shifted as a result of "growing income inequality as well as structural shifts, some connected with globalization, that are seen as having favoured economic elites while leaving others behind" (IMF, 2016a, p. xiii). The

Global Wage Report 2012/13 called for global-level policy coordination with a view to promoting inclusive and sustainable wage growth across countries. In this respect, the inclusion of wage policies on the agenda of recent G20 meetings has been a positive development.

Last but not least, wages are about more than money; they matter from the point of view of fairness and human dignity. The ILO has long emphasized that "labour is not a commodity" and that, this being so, the price of labour cannot be determined purely and simply through the application of the rule of supply and demand (see ILO, 1944 and 2014a). As pointed out by Piketty, "the price system knows neither limits nor morality" (2014, p. 6). Minimum wages play an important role in ensuring that workers are treated in a way that is fair and compatible with notions of human dignity and respect. Over and above minimum wage levels, policies in the areas of wages, hours and other conditions of work can contribute substantially to fostering social dialogue and collective bargaining, and ensuring a just share of the fruits of progress to all (ILO, 2008a). Fairness includes equal remuneration for work of equal value, and the elimination of pay discrimination between men and women, or between other groups.

With these issues in mind, Part I of this edition of the *Global Wage Report* provides comparative information on recent trends in average wages, and then compares these trends to those in labour productivity. The relationship between the growth of average wages and that of labour productivity is central to the definition of sustainable wage policies, and determines trends in the labour share of GDP. This part of the report also reviews recent trends in wage inequality and debates on the correlation between a declining labour share in GDP and increasing income inequality. A further section of Part I provides an overview of minimum wage trends and comparative information on their levels across countries in different regions. The final section of this part reviews trends in the gender pay gap. Before turning to wage trends, however, Part I of the report presents a brief summary of a few recent economic and labour market trends.

2 Economic context

2.1 Improved economic growth in developed economies, but lower growth globally

This new edition of the *Global Wage Report* is published in the context of a weak and precarious global recovery (IMF, 2016b). Eight years after the outbreak of the global financial and economic crisis, the world economy has still not fully recovered, and there is a high risk that it will remain stuck in a slow-growth trap unless co-ordinated action is taken to boost growth and make it more inclusive (ILO, 2016a).

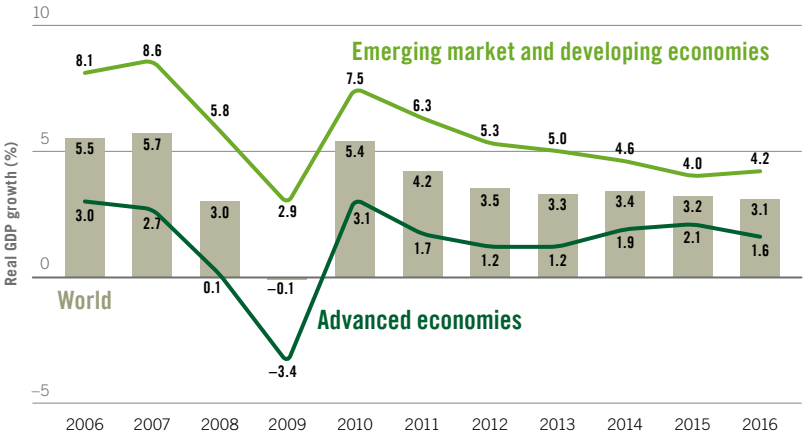
Figure 1 shows that world GDP grew at a rate of 3.3–3.5 per cent between 2012 and 2014, before dropping to 3.2 per cent in 2015 and to a forecast 3.1 per cent in 2016. This slowdown has occurred in a context of relatively weak global demand, declining oil and commodity prices, low inflation in developed economies and marked currency depreciations in some large emerging economies. There has been a substantial narrowing of the differential in growth rates between advanced economies and emerging and developing economies. However, the modest pick-up of growth in advanced economies in 2015 was not sufficient to offset the more pronounced deceleration of growth in the rest of the world.

In the group of advanced economies, economic growth increased from about 1.2 per cent in 2012 and 2013 to 1.9 per cent in 2014 and 2.1 per cent in 2015. But worries remain about the possibility of a slowdown in 2016 and long-term economic stagnation. The rise in growth in 2014 and 2015 was a result of relatively more robust performance in a few countries, including Germany, the United Kingdom and the United States, three large economies in which consumption and investment have recovered somewhat more strongly than elsewhere. In many advanced economies growth rates remained relatively low, productivity growth was slow, and investment was held back by low levels of overall demand and economic activity (IMF, 2016a and 2016b). Among countries which applied austerity measures associated with fiscal consolidation, growth rates finally turned positive in Spain and Portugal in 2014 and 2015, but GDP remains below pre-crisis levels in both countries, while in Greece, GDP contracted in seven out of eight years since 2008, and remains about 30 per cent lower than before the crisis.

Within this environment, consumer price inflation in advanced economies declined from about 1.4 per cent in 2013 and 2014 to 0.3 per cent in 2015: this was its lowest level since the onset of the global financial crisis (figure 2).[1] This low inflation can be explained by a combination of lower prices for oil and commodities and weak overall demand. Hence, in many advanced economies, inflation rates remained well below the inflation targets set by central banks. In the eurozone, especially since 2013, the risk of deflation has been and remains a rising concern, with a growing number of countries having experienced negative rates of inflation in 2014–15. In spite of ultra-low interest rates, which are now likely to persist for longer than initially expected, deflation pressures remain. While deflation may at first seem a factor that benefits real wages, it is in fact a double-edged sword (see box 2).

Emerging and developing countries have grown at a declining rate since 2010, though with wide variation among countries. Figure 1 shows that growth

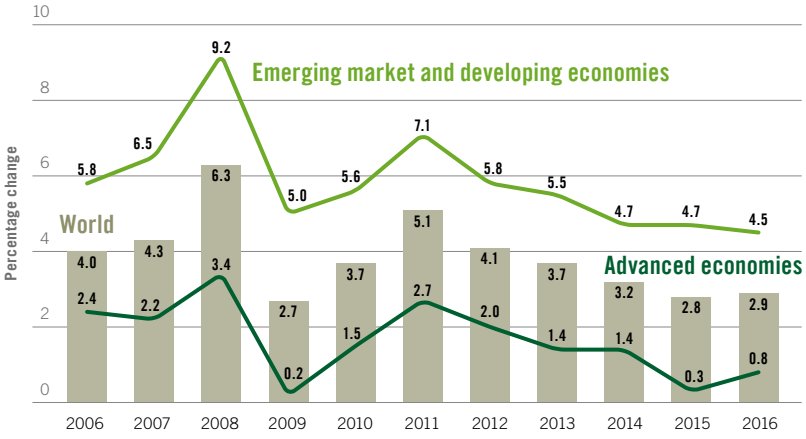
Figure 1 Annual average economic growth, 2006–16 (GDP in constant prices)



Note: Country groups are those used by the IMF as described in the appendix of the IMF's *World Economic Outlook*, Oct. 2016. Figures for 2016 are projections.

Source: IMF *World Economic Outlook* database, Oct. 2016.

Figure 2 Inflation, 2006–16 (average consumer prices)

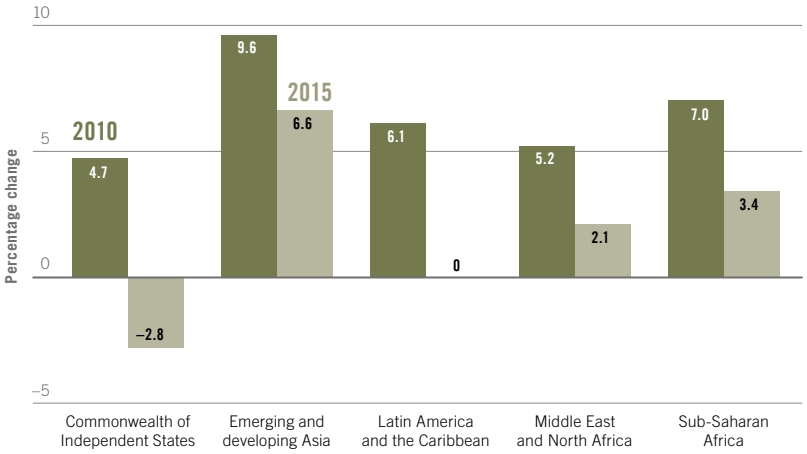


Note: Country groups are those used by the IMF as described in the appendix of the IMF's *World Economic Outlook*, Oct. 2016. Figures for 2016 are projections.

Source: IMF *World Economic Outlook* database, Oct. 2016.

in emerging and developing economies declined for the fifth consecutive year, falling from 7.5 per cent in 2010 to 4.0 per cent in 2015. Some countries – such as Brazil and the Russian Federation – experienced deep recessions. In other countries, activity has remained more robust – as in some of the members of the Association of Southeast Asian Nations (ASEAN). China's economic slowdown had a significant impact on overall growth in both emerging and developed countries, particularly in Asia. Price inflation remains largely positive in emerging and developing economies, and rates have stabilized in 2015, after three years of steady decline (figure 2). While lower oil and commodity prices, together with weaker

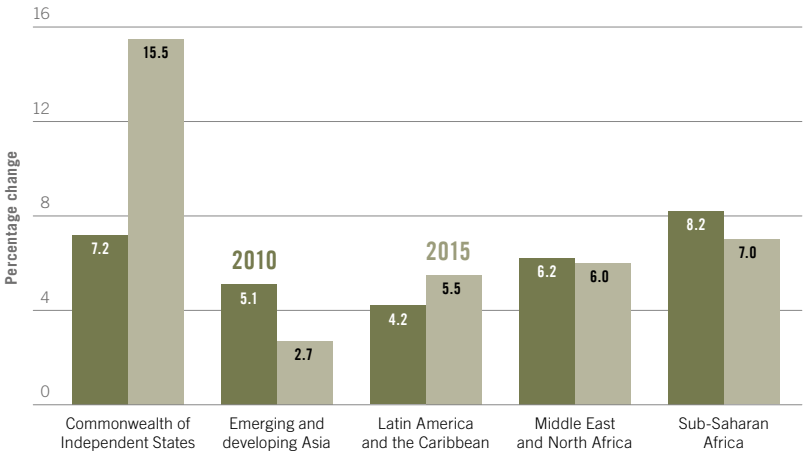
Figure 3 Annual average economic growth by region, 2010 and 2015 (GDP in constant prices)



Note: Country groups are those used by the IMF as described in the appendix of the IMF's *World Economic Outlook*, Oct. 2016.

Source: IMF *World Economic Outlook* database, Oct. 2016.

Figure 4 Inflation by region, 2010 and 2015 (average consumer prices)



Note: Country groups are those used by the IMF as described in the appendix of the IMF's *World Economic Outlook*, Oct. 2016.

Source: IMF *World Economic Outlook* database, Oct. 2016.

domestic demand, contributed to reducing inflation, in several emerging economies, including Colombia, Mexico, the Russian Federation and South Africa, this effect was offset by sharp currency depreciations that made exports cheaper but increased the prices of imported goods (IMF, 2016b).

Figures 3 and 4 show, respectively, economic growth rates and inflation rates in 2010 and 2015 in emerging and developing countries grouped into regions. In emerging and developing Asia, the Middle East and North Africa, and sub-Saharan Africa, both economic growth and price inflation declined, at different

rates, but remaining positive. Despite a continuous drop in GDP growth since 2010, emerging and developing Asia remains the region with by far the strongest economic growth, notwithstanding the slowdown in China, where economic growth slowed from 10.6 per cent in 2010 to 6.9 per cent in 2015. In sub-Saharan Africa, some of the largest economies (including South Africa and Nigeria) have experienced slowdowns, but growth in these countries remained positive in 2015. By contrast, in Latin America and the Caribbean GDP growth fell to zero while inflation went up, reflecting in part economic conditions in Brazil, where growth declined from 7.5 per cent in 2010 to −3.8 per cent in 2015 and price inflation increased from 5.0 to 9.0 per cent. In the Commonwealth of Independent States (CIS), GDP contracted and price inflation rose sharply; in the Russian Federation, for example, GDP growth fell from 4.5 per cent in 2010 to −3.7 per cent in 2015, while inflation soared from 6.9 to 15.5 per cent, eroding the value of wages.

2.2 Recent labour market trends

The slowdown in global economic growth since 2010 has translated into a further rise in global unemployment. According to a recent ILO report, the global unemployment rate stood at 5.8 per cent in 2015, meaning that almost 200 million people (an estimated 199.4 million) were unemployed (ILO, 2016c). This is almost 30 million more people than in 2007, before the global financial and economic crisis started. In developed economies, the estimated unemployment rate has recently been reduced somewhat, from 8.1 per cent in 2010 to 6.7 per cent in 2015, reflecting declining unemployment rates in Germany (from 6.9 per cent in 2010 to 4.6 per cent in 2015), the United Kingdom (from 7.9 per cent in 2010 to 5.4 per cent in 2015) and the United States (from 9.6 per cent in 2010 to 5.3 per cent in 2015).[2] In the United States and some other countries, labour force participation has declined and the fall in unemployment rates thus overstates the employment recovery (IMF, 2016b). In Spain and Greece, unemployment rates remain very high, at 22.1 per cent and 25.0 per cent respectively.

In emerging and developing economies, recent trends have taken place against a backdrop of falling poverty rates and rising living standards over the past two decades. Since 1990, the proportion of people living on less than US$3.10 per day has been reduced by half, to an estimated 36 per cent of the population. This progress has been uneven, however, with substantial improvements in China and much of Latin America, but stubbornly high poverty rates in much of Africa and parts of Asia (ILO, 2016d). A recent World Bank report has highlighted the importance of labour markets in reducing poverty and in translating economic growth into lower inequality by increasing job opportunities and earnings (World Bank, 2016). Although many countries have expanded their social protection systems, a large share of the world's population still remains without health insurance and old-age benefits, and an even larger proportion lives without child and family benefits and protection in case of unemployment, disability, work injury or maternity (ILO, 2014b).

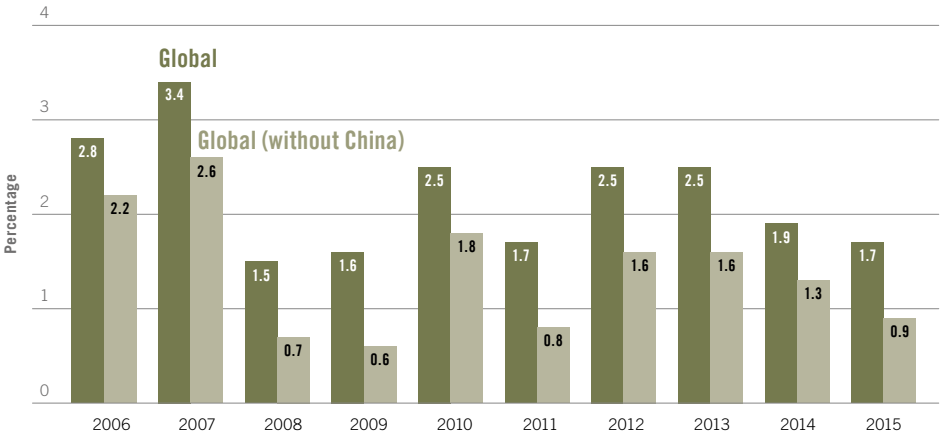
3 Global and regional wage trends

3.1 Global wage trends

How have real average wages evolved over the last few years in the context described in the previous section? According to recent ILO estimates, in 2015 there were 3.21 billion employed persons in the world, 1.66 billion (51.5 per cent) of whom were wage and salaried workers (ILO, 2015b). Figure 5 provides two estimates of global average wage growth in real terms. Average wages are calculated using gross monthly wages, rather than the less frequently available hourly wages, and fluctuations therefore reflect changes in both hourly wages and the average number of hours worked.[3] Real wages are net of consumer price inflation. That is, nominal wages are deflated by a relevant price index, normally the CPI. The full methodology and the definition of wages are provided in Appendix I, along with some country-specific data (see table A1). The full data set is available from the Global Wage Database (see box 1).

The first estimate in figure 5 is a global estimate based on the combination of real and estimated wage data for 132 economies. The second global estimate omits China because its large population of wage employees weighs significantly on the global estimates and because, according to official wage statistics, the country continues to experience extraordinarily high real wage growth. Excluding China

Figure 5 Annual average global real wage growth, 2006–15



Note: 2015 figures are preliminary estimates as national estimates are not yet available for all countries.

Source: ILO estimates based on official national sources as recorded in the ILO Global Wage Database.

Box 1 The ILO Global Wage Database data

Data underlying the *Global Wage Report* are accessible at: www.ilo.org/ilostat/GWR.

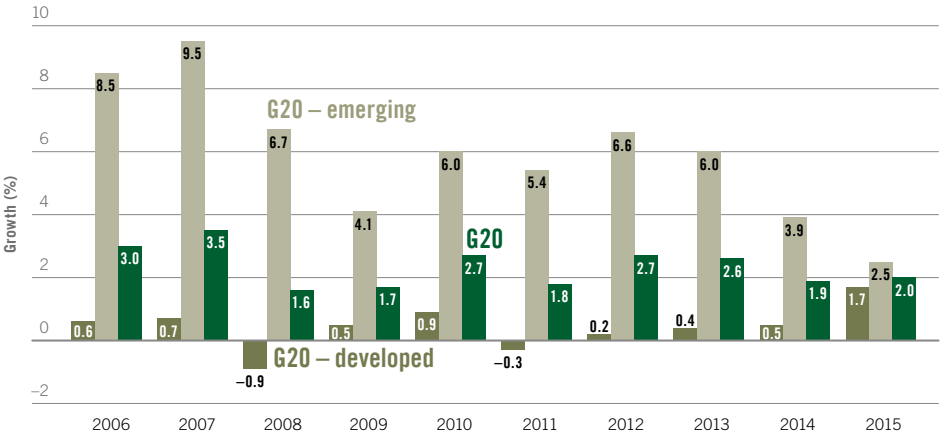
Additional wage-related indicators (e.g. low pay, wage inequality by decile, wages by sex, etc.) can be accessed through the "Yearly indicators" collection of ILOSTAT at: http://www.ilo.org/ilostat.

from the global estimate provides an estimate of global wage trends that better reflects what happens in other countries worldwide. As can be seen, global real wage growth dropped sharply during the crisis (2008 and 2009), recovered somewhat in 2010 but fell back in 2011 and has decelerated again since 2012, falling in 2015 to its lowest level in four years, and below the 1 per cent mark in 2015 if China is excluded.

3.2 G20 wage trends

Figure 6 repeats the estimate but restricts it to the G20 countries, a group that brings together the world's major developed and emerging economies.[4] Together, the countries of the G20 produce about three-quarters of world GDP and employ more than 1.1 billion of the world's 1.66 billion paid employees.[5] Figure 6 shows estimates for annual average real wage growth for the G20 as a whole and separately for developed and emerging members. For the full period considered, average real wage growth has been significantly higher in G20 emerging economies compared to developed ones. However, from 2012 onwards wage growth in emerging economies decelerated, dropping by 4 percentage points in three years, to the lowest level recorded since 2006. At the same time, in developed G20 economies average wage growth increased from an estimated 0.2 per cent annually in 2012 to an estimated 1.7 per cent in 2015 – the highest rate since 2006. As result, the differential in wage growth between developed and emerging G20 economies declined sharply. One question that arises is whether the higher wage growth in developed economies in 2015 will be repeated in the near future or whether it was a singular event, brought about in part by falling consumer price inflation.

Figure 6 Annual average real wage growth in the G20, 2006–15



Note: 2015 figures are preliminary estimates as national estimates are not yet available for all countries.

Source: ILO estimates based on official national sources as recorded in the ILO Global Wage Database.

3.3 Regional wage trends

Figure 7 presents annual average real wage growth by region, broadly following the new ILO regional groupings (see Appendix II, table A2). We see that in predominantly developed regions wage growth has accelerated since 2012, while in predominantly emerging and developing regions it has decelerated or even turned negative.

In Northern America (which comprises the United States and Canada) real wages saw faster growth in 2015, after weak growth during most of the previous decade. This was mainly attributable to the 2.2 per cent growth in real wages in the United States, the highest in the country since 1998. In Northern, Southern and Western Europe wage growth also accelerated in 2015 after a long period of relative wage stagnation or even decline. Real wage growth resumed in 2013, and in 2015 the growth rate of wages was double that observed in 2014. The EU, which includes some countries from the above region, experienced higher wage growth than in the previous 15 years, going from negative growth in 2012 to growth of 1.9 per cent in 2015. It is as yet unclear whether such wage growth will be sustained in the future or whether developed countries will return to their previous pattern of wage stagnation.

Consistently with the economic growth figures, the pick-up of wage growth in advanced economies was not sufficient to offset the more pronounced deceleration in emerging and developing regions. In Eastern Europe real wages declined significantly in 2015 following the slowdown observed in 2013–14. To a large extent this reflects the drop in real wages observed in the Russian Federation and the even steeper decline in Ukraine. In Central and Western Asia estimates show that after a strong recovery from the crisis in 2010 and 2011, wage growth has since gradually slowed down. In Latin America and the Caribbean real average wage growth declined in 2013 and turned negative in 2014 and 2015, with regional trends strongly driven by the large economies of Brazil and Mexico. In Brazil real wages fell between 2014 and 2015. In Asia and the Pacific, somewhat surprisingly, average real wage growth increased in 2015 compared to 2014, in spite of the modest slowdown in Chinese wage growth.[6] In Africa, owing to considerable data constraints, trends can be only tentatively formulated. On the basis of the available information, it seems that Africa experienced a decline in real wages in 2014, and returned to positive wage growth in 2015 with an average wage growth of 2 per cent. For the Arab States there are only tentative estimates, again because of data constraints (see table A5 in Appendix III).

Figure 7 Annual average real wage growth by region, 2006–15

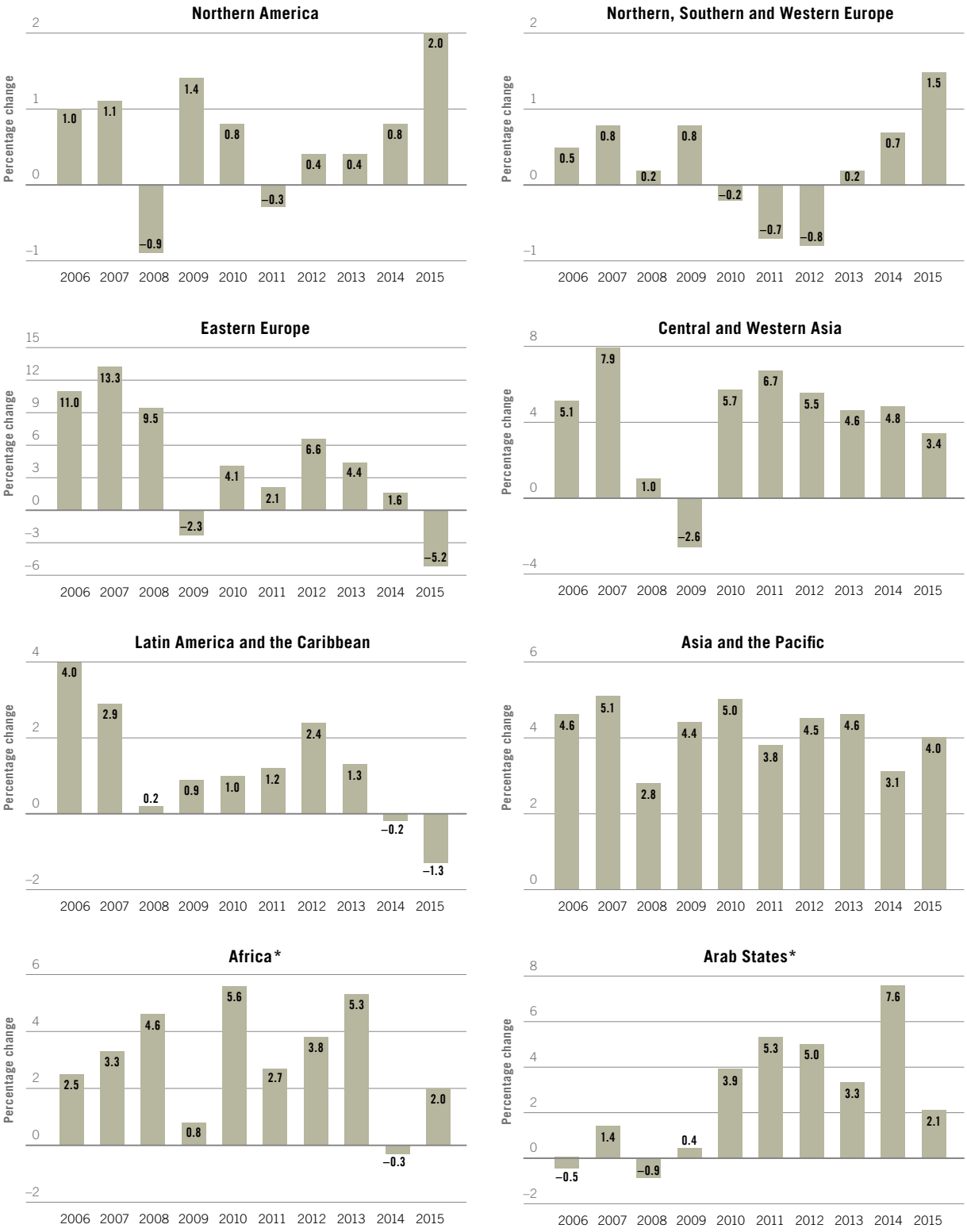
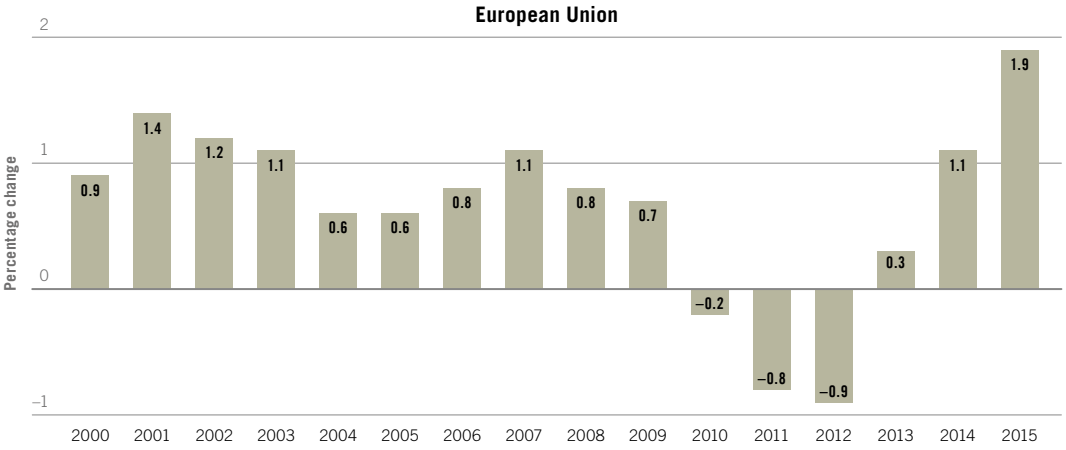


Figure 7 (cont.)



* Growth rates published as tentative estimates due to low data coverage.

Note: Regional wage growth is calculated as a weighted average of year-on-year growth in average monthly real wages. For a description of the methodology, see Appendix I.

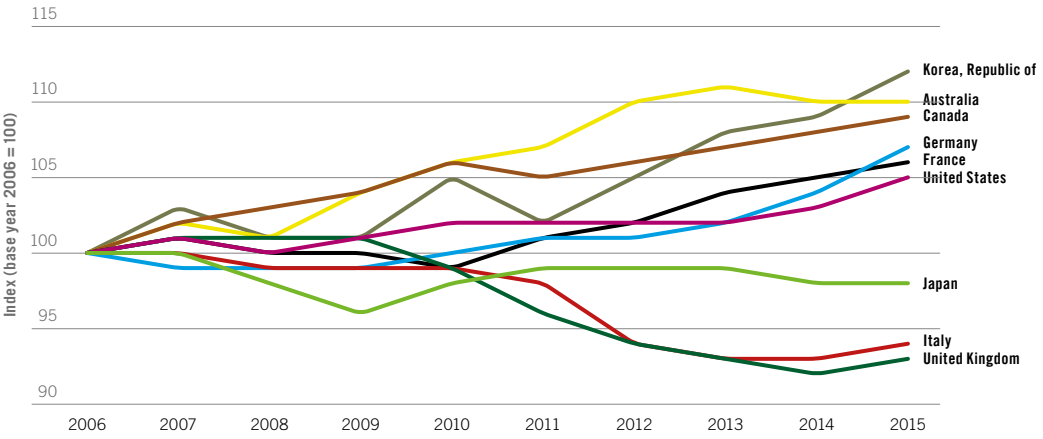
Source: ILO estimates based on official sources.

3.4 Some country-specific trends

Owing to their size, G20 countries have a significant impact on global and regional wage trends. We therefore present country-specific real wage growth for G20 member States in figure 8 (developed G20) and figure 9 (emerging G20). These figures show that there has been considerable variation across countries since 2006.

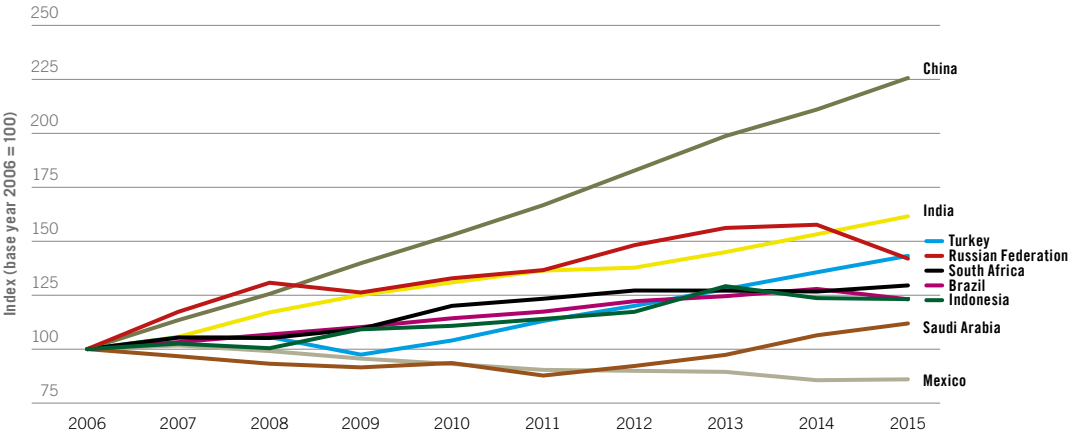
Figure 8 shows that among developed G20 countries, real average wages since 2006 have increased most rapidly in the Republic of Korea, where they rose by 12 per cent, followed by Australia (10 per cent), Canada (9 per cent), Germany (7 per cent), France (6 per cent) and the United States (5 per cent). Meanwhile, in Japan, Italy and the United Kingdom, real wages declined (by 2, 6 and 7 per cent, respectively). Thus, among European countries a substantial gap in real wage trajectories has opened up over the last ten years between, for example, France and Germany on the one hand, and Italy and the United Kingdom on the other hand. Because of differences among countries in how exactly wage data are collected and measured, statistics on average wage levels are not strictly comparable across countries. Nonetheless, converting all of these countries' average wages into US$ by using purchasing power parity (PPP) exchange rates yields a simple average of about US$PPP 3,100 per month.[7] Comparing the two wage series used in this report, the ratio of average wages in United Kingdom to those in Germany declined from about 98 per cent to 86 per cent. Looking only at 2014 and 2015, we see that, with the exception of Australia, all the developed countries of the G20 have experienced an increase in average real wage growth, with steeper rises for Germany, the Republic of Korea and the United States. In Italy and the United Kingdom, average real wages returned to modest growth after several years of decline.

Figure 8 Average real wage index for developed G20 countries, 2006–15



Note: 2015 figures are preliminary estimates as national estimates are not yet available for all countries.
Source: ILO estimates based on official national sources as recorded in the ILO Global Wage Database.

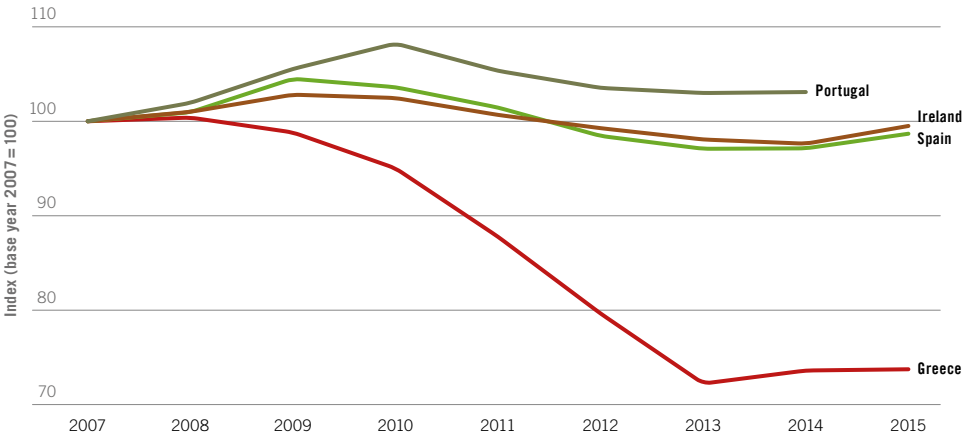
Figure 9 Average real wage index for emerging G20 countries, 2006–15



Note: 2015 figures are preliminary estimates as national estimates are not yet available for all countries.
Source: ILO estimates based on official national sources.

Figure 9 looks at the individual emerging economies in the G20. Here again, converting all of these countries' average wages into US$ by using PPP exchange rates – and bearing in mind that average wages are not strictly comparable across countries – yields a simple average of about US$PPP1,300 per month. This is less than half the average calculated for the developed economies of the G20. We can observe that since 2006 average wages more than doubled in China, increased by about 60 per cent in India and by between 20 and 40 per cent in most other countries in this group. Only in Mexico did real wages decline. Looking at 2014 and 2015 only, we see that the downward trend observed in the overall estimates for the emerging countries in figure 6 is strongly driven by a decline in average real wages in 2015 in the Russian Federation and Brazil. In China, the high growth rate of

Figure 10 Average real wage index for selected European countries, 2007–15



Source: ILO estimates based on official sources.

wages slowed somewhat, but the country remains on a trajectory of its own among G20 economies. Wage growth continued in India and Turkey, while in Mexico real wages stabilized in 2015 after declining almost constantly since 2008.

Figure 10 shows that the wage declines in the European countries most affected by the crisis and placed under austerity measures seem to have ceased in 2015, though in Greece real wages have dropped by approximately 25 per cent since 2007–08.

3.5 Wages and the risk of deflation

As noted above, the risk of disinflation leading to deflation has recently increased in many countries, particularly developed countries. Disinflation refers to a slowdown in the inflation rate. Deflation occurs when the inflation rate falls below zero per cent as result of a drop in the general price level of goods and services. According to the IMF, in 2015 inflation rates in more than 85 out of 120 economies were below long-term expectations, and about 20 per cent of countries were in deflation (IMF, 2016b). More often than not deflation is the consequence of a prolonged period of decline in consumer demand relative to the supply of goods and services in the economy. Even though it might be tempting to link deflation with higher real wages (owing to a decline in the general price level), the effects of a deflationary period on real wages are likely to depend on its length. In the short run, lower prices may lead to higher real wages as a result of fixed or increasing nominal wages, as nominal wages are often based on agreed contracts under expectation of positive inflation rates. But in the medium term, if deflationary pressure persists nominal wages are likely to be adjusted downwards, leading to stagnating or possibly declining real wages. Falling wages can then themselves become an important factor in a deflationary process, as lower wages lead to lower prices and a deflationary wage–price spiral sets in (see the example of Japan in box 2).

Box 2 Deflation and wages in Japan

The experience of Japan may serve as a recent example to illustrate how deflation can become entrenched. Until the end of the 1980s Japan experienced strong economic growth, to a large extent fuelled by an asset price bubble that resulted from excessive loan growth. At the beginning of the 1990s, the Bank of Japan raised lending rates and the bubble burst, forcing firms and financial institutions to repair their balance sheets. In response to the economic slowdown, Japanese consumers became far more cautious, and the spending spree of the pre-crisis period turned to much more constrained consumption patterns. Faced with stagnant sales, firms started to cut expenses, including labour costs, by shifting to non-regular employees, including part-time workers, and by reducing the wages of regular employees. As a result, wages and the labour income share of GDP declined. A vicious circle of declining wages, prices and aggregate demand was set in motion. As profits were not invested, aggregate demand fell and profits declined, leading enterprises to reduce wages further. To improve the outlook for both employers and employees, and encourage wage growth, the Bank of Japan tried to stimulate the economy through monetary policy. But by now wage-setting practices had changed, and non-standard forms of employment are here to stay. Prior to the deflation experience, the so-called "spring offensive" served as a mechanism to raise wages through simultaneous wage negotiations between large employers and employees. But this mechanism now works less effectively.

Source: Kuroda, 2014.

The risks of a deflationary period have been understood for a long time (Fisher, 1933) and continue to be a cause of concern. In the long run persistent deflation makes a nation's debt grow while also dampening investment incentives. More and more resources are devoted to paying for the national debt and interest thereon while the economic activity of the nation declines.

Establishing a *nominal wage anchor* can be useful in guarding against deflationary dangers. The Governor of the Bank of Japan, for example, has suggested that the Bank's price stability target can serve as a benchmark for enterprises in their wage setting. "That is, once the Bank has succeeded in firmly anchoring inflation expectations at 2 per cent, this could provide the basis on which wage negotiations between management and labour are conducted. Firms and households can then base their economic decisions firmly on the expectation that prices will rise at a rate of around 2 percent" (Kuroda, 2014, p. 4). Others have proposed that, to prevent the labour share of GDP from declining, nominal wages should increase according to trend economy-wide productivity increases plus the target inflation rate of the central bank (see e.g. Herr, 2009 and 2015). Whatever the anchor selected, for wages to increase at this rate some wage coordination mechanism is necessary. Coordinated collective bargaining is perhaps the most effective such mechanism. In a situation of high employment and weak collective bargaining coverage, minimum wages can be used to try to establish a nominal wage anchor.

4 Wages, productivity and the labour income share

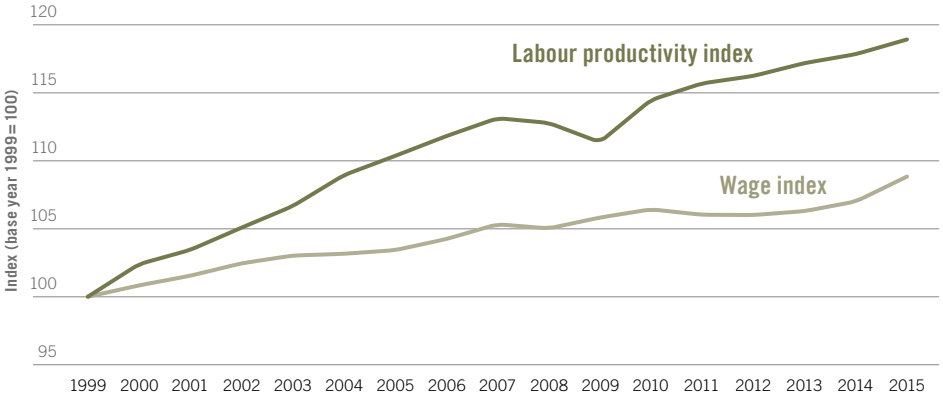
Average wages provide an indication of the labour compensation and living standards of wage employees, but for the purpose of economic analysis average wages are perhaps best compared to labour productivity. In the long run, increases in labour productivity (the average value of goods and services produced by workers) are what allows for sustainable wage increases. At the same time, the relationship between wages and productivity also affects macroeconomic aggregates. Under some circumstances, wage moderation relative to productivity can boost profits, investments, exports and job creation. In other instances, however, it will reduce aggregate demand and employment, because it constrains household consumption, which accounts for the largest share of GDP in most countries. Also, while each individual country may in principle increase aggregate demand by exporting more, not all countries can do so at the same time. If too many countries pursue wage moderation policies, regional or global aggregate demand is likely to decline, which is why coordination across countries is so important.

4.1 A persistent gap between wage growth and labour productivity growth

As pointed out in previous editions of the *Global Wage Report*, average wage growth has lagged behind average labour productivity growth since the early 1980s in several large developed economies, including Germany, Japan and the United States, where the labour share of GDP has therefore declined (see box 3 for a definition of the labour income share).

Figure 11 updates our previously published chart on average wages and labour productivity in 36 developed economies. Labour productivity is measured as GDP per worker, and both the real wages index and the labour productivity index are

Figure 11 Trends in growth in average real wages and labour productivity in developed economies, 1999–2015



Note: Wage growth is calculated as a weighted average of year-on-year growth in average monthly real wage in 36 economies (for a description of the methodology see Appendix I). The base year is set in 1999 for reasons of data availability.

Source: ILO Global Wage Database; ILO *Global Employment Trends* (GET).

Box 3 Determining the labour income share

National income is the sum of all income available to the residents of a given country in a given year. The division of national income between labour and capital is called the functional distribution of income. The labour income share (or labour share) is the part of national income allocated to labour compensation, while the capital share is the part of national income that goes to capital. A falling labour share often reflects more rapid growth in labour productivity than in average labour compensation, and an increase in returns to capital relative to labour.

The labour share, then, measures the fraction of national income accruing to labour (Krueger, 1999). Although the idea is simple, there are challenges involved in measuring the labour share. The unadjusted labour share is usually calculated as the ratio of total compensation of employees – wages and salaries before taxes, plus employers' social contributions – to a national product or income aggregate (Lübker, 2007). Regarding the numerator, issues arise as to who exactly is an employee (should CEOs be included?) and what should be counted as compensation (should stock options be counted as labour income?). The denominator can be, for example, gross national income (GNI) or gross domestic product (GDP), and it may be measured at market prices or factor costs. Because measurement of value added is problematic in some sectors (particularly public administration, where value added in national accounts is often just the sum of labour costs), the analysis sometimes focuses on the "corporate sector" (Karabarbounis and Neiman, 2014), or some other subset of the economy (OECD, 2012).

However it is measured, the unadjusted labour share is a lower estimate of the true share of labour income because compensation of employees excludes the income from self-employment, which is recorded as "mixed income" in systems of national accounts and may thus implicitly be recorded as capital income. Yet at least part of mixed income should be seen as return to labour input, and hence as an integral part of the labour share. Various methods to adjust the labour share have been tried and are recorded in the literature. One simple method of adjustment assumes that two-thirds of mixed income can be attributed to the labour share; another method is to attribute to the self-employed the same wage as the average wages of employees; yet another is to attribute to the self-employed earnings equal to the wages of employees with similar industry and personal characteristics (see Guerriero, 2012; Gollin, 2002; Arpaia, Prez and Pichelmann, 2009; Freeman, 2011).

While these differences in the way adjustments are made affect the level of the labour share, they do not generally affect trends (ILO, 2010a; Guerriero, 2012). It is important, however, to carefully interpret adjusted and unadjusted labour shares. Structural shifts from self-employment (such as family farming) to wage employment tend to raise the unadjusted labour share more than the adjusted figure. This should be kept in mind, particularly when looking at trends in emerging and developing countries, where the share of self-employed workers and unincorporated enterprises is larger than in advanced economies, and where the unadjusted labour income share is thus generally lower than in more developed countries. Once labour shares are adjusted for self-employment, it is no longer the case that labour shares are always lower in poorer countries (Gollin, 2002; Guerriero, 2012).

Source: Adapted from ILO and OECD, 2015.

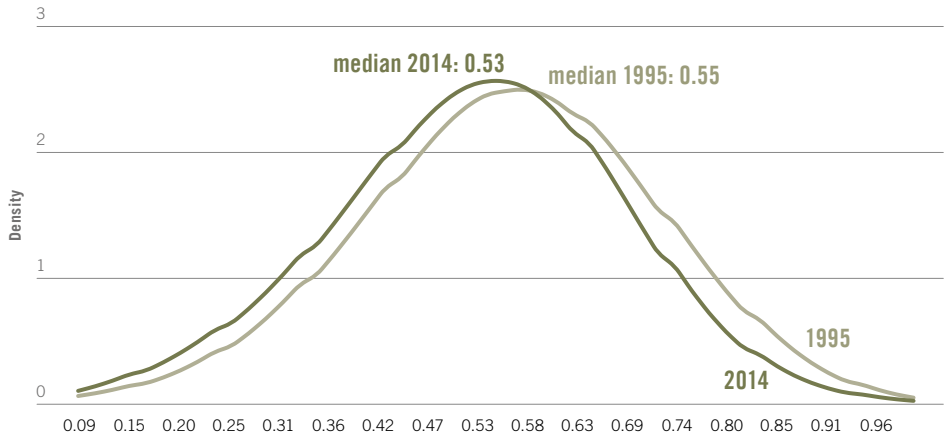
calculated as weighted averages. Large countries thus influence the figure more than small countries. The figure shows that since 1999, labour productivity growth in this group of countries exceeded wage growth by about 10 percentage points. In the period 2014–15 the gap between the two lines contracted by about 1 percentage point as result of a slight increase in real wages in excess of the relatively weaker growth in labour productivity between the two years. The gap, however, remains substantial.

4.2 An overall decline in labour income share

Although figure 11 covers only developed countries (for which more abundant, and more easily comparable, data on wages and labour productivity are available), the relationship between wages and productivity is also captured in the labour income share of GDP (see box 3). Recent studies have observed that, although not universal, the decline in labour income share is a global trend (see e.g. Trapp, 2015; Karabarbounis and Neiman, 2014). Figure 12 illustrates this global trend by showing the distribution of labour income share in 1995 and 2014 for a sample of 133 countries. There is a clear leftward shift (decline) in the distribution of estimated labour income, with the median value about 2 percentage points lower in 2014. Among the whole sample of 133 countries, 91 experienced a decline, 32 experienced an increase and ten remained stable. Figure 13 shows four examples of very different countries with declining labour shares, two from emerging economies (China and Mexico) and two from developed economies (Portugal and the United States). The labour share has increased in China in the most recent years and US labour income share has also risen slightly, whereas in Mexico and Portugal labour income shares have continued their declining trend.

The examples of China and the United States raise the question whether the post-crisis recovery of the labour income share is a wider movement, affecting

Figure 12 Distribution of the adjusted labour income share for a selection of 133 economies, 1995 and 2014



Note: The figure shows the probability of countries to fall at a particular level of the labour income share.

Source: Penn World Tables, available at: http://cid.econ.ucdavis.edu/pwt.html. The adjusted labour income share takes into account an estimate of the labour income of self-employed workers.

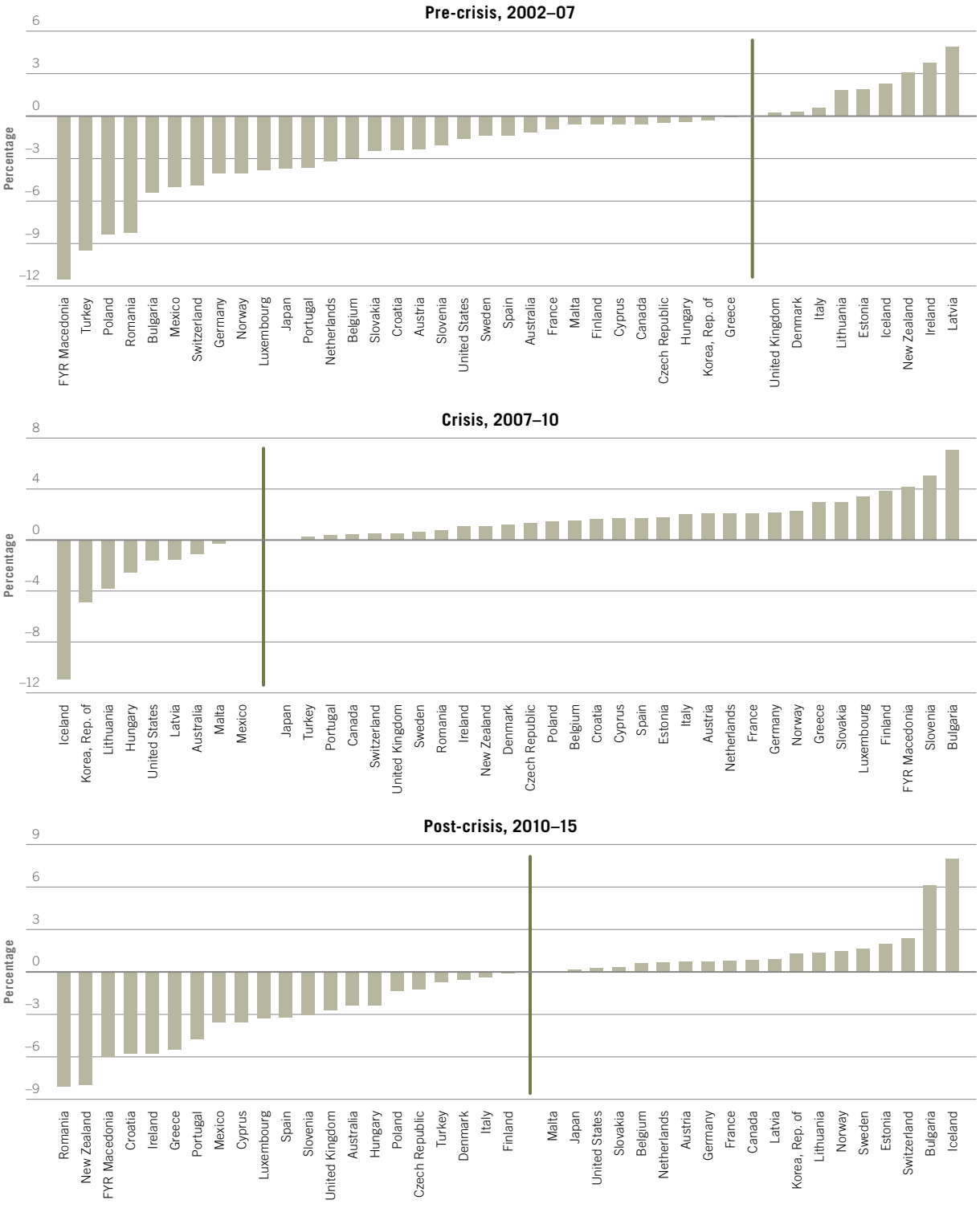
Figure 13 Labour income shares in four examples of developed and emerging economies

Source: Adjusted labour income share from AMECO for Mexico, Portugal and the United States. Unadjusted labour income share in China from the National Bureau of Statistics, China Statistical Database http://219.235.129.58/indicatorYearQuery.do?id=030210300000000; AMECO http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm

a broader range of countries. Figure 14 shows how the adjusted labour income share has changed in a selection of countries before, during and after the global economic crisis. In the pre-crisis period (2002–07), 31 countries out of 39 for which recent data are available from AMECO experienced a decline in the labour share. The magnitude of the fall varies across countries, ranging from 11.5 percentage points in The Former Yugoslav Republic of Macedonia to 0.1 percentage point in Greece. However, during the years of the crisis (2007–10) the opposite trend is observed, with the majority of countries (30 out of 39) experiencing an increase in the labour share. This reflects the well-known fact that during downturns profits tend to fall further or faster than wages. This countercyclical behaviour is well documented in the literature and appears to be a reality in most of the advanced economies (IMF, 2012).

Less is known about the post-crisis period. The last plot of figure 14 provides information on whether or not countries were still experiencing a downward trend in the last five years. The evidence suggests a rather mixed picture, with slightly more than half of the countries seeing a decline in the labour share and the other countries experiencing an increase. While Bulgaria, Iceland and Switzerland experienced appreciable increments in their labour share, reversing losses from

Figure 14 Change in adjusted labour income share before, during and after the crisis



Note: Adjusted wage share as percentage of GDP at current prices.

Source: AMECO.

earlier periods, workers in the United States also benefited from a modest increase in their income share for the first time in decades. Some other developed G20 countries, such as Canada, France and Germany, saw slight increases in labour share emerge during the crisis and continue in the recent period. On the other hand, in 20 other countries for which we have data, the long-term downward trend has resumed. In particular, workers from countries most seriously affected by the crisis, and where austerity measures and wage moderation policies were implemented (notably Greece, Ireland, Portugal and Spain), have seen their labour income share reduced.

Whether the upward movement in the labour share observed in a number of countries during the most recent period will be sustained by durable policy changes (such as the implementation of a minimum wage in Germany or the rise of the threshold at which employees are exempt from overtime pay in the United States) is a question for the future.

5 Wage inequality and minimum wages

5.1 Wage inequality

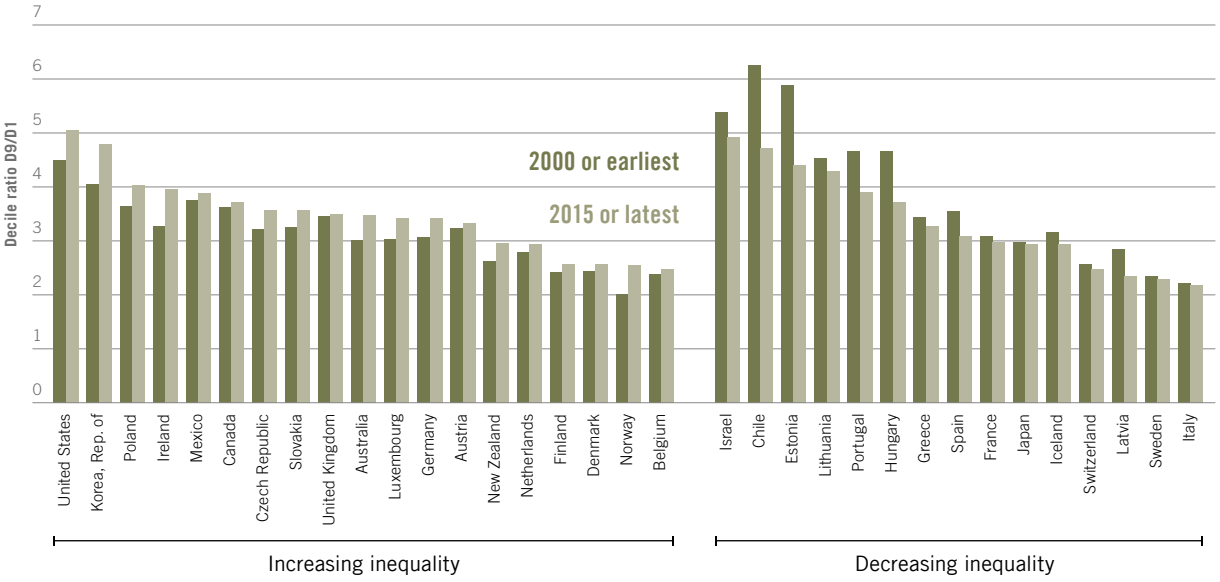
Previous sections of this report have provided information on the evolution of average wages themselves, as compared to labour productivity and as a component of the labour income share. But average wages do not tell the story of how wages are distributed among different groups of wage earners. It is a well-established fact that during recent decades wage inequality has increased in many countries around the world, including two-thirds of OECD countries as well as some of the large emerging economies (see e.g. OECD, 2008 and 2011a). While some level of inequality reflects differences in workers' individual and productive characteristics, growing concern has been expressed about the adverse social and economic consequences of excessive inequality, which can lead to weaker social cohesion, reduced household consumption (since well-paid workers save a higher proportion of their income) and lower rates of economic growth. The issue of wage inequality is explored more fully in Part II of this report.

A common measure of income inequality is the threshold ratio D9/D1, which measures the distance between the upper bound of the lowest-paid 10 per cent and the lower bound of the highest-paid 10 per cent of wage earners (see figure 15). Figure 16 shows how this ratio has changed for OECD countries since around the turn of the century. The left-hand panel displays countries where wage inequality has increased since the early 2000s, with the largest increases in Ireland, Norway, the Republic of Korea and the United States. On the right-hand side we see countries where wage inequality has decreased, with the sharpest falls in Chile, Estonia, Hungary and Portugal. Figure 17 shows the same wage ratios for a selection of developing and emerging economies. It shows increasing wage inequality in Indonesia, the Philippines and Viet Nam, and decreasing inequality in a range of other countries, several of which are in Latin America. In relative terms the largest decrease is observed in Brazil and Peru, whereas South Africa and Mexico have experienced a lower relative decrease in inequality.

Wages are a major determinant of household income. It is thus not surprising that the long-term trend towards greater wage inequality is mirrored in higher

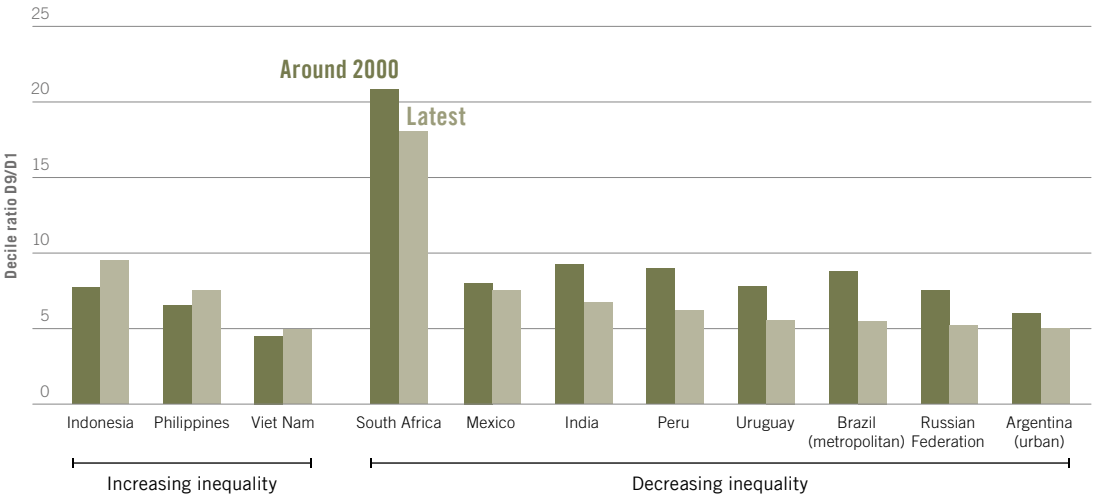
Figure 15 Measuring income inequality: The D9/D1 ratio

Figure 16 Wage inequality in OECD countries



Source: OECD Earnings Database.

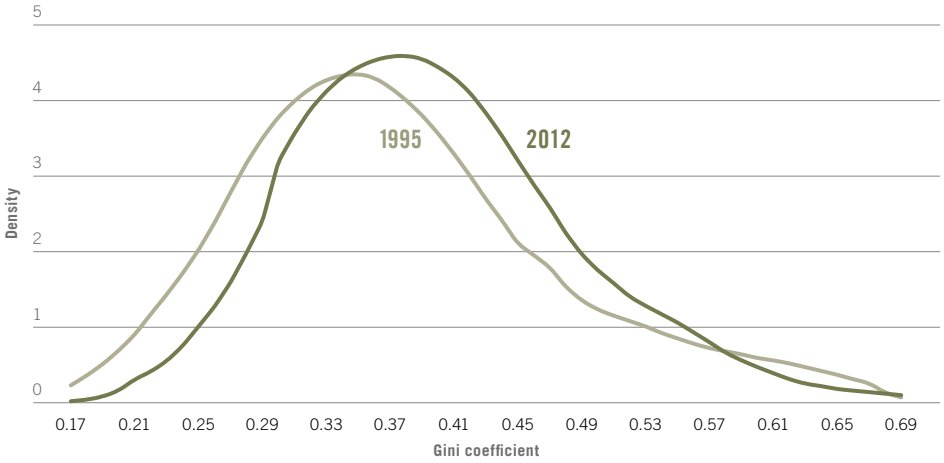
Figure 17 Wage inequality in selected emerging and developing countries



Source: ILO estimates based on national sources.

inequality in total household incomes (which include not only wages but all other sources of income). Figure 18 shows the distribution of Gini coefficients based on per capita household income covering 71 countries in all regions for which data are available. The horizontal axis shows the Gini coefficient, while the vertical axis shows the probability of finding such value among the countries covered in the data. The rightward shift implies that in more countries inequality was higher

Figure 18 Evolution of income inequality between 1995 and 2012



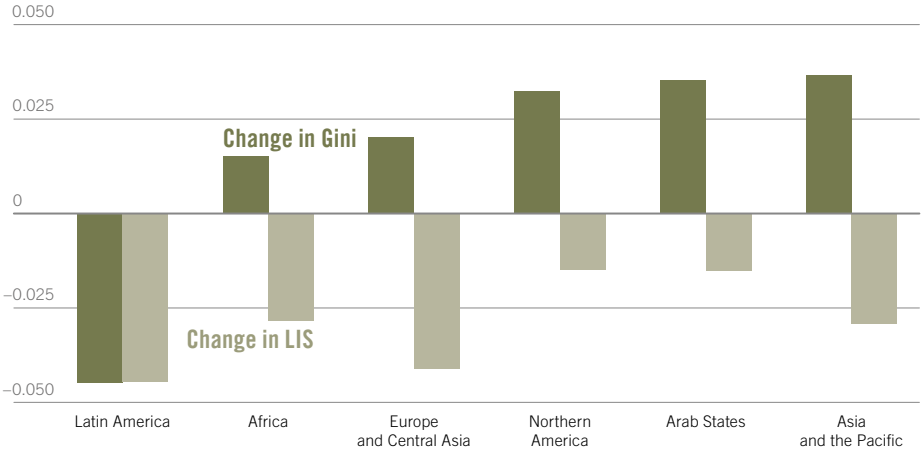
Note: The figure shows the probability of countries to fall at a particular level of the Gini coefficient (0 = perfect equality).
Source: Euromonitor, 2014.

in 2012 than in 1995 in a greater number of countries, resulting in an increase of 2 percentage points in the average value of the Gini coefficient.[8]

In many countries for which data are available, a rise in income inequality coincides with the decline in labour income share highlighted in the previous section. Figure 19 shows how average labour income shares and average Gini coefficients have changed in different regions. We see that all regions, with the exception of Latin America, have experienced an increase in inequality along with a decline in labour income share. The greatest declines in labour share have been observed in Latin America and Europe, while the greatest increases in income inequality have been experienced in the Arab States and in Asia and the Pacific. In Latin America both inequality and labour income share have declined. This suggests that here the inequality-increasing effect of a lower labour share may have been more than offset by more compressed wage distributions.

While the correlation in most regions between declining labour income shares and increasing income inequality suggests a link between the two trends, the nature of the relationship is complex and still widely debated among researchers. Jacobson and Occhino observe that in the United States the labour share declined and the Gini coefficient increased, and hypothesize that since labour income is more evenly distributed than capital income, the decline in the labour share has contributed to greater income inequality. They calculate that "for every percentage point decline in the labor share the Gini index increases by approximately 0.15 to 0.33 percentage points" (Jacobson and Occhino, 2012, box 1). Similarly, Adler and Schmid find rising inequality of market incomes as a consequence of decreasing labour share in Germany (Adler and Schmid, 2012). In a more recent paper, however, Francese and Mulas-Granados find that the share of labour income has a negligible impact on income inequality in a sample of 93 countries. According to these authors, the most important determinant of rising income inequality remains

Figure 19 Change in labour income share and income inequality, 1995–2012



Note: Europe and Central Asia includes 34 countries: Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Kazakhstan, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, the Russian Federation, Slovakia, Slovenia, Spain, Switzerland, Turkey, Sweden, Ukraine and the United Kingdom. Northern America includes two countries: Canada and the United States. Asia and the Pacific includes 13 countries: Australia, China, Hong Kong (China), India, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, the Philippines, Singapore, Taiwan (China) and Thailand. The Arab States include three countries: Kuwait, Jordan and Saudi Arabia. Africa includes four countries: Egypt, Morocco, South Africa and Tunisia. Latin America includes nine countries: Argentina, the Plurinational State of Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and the Bolivarian Republic of Venezuela.

Source: Euromonitor, 2014 (for Gini indices); Penn World Tables Version 9 (June 2016) (for labour income shares). Available at: http://cid.econ.ucdavis.edu/pwt.html

the growing dispersion of wages and not the evolution of the labour income share (Francese and Mulas-Granados, 2015). Looking at the relation between the top logged income share and logged labour income shares, Bengtsson and Waldenström found in a sample of 19 countries that on average each percentage point decrease in the labour share was associated with an increase of 0.86 point in the top 1 per cent income share (Bengtsson and Waldenström, 2015). More research is needed to better understand to what extent, and exactly why, a lower labour income share may be associated with higher income inequality.

5.2 Minimum wages

One measure introduced to reduce wage inequality and working poverty in many countries in recent years has been the establishment or strengthening of minimum wages. The level and distribution of wages are determined by a wide range of factors. Choices that are made in education, childcare or migration policies can affect the supply of male and female workers of different skill levels to the labour market, while trade policies or technological innovations can change the relative demand for workers with different levels of qualifications. Labour market institutions also have a significant impact on wages and wage inequality. Collective bargaining allows groups of workers to negotiate higher wages with employers, and this can have a particularly large impact for workers in the lower half of the distribution who may have less individual bargaining power. In many countries,

however, collective bargaining coverage remains relatively low or has contracted (Visser, Hayter and Gammarano, 2015). Several countries have accordingly turned towards new or stronger minimum wage setting mechanisms. As the OECD has pointed out, "the recent crisis and the longer-running trend of rising inequality have added new momentum to minimum-wage debates" (OECD, 2015a, p. 1).

The United Kingdom introduced a statutory minimum wage with national coverage in 1999 and a higher national "living wage" in 2016. Since the early 1990s eight other OECD countries – the Czech Republic, Estonia, Ireland, Israel, Poland, Slovakia, Slovenia and, most recently, Germany – have also adopted a statutory minimum wage (OECD, 2015a). Most OECD countries without a statutory minimum wage have legal wage floors set through collective agreements, as in Denmark, Finland, Norway and Switzerland. As a result, minimum wages exist in all European countries, though they do not cover a majority of wage earners everywhere and may not always be set in a way that takes into account both the needs of workers and their families and economic factors.

Many developing and emerging economies have also established or strengthened minimum wages. China adopted a minimum wage in 1994 and strengthened it in 2004; South Africa established a system of sectoral minimum wages after the end of apartheid in 1997, and is evaluating the possibility of introducing a national minimum wage; Brazil strengthened minimum wages from 1995, with further accelerated increases since 2005; Uruguay reactivated its minimum wage policy in 2005; the Russian Federation complemented its national minimum wage with regional floors in 2007; and Malaysia adopted a national minimum wage in 2013, followed by Myanmar and the Lao People's Democratic Republic in 2015, and Macau (China) in 2016. In Africa, the country to introduce a national minimum wage most recently was Cabo Verde in 2014.

The setting of minimum wages is a balancing act; it should be based on statistical evidence and done in full consultation with social partners and, where appropriate, with their direct participation on an equal footing (see box 4). Recent evidence shows that when minimum wages are set at an adequate level, taking into account the needs of workers and their families as well as economic factors, they can raise the wages of low-paid workers – many of whom are women – without significant negative effects on jobs. This has been the finding, for example, of the UK Low Pay Commission (2014) and of the first evaluation of the new national minimum wage in Germany (Mindestlohnkommission, 2016). After reviewing the existing literature, a World Bank study concluded that "although the range of estimates from the literature varies considerably, the emerging trend in the literature is that the effects of minimum wages on employment are usually small or insignificant (and in some cases positive)" (Kuddo, Robalino and Weber, 2015, p. 11). In high-income countries, a review of about 70 studies shows that findings are varied but the most frequent finding is that employment effects are close to zero and too small to be observable in aggregate employment or unemployment statistics (Belman and Wolfson, 2014, p. 21). Similar conclusions emerge from meta-studies (quantitative studies of studies) in the United States (Doucouliagos and Stanley, 2009), the United Kingdom (Leonard, Stanley and Doucouliagos, 2014), and in developed economies in general (Belman and Wolfson, 2014). These

Box 4 The new online ILO policy guide on minimum wages

Because of the many requests it receives for advice on setting and enforcing minimum wages, the ILO launched a new online policy guide in 2016. Based on existing ILO standards and the diversity of international practice, this policy guide (www.ilo.org/minimumwage) provides information on key questions of good practice and highlights different choices that can be made depending on national preferences and country circumstances.

Across the world, minimum wage systems are diverse and many approaches are possible, depending on the needs and choices of individual countries. Some principles, however, are of general relevance to countries that operate minimum wages. Many of these principles have also been highlighted in a recent World Bank publication.*

At its heart, the ILO Minimum Wage Fixing Convention, 1970 (No. 131), calls for full consultation with social partners in the design and operation of the minimum wage system and, where appropriate, their direct participation, on equal footing, in the system. In addition, the Convention calls for the participation of "persons having recognised competence for representing the general interests of the country" and appointed after consultation with social partners. In practice, in a majority of countries, governments make the final decision following some consultations with social partners, while in other countries the minimum wage is set directly through specialized tripartite bodies. In many countries, tripartite consultation takes place between government and social partners within national social dialogue institutions such as tripartite wage commissions, wage boards, or other tripartite bodies with general competence for economic and social affairs.

Regarding the level, the Minimum Wage Fixing Convention considers that the elements to be taken into consideration in determining the level of minimum wages shall, so far as possible and appropriate in relation to national practice and conditions, include: (a) the needs of workers and their families, taking into account the general level of wages in the country, the cost of living, social security benefits, and the relative living standards of other social groups; (b) economic factors, including the requirements of economic development, levels of productivity, and the desirability of attaining and maintaining a high level of employment. It is understood that these criteria are not exhaustive but seek to balance economic and social factors. To keep their relevance, minimum wages should also be adjusted from time to time.

The Minimum Wage Fixing Convention also calls for "appropriate measures, such as adequate inspection reinforced by other necessary measures" to ensure the effective application of all provisions relating to minimum wages. High rates of non-compliance have negative consequences not only for workers and their families, whose rights are violated, but also for compliant employers, as it gives non-compliant enterprises an illegitimate cost advantage. The rate of compliance is affected by a range of factors including the level at which minimum wages are set, as well as by institutional factors. The policy guide provides some examples of how compliance can be increased through information and awareness-raising campaigns, as well as a host of other measures.

* Kuddo, Robalino and Weber, 2015.

Source: ILO, 2016e (www.ilo.org/minimumwage).

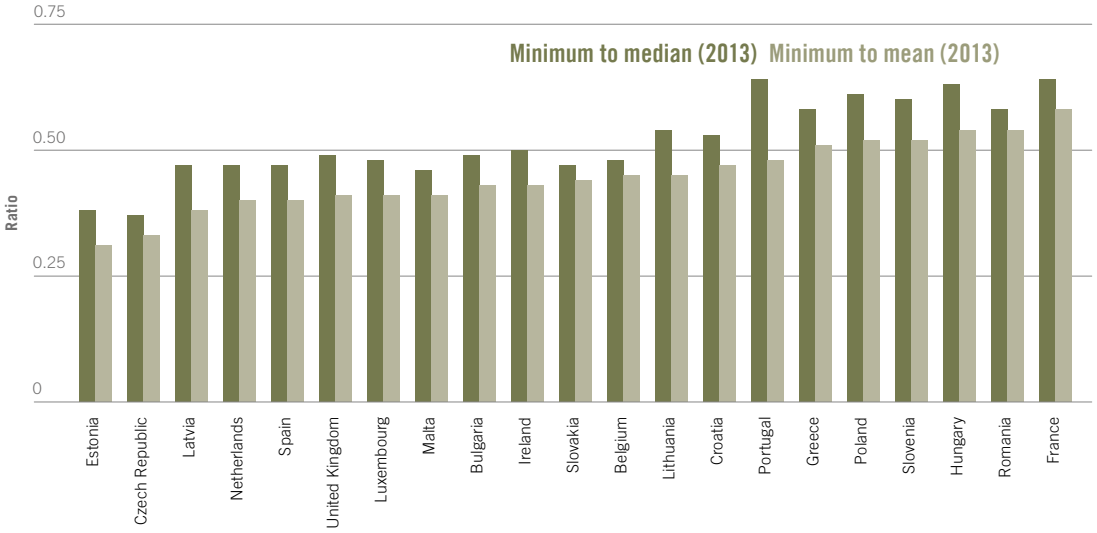
findings, however, remain controversial; other reviews conclude that employment effects are less benign and that minimum wages reduce employment opportunities for less-skilled workers (Neumark and Wascher, 2008). In developing countries, findings also seem more mixed and country-specific (Belman and Wolfson, 2016; Betcherman, 2015), which points towards the importance of monitoring the effects of minimum wages at country level. An additional concern in developing countries is that instead of causing lower employment, minimum wages that are too high may cause employees to be displaced from the formal to the informal economy (Nataraj et al., 2014).

The statistical indicator most frequently used to evaluate the level of minimum wages relative to national economic and social circumstances is probably the ratio of minimum wages to median wages (sometimes called the "Kaitz" index). An alternative measure is the ratio of the minimum to the mean wage. In many countries, the Kaitz index is used as a tool to monitor the minimum wage level, and debates frequently revolve around the question of which Kaitz ratio will be appropriate in national circumstances to maximize social and economic benefits and minimize possible adverse employment or inflation effects. There exist different sources for such estimates, and comparisons across countries should be interpreted with care because of the differences among countries in measuring mean or median wages and the difficulties in obtaining accurate and consistent estimates for these values. Some countries have multiple minimum wage rates, which complicates the calculation of these indicators. Hence, while cross-country indicators can be useful in evaluating minimum wage levels at national level, they should be complemented by more refined country-specific analysis. Country-level ratios should also be calculated at a disaggregated level by sector, sex and region.

We provide some illustrative estimates for a set of developed and developing countries. Figure 20 shows estimates for European countries for which data are available from Eurostat's European Union Statistics on Income and Living Conditions (EU-SILC) survey. The estimates show that in the case of Estonia or the Czech Republic someone who earns the minimum wage receives about 37 or 38 per cent of what the median earner receives, while in Hungary, Portugal or France that ratio increases to more than 60 per cent. Most countries have a minimum wage somewhere between 45 and 60 per cent of the median wage. Looking at the ratio of minimum wage to mean wage (which is on average 15 per cent higher than the median wage), the ratio most frequently lies between 40 per cent and 55 per cent. The weighted average for Europe as a whole is of minimum wages set at approximately 50 per cent of median wages.

Figure 21 shows that in emerging economies the variance seems to be greater, between relatively low minimum wages in Viet Nam or Mexico and much higher ratios in the Philippines or Indonesia. In Peru, India, Brazil and Costa Rica minimum wages range between 68 and 82 per cent of median wages. It has been observed previously that some emerging economies have a significantly higher degree of wage and income inequality than some advanced economies. In emerging economies the wage distribution is often characterized by a compressed distribution up to the median (meaning that the wage of the median earner is

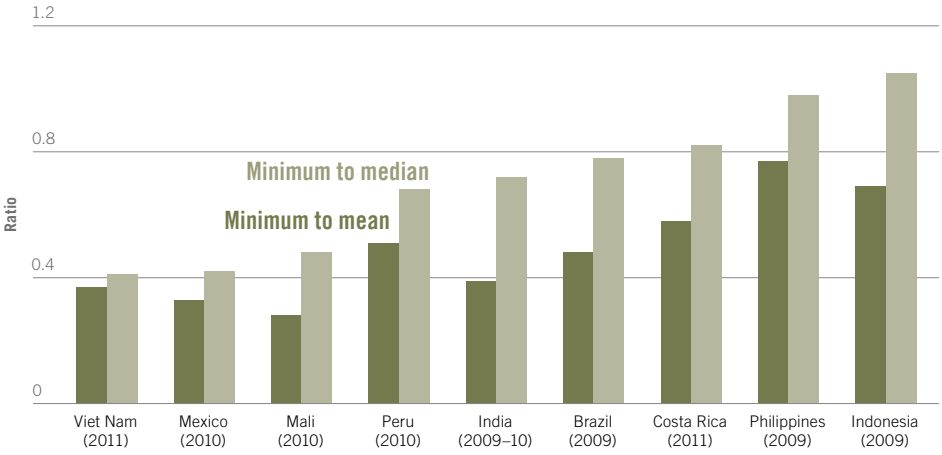
Figure 20 Minimum wages relative to median and mean wages, selected European countries



Note: Countries are ranked from lowest to highest ratio of minimum wages to mean wages.

Source: ILO estimates based on EU-SILC data.

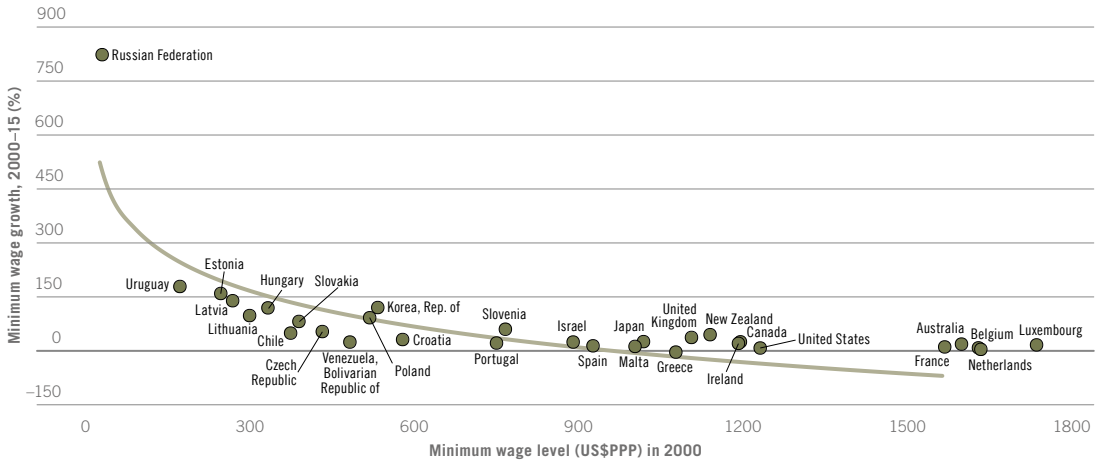
Figure 21 Minimum wages relative to mean and median wages, selected emerging economies



Source: Rani et al., 2013.

often quite low) and a very long upper tail where top earners earn much more than the median wage earner. This may perhaps explain why in some emerging economies there are higher minimum-to-median wage ratios than in developed economies. Yet, because there is more inequality in those countries, the ratio of minimum to mean wages is closer to those found in developed countries. Note that figure 21 uses information on multiple minimum wage rates where they exist. So, for example, the estimate for Brazil uses not only the federal minimum wage

Figure 22 Convergence of minimum wages among higher-income countries



Source: ILO Global Wage Database; World Bank (for PPP conversion factor).

but also the state-level minimum wages where they are set at a level that exceeds the federal floor. In the case of Indonesia, provincial rates are taken into account.

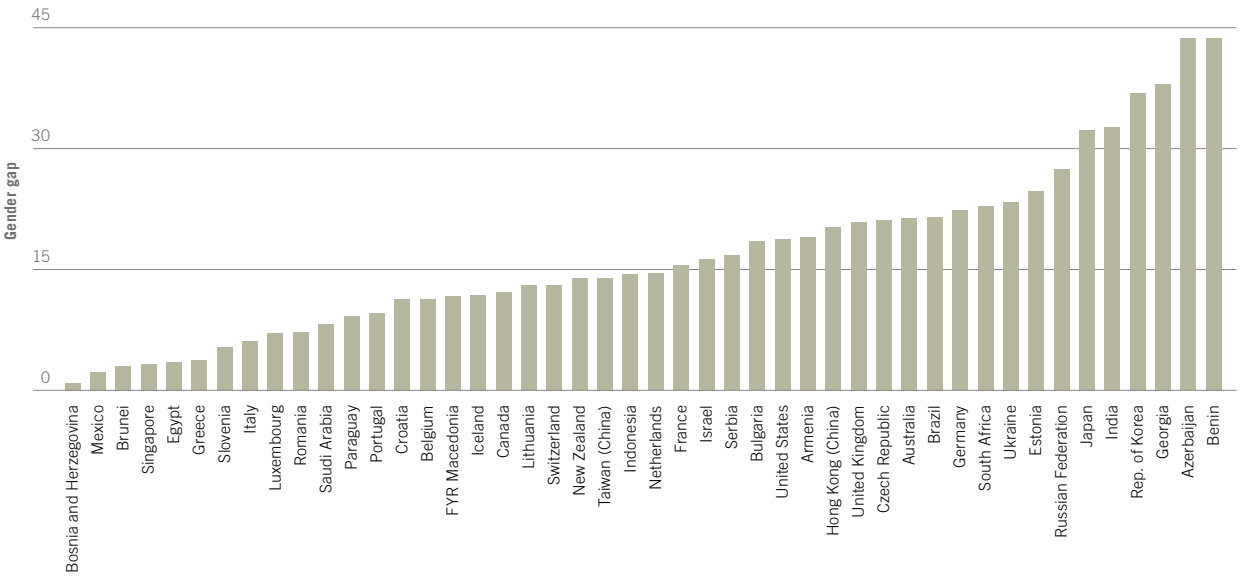
Looking at changes over time, figure 22 shows that among higher-income countries there has been some trend towards more convergence in the levels of minimum wages, as measured in US$PPP. We see that countries with lower minimum wages in 2000 have implemented the largest increases on average between 2000 and 2015, while countries with higher levels of minimum wages in 2000 have implemented smaller changes in the last 15 years.

6 Average gender pay gaps

Within the overall wage distribution there are pay gaps between different groups of workers. One of these is the gender pay gap, the percentage shortfall in the average wage of women relative to the average wage of men. Various studies have shown that across most countries for which data are available, the gap has generally narrowed over time but has not been closed in most countries. Blau and Kahn's observation remains valid: "Virtually every industrialized country has passed laws mandating equal treatment of women in the labor market. Yet the gender wage gap, while on the decline in many countries, is a persistent feature of virtually every nation's labor market" (Blau and Kahn, 2003, p. 107).

Figure 23, which displays the most recent available estimates of the gender gap in hourly pay for a wide range of countries, shows the tremendous variation across countries. At the same time, "raw" gender pay gaps – like all other such pay gaps comparing different groups of workers – are sometimes difficult to interpret. This is because the male and female individuals who are employees may differ widely in terms of their personal characteristics (such as age or level of education) and in terms of their labour market characteristics. Occupational segregation, for example, means that women will tend to be over-represented in particular occupations. In addition, sometimes only few women – those with relatively high levels of education – enter the labour market, and so employed women are on average more qualified than employed men. Thus there is a need to understand what lies behind "raw" gender pay gaps through more sophisticated analysis, comparing wages of men and women with comparable profiles and jobs (see e.g. ILO, 2014b, and the literature review in box 5).

Figure 23 Gender gap in hourly wages for a number of selected economies (preliminary data)



Note: Hourly gaps built with data on average/median wages and average/median hours worked received by the ILO from the respective national statistical institutes or equivalent institutions of the countries included; 94.6 per cent of the data refer to 2013 or a more recent year.

Box 5 What lies behind gender wage gaps: A review of the literature

Human capital explanations of pay gaps, developed by Becker (1964) and Mincer (1974), focus on education and accumulated work experience. These suggest that women have different educational backgrounds or attainment levels from men, and are more likely to have career interruption(s) that lead to lower levels of accumulated work experience. Empirical studies provide evidence that differences in human capital represent a significant part of the wage differential between men and women. However, as gaps in education between men and women have narrowed, particularly in more developed economies, so has the explanatory power of education in explaining the remaining gap (World Bank, 2012). Indeed, in 43 out of 53 countries,* after controlling for individual characteristics and place of residence, differences in education between men and women are very small or have even reversed, such that women have higher levels of education than men. In these cases, education not only fails to explain the observed gap but, when taken into account, actually increases the unexplained gap.

The notion that educational differences fail to explain completely the differences in pay between men and women has redirected the focus. Instead of focusing on the differences in the number of years of schooling (or degrees attained), a newer stream of research explains wage differentials by the fact that men and women tend to specialize in different fields of education (Machin and Puhani, 2003). The transition in the literature from the amount of education received to the field of education one studies also provides evidence of changing goalposts: now that women have achieved parity in education, the pay equity goal posts shift further away and focus on the type of education (O'Reilly et al., 2015; Grimshaw and Rubery, 2015). In other words, the goal of pay equity becomes increasingly elusive.

Differences in access to and choice of educational specialization are also linked to occupational segregation and the undervaluation of women's work. Occupational segregation relates to the over-representation of women in particular occupations. In some cases, occupational segregation occurs following the educational choices of women. For example, since the majority of individuals who study to become nurses are women, this profession is over-represented among women. Similar findings can be observed in other sectors, especially those occupations related to care work. In general, care work is undervalued because it may be perceived as a natural female attribute rather than a skill to be acquired and cultivated (Peetz, 2015). Subsequently, the over-representation of women in sectors where their work is undervalued results in a gender pay gap. Across a sample of 33 low- and middle-income countries, gender differences in occupation and sector of employment accounted for 10–50 per cent of the observed wage gap (World Bank, 2012). Research also showed that in the United States, declines in occupational segregation were also linked to decreases in the gender pay gap (UN, 2016).

At the macroeconomic level, many studies have shown that economic growth is not strongly correlated with the narrowing of gender pay gaps (Nopo, Daza and Ramos, 2011; Hertz et al., 2008; Blau and Kahn, 2003; Dar and Tzannatos, 1999). The relatively tenuous linkage between economic development and the gender pay gap is not surprising given the huge variation in institutional environment, cultural norms and policies in place across countries. Moreover, all of these factors have changed over time.

Generally, countries with strong labour market institutions and policies, such as collective bargaining and minimum wages, tend to provide environments conducive to promoting gender equality (Schäfer and Gottschall, 2015; Ugarte, Grimshaw and Rubery, 2015). In countries where collective bargaining is strong, inequality tends to be lower and this also translates into lower pay gaps. Across OECD countries, research shows that the gender pay gap is smallest (8 per cent) in the group of countries where the collective bargaining rate is at least 80 per cent, and widest in countries with weak collective bargaining and no or very low minimum wages (Rubery and Grimshaw, 2011). Generally, however, the presence of unions tends to be weaker in sectors where women are over-represented (Peetz, 2015; ILO, 2008b), and women are over-represented among the low-paid in both developed and developing countries (Lee and Sobeck, 2012; ILO, 2010a). For this reason, minimum wages are also an effective policy to help reduce the gender wage gap between men and women at the bottom of the wage distribution.

* In the remaining ten countries, all of which are low- and middle-income countries, educational differences between men and women accounted for 10–50 per cent of the observed wage gap in five of them, and for 0–10 per cent in the other five.

Source: This box is adapted from Maître and Sobeck, forthcoming.

PART II Wage inequality in the workplace

7 Introduction

The issue of inequality has continued to climb up the global policy agenda in recent years. A 2014 survey of opinions in 44 countries revealed that inequality between rich and poor is seen as a "big problem" by a majority of respondents in all countries, and as a "very big problem" in 28 countries (Pew Research Center, 2014). In developed economies, this perception is accompanied by a dose of pessimism about the future, as most of those surveyed also think children in their countries will be worse off financially than their parents. In developing and emerging economies, the majority is looking more optimistically into the future, believing that the next generation will have higher living standards. But in both sets of countries, these perceptions have contributed to making inequality a major policy and political issue.

At the same time, it is also more and more widely accepted that excessive inequality is bad for economic growth and for the social fabric of a country (see, for example, OECD, 2015b). Inequality can have an adverse effect on economic growth by holding down consumption demand, as high-income individuals and households tend to save a larger proportion of their wages and other income than low-income households. It is also more difficult to eliminate poverty in highly unequal societies, and as eliminating poverty has become a global goal as SDG 1, this issue will draw increasing attention (World Bank, 2016). Inequality can also reduce equality of opportunity and social mobility and create divisions within society. These developments can threaten political stability and/or the stability of the labour relations environment. It has also been noted that social justice and social inclusion are conditions for a conducive environment for sustainable enterprises, which can align enterprise growth with the creation of productive employment and decent work (ILO, 2007).

What can be done to reduce excessive inequality? Responding to this question requires first and foremost a detailed understanding of the factors that cause inequality in different national contexts and circumstances.

The previous *Global Wage Report* suggested that it was useful to decompose the income sources of different categories of households in order to better understand the relative weight of different factors. The analysis showed that, together with fiscal redistribution through taxes and transfers, changes in the distribution of wages and the creation or destruction of paid employment have been key factors behind recent inequality trends. In developed economies this is not so surprising, given that wages frequently account for 70–80 per cent or more of the total incomes of households with at least one member of working age. In developing countries this proportion is typically lower as many people are own-account workers, but

the analysis nonetheless showed that where income inequality diminished, as for example in Brazil, lower wage inequality was an important part of the story.

But what explains *wage* inequality? Until recently, research has focused almost exclusively on the examination of characteristics of workers (such as their levels of education or training), and on changes in the relative demand for skilled and unskilled workers, as explanations for the growing observed wage inequality in many countries, particularly high-income countries. For example, wage inequality may be high because a country's workers have a relatively diverse distribution of education, or because higher education is associated with particularly high wages.[9] Both globalization and new technology have been identified as factors that have increased demand for skilled workers and reduced the relative demand for low-skilled workers. These are certainly important factors. The decline of wage inequality in various Latin American countries, for example, has been attributed at least in part to an increase in the number of educated workers, with expanded supply pushing down the wage premium for education. This has contributed to raising the *relative* wages of less educated workers in these countries, while increases in minimum wages have also improved absolute levels of wages for the latter (see e.g. Azevedo, Inchaust and Viviane, 2013; Maurizio and Vazquez, 2016).

But workers' characteristics can explain only part of the observed wage inequality, and sometimes only a rather limited part.[10] There is in fact a large variability or "unpredictability" in wages between workers with very similar individual characteristics. There has also been a growing literature documenting the large increases in wages for those at the very top of the wage pyramid, which cannot be explained by differences in easily observable individual factors, such as level of education or years of experience.

Part II of this report therefore looks at the distribution of wages through the prism of both individuals and enterprises. First, a closer look at the distribution across individuals calls attention to a number of characteristics beyond skills and tenure that affect wage inequality. The report then turns to the enterprise perspective and highlights the fact that changes in overall wage inequality are significantly influenced by (1) changes in wage inequality *between* enterprises, and (2) changes in wage inequality *within* enterprises. We suggest that it is important to decompose overall wage inequality and understand the relative importance of each of these factors in different countries in order to inform national policy debates on wage inequality. While stronger labour market institutions and wage policies can affect both inequality within enterprises and differences in average wages between enterprises, different specific policy measures could be contemplated depending on which of these factors dominate. Policy implications are discussed more fully in Part III of the report.

8 The overall distribution of wages

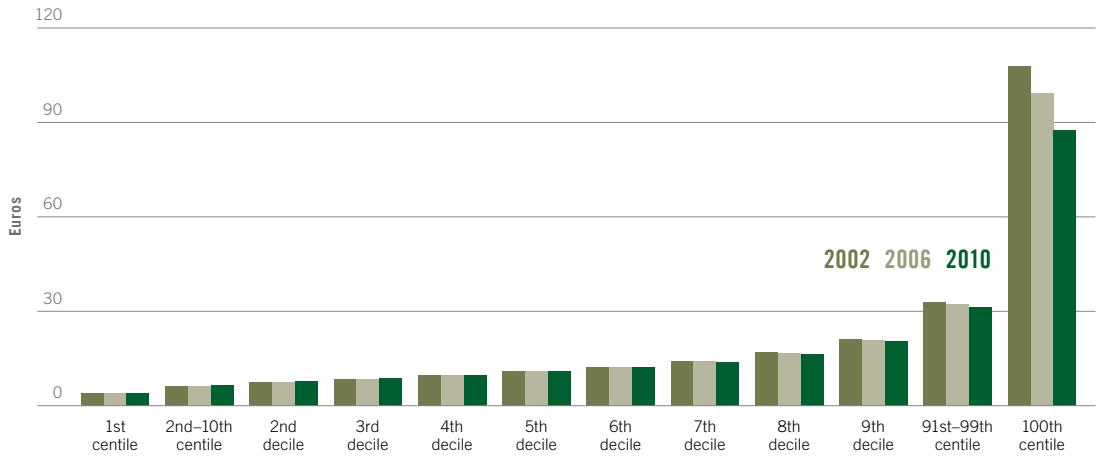
How large is wage inequality across individual workers in developed and developing countries? To address this question we rely, for advanced economies, on Eurostat's European Structure of Earnings Survey (SES), for which we have data from 22 countries in Europe. For each of the 22 countries we can observe the wage structure of the economy through a selection of enterprises that have ten or more employees.[11] For developing countries, only few data sets with matched employer–employee information exist. For these countries we therefore rely in this section on traditional labour force surveys (see Appendix IV for more information on data sources).[12]

8.1 Wage levels across the wage distribution

We begin by looking at the broad pattern of wage distribution ranked by ascending order of gross hourly wages. We divide all workers into ten groups (or "deciles") and also show the top 1 per cent (or "100th centile") (see figure 15 above for a visual representation of deciles). The figures in this section show the level of wages of workers from the lowest-paid 10 per cent to the highest-paid 10 per cent, and also separately those of the top 1 per cent of workers for each of the three years observed, 2002, 2006 and 2010.

Figure 24 sets out the distribution of wages in Europe as a weighted average taking into account the number of wage employees in each of the 22 economies for which we have data. While wages climb gradually across most of the deciles, they jump sharply for the top 10 per cent and especially for the top 1 per cent of highest-paid workers. Figure 25 shows that the differences between top wages

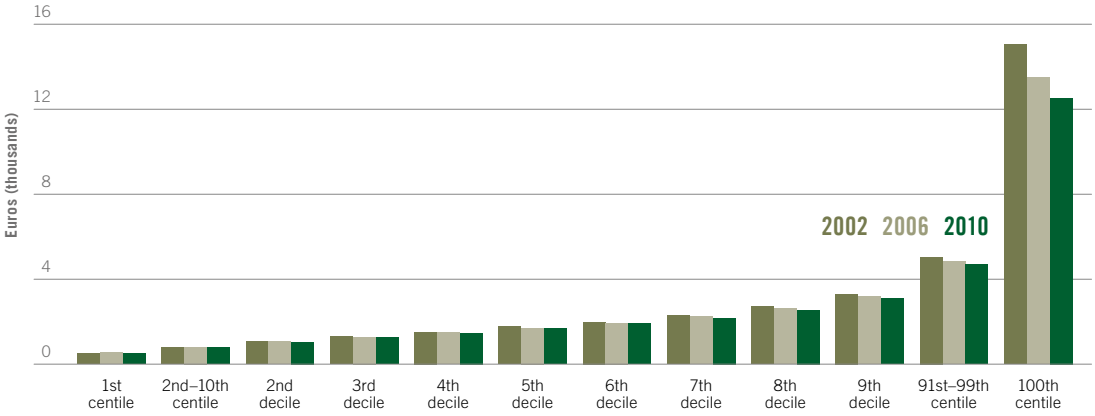
Figure 24 Hourly wages in Europe, 2002, 2006 and 2010



Note: The countries covered are Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the United Kingdom. The measure "hourly wage" refers to the total gross hourly wage including contractual and overtime pay, plus bonuses and benefits. Values are in euros in real terms with base year 2010. See Appendix IV for additional information on the data set.

Source: ILO estimates based on the weighted average using 22 economies from the Eurostat SES, where the frequency weights are provided by Eurostat in the database. Estimates show average values within deciles and centiles.

Figure 25 Monthly wages in Europe, 2002, 2006 and 2010



Note: The measure "monthly earnings" refers to the total gross monthly wage including contractual and overtime pay, plus bonuses and benefits. Values are in euros in real terms with base year 2010. Monthly earnings are collected in each country in October of the given year to reduce seasonal effects. Estimates are based on declared amounts from all wage employees in the data and include full-time and part-time employees. See note to figure 24 for further details.

Source: ILO estimates based on SES database.

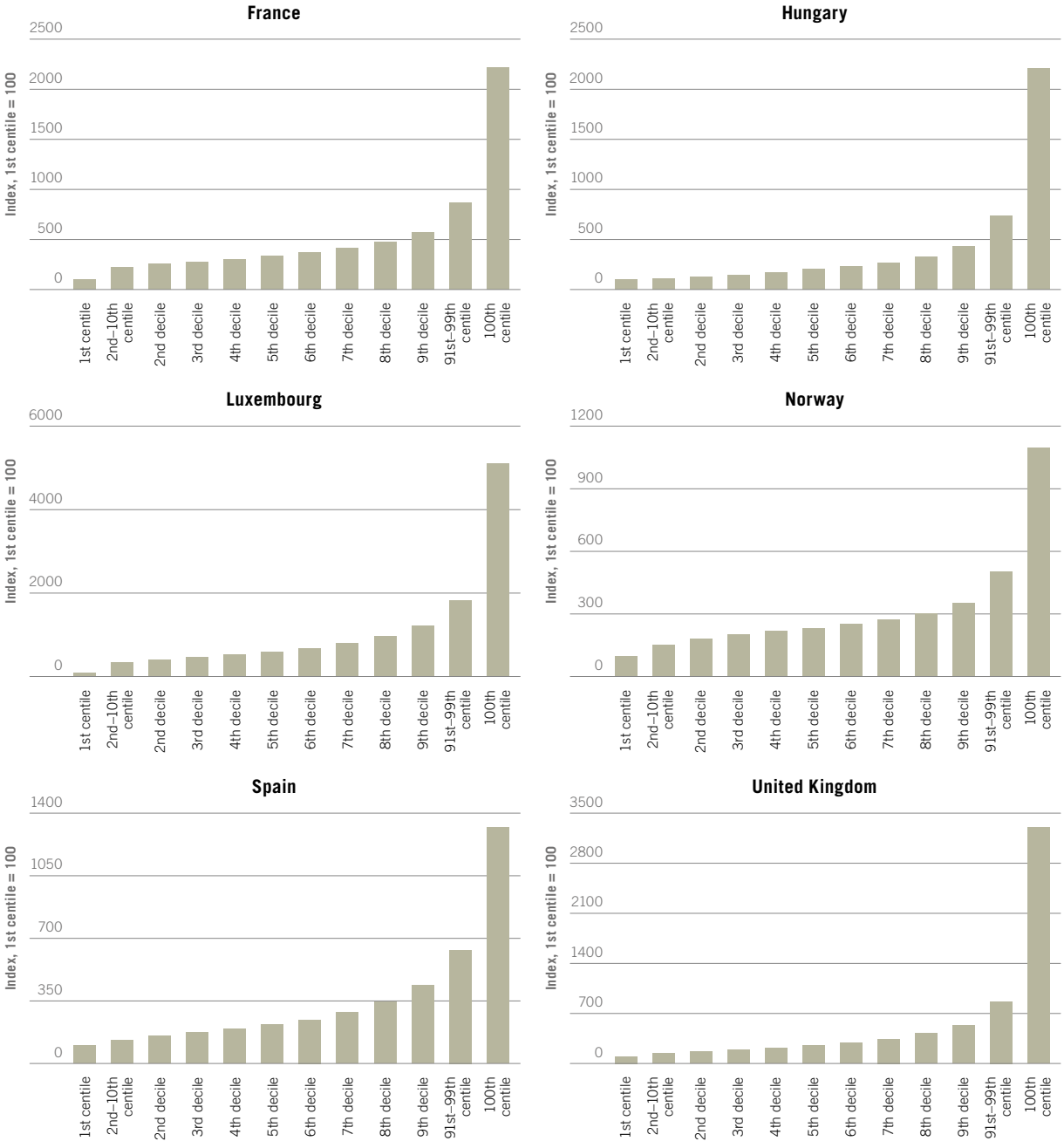
and bottom wages in Europe are even larger when we examine monthly wages instead of hourly wages. This is explained in part by the much higher incidence of part-time work among the lower deciles of the wage distribution. The two figures also show that the wages of the top 10 per cent and the top 1 per cent in Europe declined over the period 2002–10 by almost 15 per cent, which may warrant further investigation to determine whether this is a structural or a temporary shift. Even so, in 2010 the wages of the top 1 per cent remained almost three times those of the other members of the top 10 per cent, eight times the median wage and 22 times the wages of the bottom 1 per cent.

Differences across a small selection of countries are shown in figure 26, where we can observe that, compared to the wages of the bottom 1 per cent, the wages of the top 1 per cent are highest in Luxembourg (50 times higher) and the United Kingdom (33 times higher), and lowest in Norway (11 times higher) and Spain (13 times higher), with intermediate values in France and Hungary.

In figure 27, we similarly observe the wage distribution in a sample of developing countries. We observe that in all countries in the sample, wages increase fairly gradually until one moves towards the top 10 per cent and especially the top 1 per cent, where they jump sharply. So the wage distributions have the same shape as in Europe, but inequality is generally even higher. When comparing the wages of the top 1 per cent or the top 10 per cent to the median wage earners in the middle of the distribution, wage inequality appears to be particularly high in South Africa and Brazil (where the shape of the wage distribution is very steep), while wages increase more progressively and somewhat less abruptly in Argentina, the Russian Federation and Mexico.

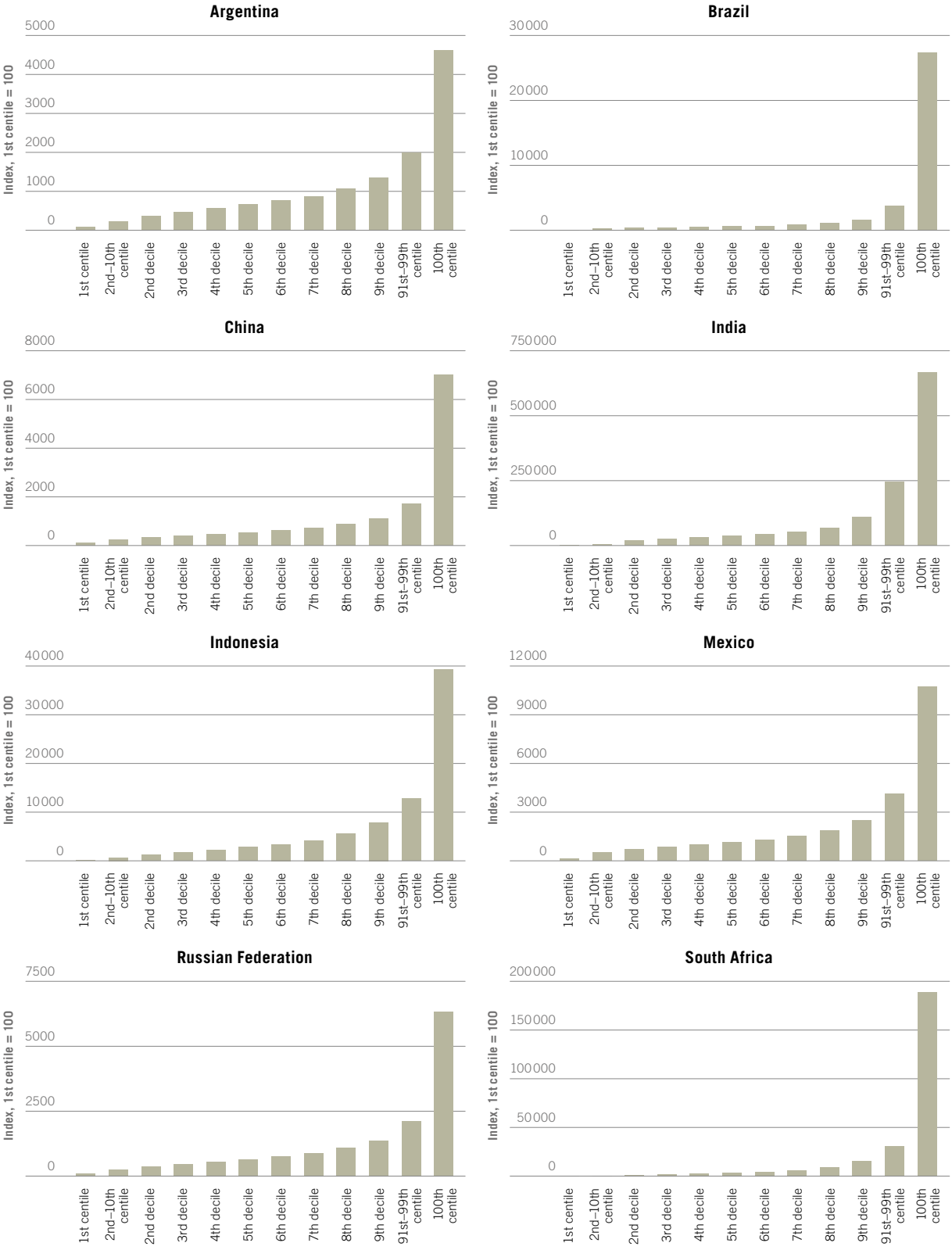
In figure 28 we can observe the actual composition of monthly earnings in Europe. We see that inequality in contractual wages is reinforced by the very unequal distribution of bonuses and benefits, most of which go to the top 1 per cent.

Figure 26 Relative wage distribution in selected European countries, 2010



For this group of workers, bonuses and benefits account for roughly one-quarter of total hourly earnings. For those in the top 10 per cent ranked immediately below this centile, bonuses and benefits amount to about 10–12 per cent of income, depending on the year of observation. Although overtime pay increased for the top 1 per cent during this period, both contractual wages and bonuses and benefits declined, illuminating the trend highlighted in the discussion of figure 24 above.

Figure 27 Relative wage distribution in selected developing countries, latest year



Note: Years for the data are 2009 for China and Indonesia; 2011 for Argentina; 2012 for Brazil, India and the Russian Federation; 2014 for Mexico and South Africa. All estimates are based on gross hourly wages except for China, India and Indonesia, where estimates are based on full-time monthly equivalent earnings. See Appendix IV for additional information on the data sets.

Source: ILO estimates based on country-specific data sets (see Appendix IV).

Figure 28 Composition of average monthly earnings in Europe, 2002, 2006 and 2010

Note: Total hourly wages include contractual and overtime pay and irregular benefits such as profit sharing, productivity gains, etc. Each of the bars shows the average value at the deciles except the two extreme bars that show the averages at the bottom and top centiles of the distribution.

Source: Source: ILO estimates based on the weighted average using 22 economies from the Eurostat SES, where the frequency weights are provided by Eurostat in the database. See Appendix IV for additional information on the data set.

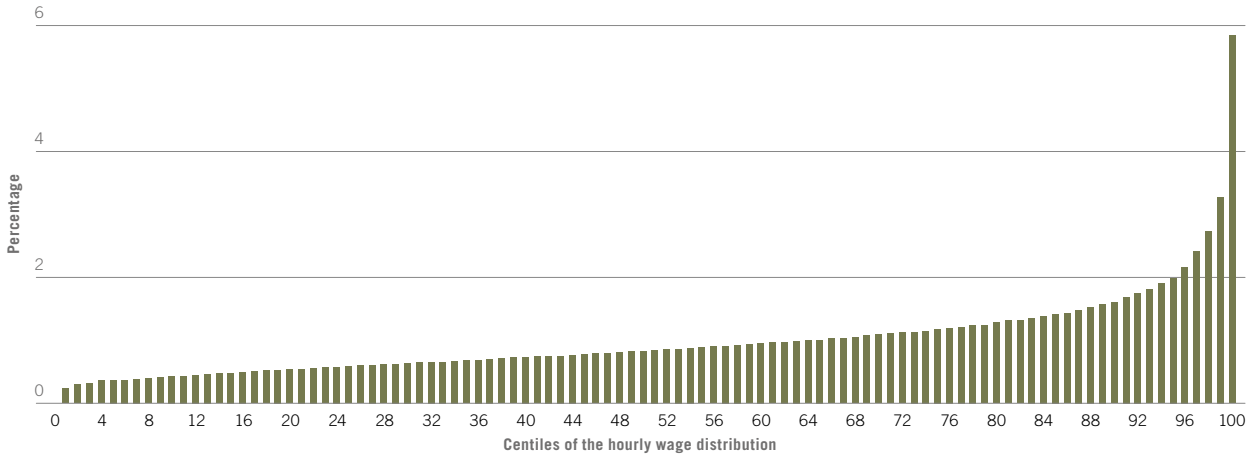
8.2 Wage distribution as seen through different measures of inequality

The above analysis has shown that wage inequality is particularly stark when the earnings of the top 1 per cent of wage earners are reported separately from those of the top 10 per cent. This points towards the importance of using a variety of measures when analysing and debating wage inequality, as inequality has many facets across different parts of the wage distribution, with sometimes extremely low pay at the bottom, and wide differences between median and top wages.

An interesting measure is to establish what shares of the total wages go to different groups. We illustrate this with figure 29, where we once again rank workers according to their wages and divide them into 100 groups (centiles) of ascending average wages. But then, instead of showing the average wages, we show the proportion of total monthly wages that goes to the different groups of workers. Together, all the bars in the graphs add up to 100 per cent. We see that in Europe the top 1 per cent takes by far the largest share of total wages compared to any other centile in the distribution. We further observe that this top 1 per cent takes about 6 per cent of total wages (5.8 per cent, to be exact).

Table 1 summarizes what might be difficult to see in the graph, namely the "shares of total wages" of different groups. We also provide here information for individual countries in our data set. From this table we can observe, for example, that in Europe in 2010, the top 10 per cent of best-paid workers obtained 25.5 per cent of total wages, and the lower 50 per cent of workers obtained less than 30 per cent of total wages. The European country with the highest top 1 per cent share of wages in our data set was the United Kingdom, with 8.4 per cent, while Sweden, Finland and Belgium were the countries with the largest share of wages for the

Figure 29 Centile-by-centile share of total real gross monthly wages in Europe, weighted average, 2010



Note: The figure shows the proportion of total wages that falls in each centile of the hourly wage distribution. We rank individuals using "hourly wages" because this is the best measure to compare the earning capacity of individuals. But the share estimated is "monthly" earnings because this is what defines the final "cake" that is then distributed in the population. The figure shows actual proportions. For example, those who are located at the bottom centile – in terms of their hourly earnings – took home a total of 0.24 per cent of total monthly earnings generated in Europe in 2010 (based on the representation of the weighted sample that considers 22 economies and reflects 110 million wage earners in Europe). At the opposite extreme, the top centile took home 5.84 per cent of the total cake. By construction we have approximately the same number of individuals in each of the 100 "bins" so, on average, comparing top and bottom centiles, the estimates show that for each part of income that each individual in the bottom centile takes home, an individual in the top centile takes 24 parts.

Source: ILO calculations based on Eurostat SES data set.

Table 1 Different measures of inequality in 22 European countries, 2010

	Cumulative wage distribution							Decile ratios			
	Bottom 1%	Bottom 10%	Bottom 50%	Bottom 75%	Top 25%	Top 10%	Top 1%	P90/ P10	P90/ P50	P50/ P10	P100/ P10
Belgium	0.3	4.4	34.2	59.7	40.3	20.5	3.7	2.6	1.8	1.4	5.0
Bulgaria	0.3	3.5	24.1	46.6	53.4	32.0	7.5	4.1	2.5	1.6	12.0
Cyprus	0.2	3.7	27.3	51.4	48.6	26.2	5.0	4.4	2.5	1.8	9.0
Czech Rep.	0.3	3.7	29.8	54.7	45.3	25.4	6.3	3.5	1.8	1.9	9.0
Estonia	0.3	3.3	27.0	51.8	48.2	26.7	5.6	4.3	2.0	2.1	9.0
Finland	0.3	4.8	34.8	60.1	39.9	20.3	3.6	2.5	1.7	1.4	5.0
France	0.2	4.3	31.6	55.7	44.3	24.4	5.4	2.7	1.8	1.5	6.0
Greece	0.3	4.6	32.5	57.2	42.8	23.6	4.8	2.9	1.9	1.6	6.0
Hungary	0.4	3.9	26.7	48.8	51.2	30.2	7.3	4.1	2.3	1.8	12.0
Italy	0.2	4.0	32.1	57.5	42.5	22.9	4.9	3.2	2.0	1.6	7.0
Latvia	0.2	3.5	22.9	47.1	52.9	29.9	7.0	4.3	2.4	1.8	11.0
Lithuania	0.4	3.6	25.2	50.8	49.2	26.7	6.0	4.4	2.4	1.9	10.0
Luxembourg	0.1	3.5	28.4	52.9	47.1	26.1	6.0	3.6	2.2	1.7	8.0
Netherlands	0.1	1.9	27.0	53.3	46.7	24.9	4.7	3.5	1.8	1.9	7.0
Norway	0.3	3.5	31.9	57.5	42.5	22.5	4.4	2.3	1.6	1.4	5.0
Poland	0.3	3.7	28.5	54.1	45.9	24.7	6.3	4.8	2.4	2.0	10.0
Portugal	0.3	3.7	24.7	47.0	53.0	30.4	6.9	4.9	3.0	1.6	12.0
Romania	0.3	3.2	23.7	46.8	53.2	31.4	7.7	4.9	2.5	1.9	14.0
Slovakia	0.3	4.0	29.8	53.9	46.1	26.2	6.4	3.4	1.9	1.8	9.0
Spain	0.3	4.0	29.8	54.9	45.1	23.3	3.5	3.4	2.1	1.6	7.0
Sweden	0.4	4.8	35.0	59.6	40.4	21.7	4.5	2.1	1.6	1.3	4.0
United Kingdom	0.2	2.7	24.5	49.1	50.9	29.9	8.4	4.0	2.3	1.8	11.0
Europe	0.2	3.6	29.1	53.9	46.1	25.5	5.8	3.6	2.1	1.7	8.4

Source: ILO calculations based on SES database. Estimated decile ratios show threshold values.

bottom 50 per cent (who in all three countries received between 34 and 35 per cent of all wages).

To complete our selective review of inequality measures, we turn to a classic measure of inequality, which was also used in Part I of the report, namely the ratio between the top and bottom deciles or "ten per cents" (P90/P10). In table 1, we calculate this ratio from the SES database for European countries. We see that in Europe the top decile of highest-paid employees earn between two and five times as much as those in the bottom decile, with lower ratios in Sweden, Norway and

Table 2 Different measures of inequality in selected developing countries, 2010

	Cumulative wage distribution							Decile ratios			
	Bottom 1%	Bottom 10%	Bottom 50%	Bottom 75%	Top 25%	Top 10%	Top 1%	P90/ P10	P90/ P50	P50/ P10	P100/ P10
China	0.1	3.1	26.2	49.6	50.4	29.7	9.3	4.2	2.2	1.9	10
Indonesia	0.0	1.3	19.0	41.7	58.3	34.2	8.7	11.0	3.1	3.6	25
Viet Nam	0.1	2.9	27.7	51.7	48.3	27.2	6.8	5.0	2.4	2.1	15
Chile	0.1	3.1	23.9	44.1	55.9	34.5	7.5	5.1	3.2	1.6	20
Argentina	0.1	3.3	30.7	56.9	43.1	21.7	4.0	4.9	2.2	2.3	10
Brazil	0.1	3.0	23.8	44.2	55.8	35.0	5.6	5.3	3.0	1.8	26
Peru	0.1	2.6	27.5	51.4	48.6	27.8	5.5	6.0	2.5	2.4	19
India	0.0	0.7	17.1	35.9	64.0	42.7	9.9	10.9	3.6	3.0	33
Russian Fed.	0.2	3.0	27.6	53.2	46.8	24.8	4.5	5.1	2.2	2.4	12
Uruguay	0.1	3.0	27.5	52.8	47.2	25.4	4.2	5.2	2.4	2.2	13
Mexico	0.1	3.6	30.1	54.5	45.5	24.6	4.9	4.7	2.4	1.9	12
South Africa	0.0	0.8	11.9	28.1	71.9	49.2	20.2	18.8	5.0	3.8	69

Source: ILO calculations based on national sources (see Appendix IV). Estimated decile ratios show threshold values.

Finland and higher ratios in the United Kingdom, Bulgaria, Hungary, the Baltic States, Cyprus, Poland, Portugal and Romania.

But we see that when we move the cursor of inequality from the top decile to the top 1 per cent (relative to the bottom decile) the picture of wage inequality changes quite dramatically: wage inequality more than doubles for almost all countries. In Europe, the top 1 per cent earn on average wages that are about eight times higher than those of the lowest 10 per cent, with multiples ranging from four in the Nordic countries to 14 in Romania.

In table 2 we can see these ratios for a selected set of developing countries. We see that on both measures inequality tends to be relatively high among this group of countries, although with large differences among them. It is in South Africa that the top 1 per cent obtain the largest part of total wages (20.2 per cent) and in Argentina and Uruguay that they obtain the smallest parts (4.0 and 4.2 per cent respectively). And it is in South Africa, India and Indonesia that the bottom 50 per cent of wage earners obtain the lowest shares of total wages. According to our data sets, the top 10 per cent earn about five times as much as the bottom 10 per cent in Viet Nam and Chile, and 11 times as much in Indonesia. The top 1 per cent earn about 15 times as much as the bottom 10 per cent in Viet Nam, but 33 times as much in India.

9 The characteristics of workers

The estimates presented in the previous section demonstrate the existence of wage inequality but do not provide information on the differing characteristics of high-, middle- or low-paid workers or on the characteristics of the establishments for which they work.

9.1 Exploring how personal and labour market characteristics affect wages

Our next set of estimates compares personal and labour market characteristics and labour market endowments of individuals located in the different deciles or centiles of the distribution, along with some characteristics of the enterprises that employ them. The purpose of the exercise is to explore the possibility of significant differences between individuals according to their location in the wage distribution. The estimates are presented in two sets: first, we look at basic descriptive statistics that ignore the causal effect of labour market attributes on wages; and second, we use a classic wage regression that considers the interaction between individual skills-related variables and the causal effect of these on wages of individuals.

9.2 How the wage distribution varies for European workers with various characteristics

Figure 30 shows estimates of the proportions of European workers with various characteristics, averaged over decile groups, in 2010. Looking at gender, it is striking that as one moves upwards along the wage deciles, the proportion of women continuously declines. In Europe, women make up 60 per cent of the lowest-paid decile of workers, and only 20 per cent of the top 1 per cent of earners. In terms of age, it is perhaps no surprise that the share of young people is greatest in the bottom part of the distribution, with only few young workers among the highest-paid 10 per cent and fewer still in the top 1 per cent. In terms of education, those with primary and secondary education make up the large majority of workers in the bottom 50 per cent of the distribution, while those with university degrees and higher qualifications dominate the top 10 and 1 per cent. But it is also clear that post-secondary or university education does not guarantee a highly paid job, as significant numbers of those educated to these levels can be found across the deciles.

In what kinds of enterprises do workers work? First, there is a clear relation between the size of the enterprise and earnings: a larger number of higher wage earners work for larger enterprises, and more low-paid workers work in smaller firms. In Europe, 40 per cent of workers in the bottom decile work for companies with fewer than 50 employees, whereas only 20 per cent of those in the top 1 per cent work in smaller firms. In terms of sectors, the real estate and financial sector is over-represented among top-paid workers and has few low-paid workers. Lower-paid workers are over-represented in the wholesale trade as well as in the hotel and restaurant and construction sectors. It is striking, however, that all sectors have some employees whose earnings are in the top 10 per cent and the top 1 per cent.

Figure 30 Looking within "deciles" of the wage distribution: Characteristics of individuals, European economies, 2010

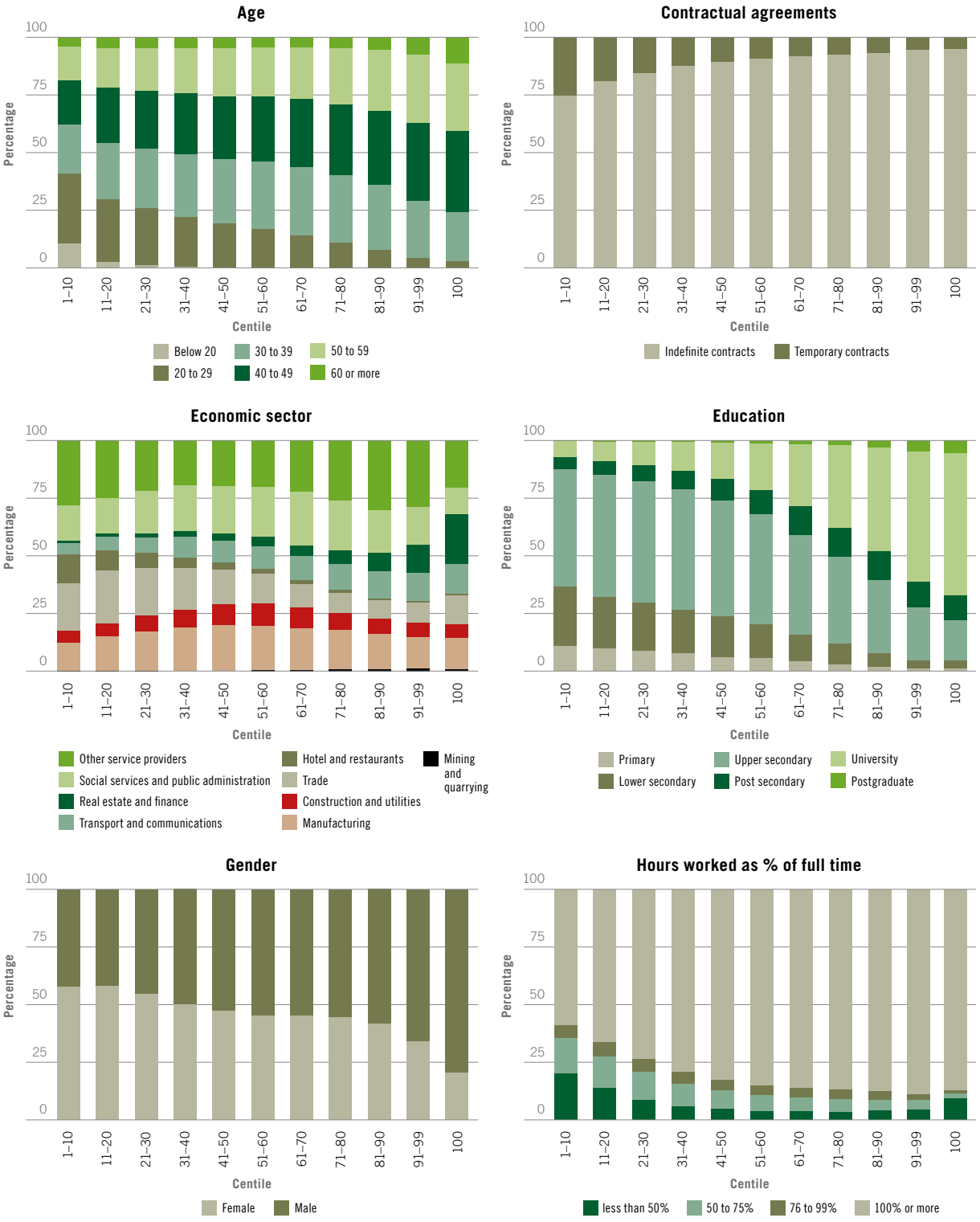
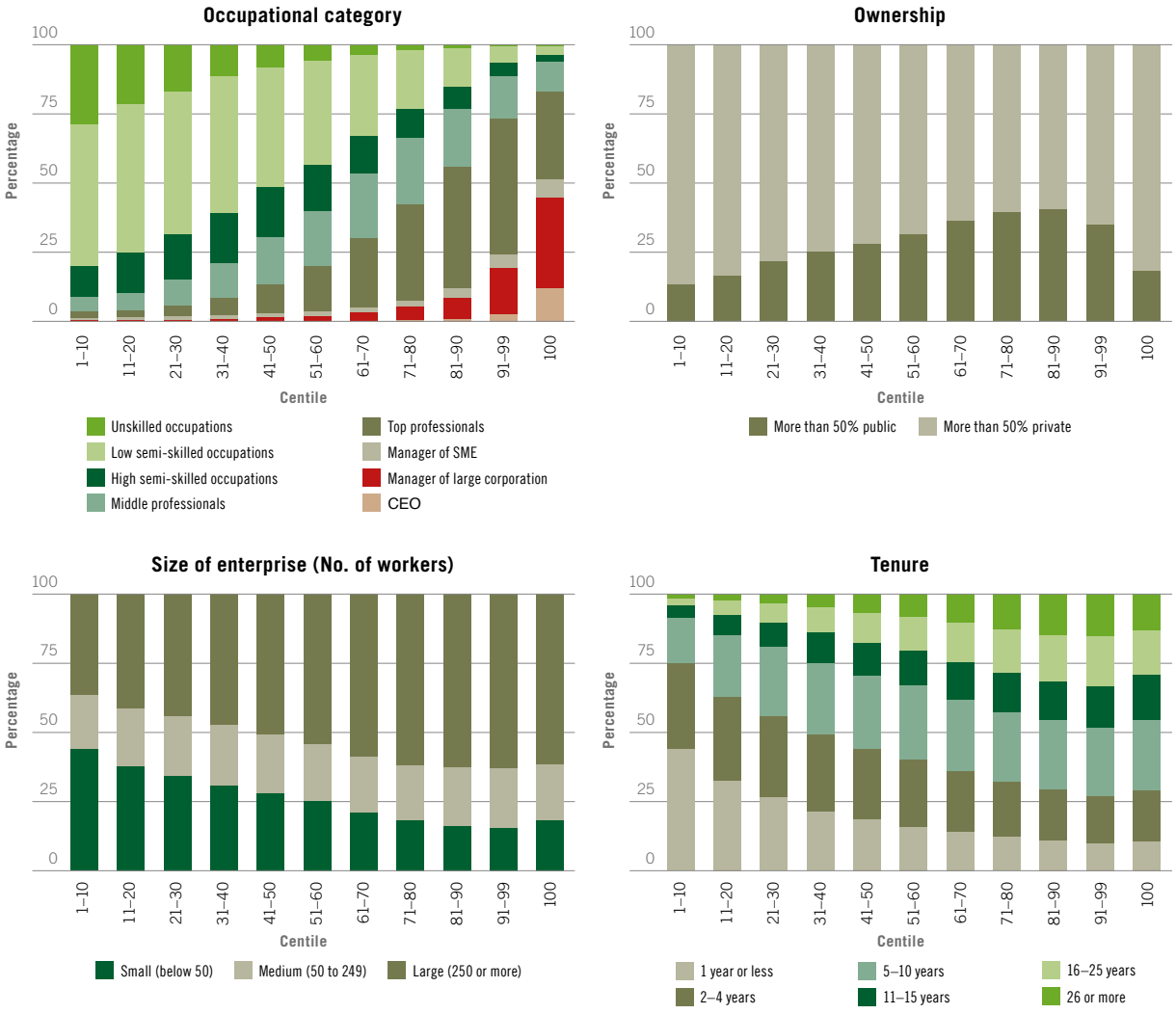


Figure 30 (cont.)



Source: ILO calculations based on SES database. Individuals organized in ascending order of hourly wages.

Looking at ownership, workers in establishments with more than 50 per cent of public capital are less likely to be in the top 1 per cent – but are also less likely to be found in the bottom 10 per cent, suggesting that public ownership is associated with less wage dispersion, while wages are more polarized to the top and bottom of the distribution in privately owned firms.

Finally, what jobs do workers hold and in what conditions do they work? On average, between 40 and 50 per cent of those in the top 1 per cent are either CEOs or corporate managers. The others are mainly the most highly skilled workers. But it is important to note that highly skilled workers are found right across the upper half of the distribution. At the other end of the wage distribution, we find

mostly low-skilled but also many medium-skilled workers. It is also worth noting the high turnover among low-paid workers: almost half of the lowest-paid 10 per cent of workers have one year or less of tenure, and three-quarters have four years or less, compared to about 40 per cent of workers with mid-level wages. Part-time and temporary workers are also over-represented at the bottom end of the wage distribution.

Another striking pattern that emerges from figure 30 is that the attributes and characteristics of those in the top decile are very similar – sometimes identical – to those of the top 1 per cent. Yet, as we saw earlier, the top 1 per cent earn much more than those in the 91st–99th centiles. Clearly, the personal attributes, labour market endowments or workplace characteristics shown in the figure cannot by themselves explain these differences in wages.

9.3 How the wage distribution varies for workers with various characteristics in emerging economies

Roughly similar patterns regarding the relationship of wages to gender, education, occupation and economic sector can be found in emerging economies, as shown in figure 31, though with some major variations across an illustrative sample of countries. Looking at gender, the proportion of women in India in the bottom two deciles is similar to that in Europe (about 60 per cent), but drops precipitously thereafter, and in the upper half of the distribution women represent no more than 10–15 per cent of wage earners. In the Russian Federation, women make up about 70 per cent of workers in lower deciles and this share shrinks to about 40 per cent in the upper deciles. In Argentina, what is striking is the much lower share of women in the top 1 per cent than in the top 10 per cent. There is a similar, but less steep, decline within the top 10 per cent in South Africa.

In terms of education, the upper deciles include a higher share of university graduates than lower deciles in all the countries sampled, but this pattern is particularly noticeable in South Africa and Argentina. In the Russian Federation, there appears to be a surprisingly high proportion of university graduates among lower-paid workers, while in China a comparatively high proportion of top 1 per cent wage earners have an education below university or high-school level. Looking at occupation and economic sector, the real estate and financial sector is over-represented globally among top-paid workers as it is in Europe and, unsurprisingly, a majority of the top-paid workers occupy managerial and professional positions. In Chile, private services and trade are the largest employers of workers in the lower wage deciles, while in Viet Nam workers in the lower deciles are much more likely to be employed in the manufacturing or social services sectors than is the case in either Europe or Chile.

Figure 31 Looking within "deciles" of the wage distribution: Characteristics of individuals, emerging economies

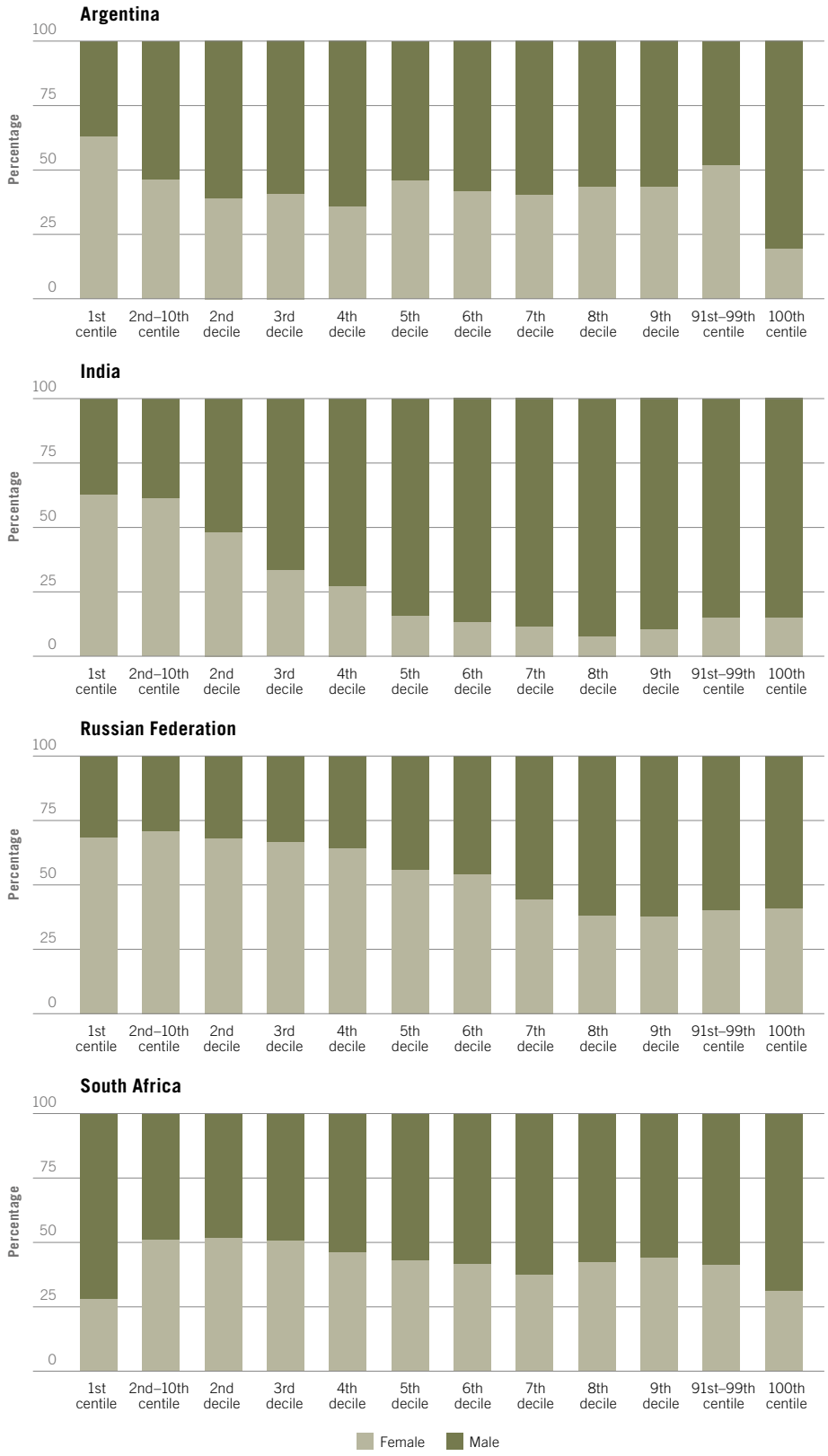


Figure 31 (cont.) – Education

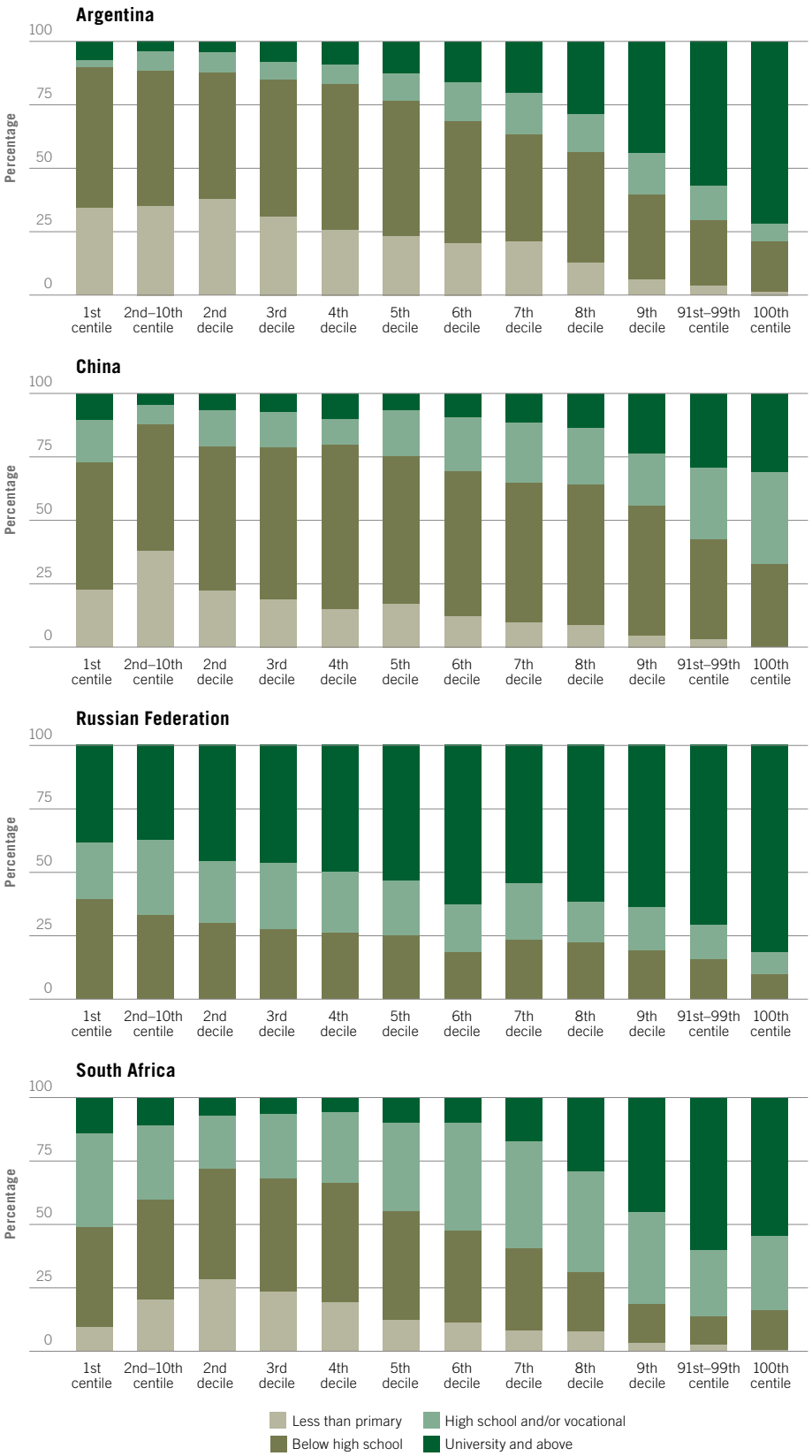


Figure 31 (cont.) – Occupation

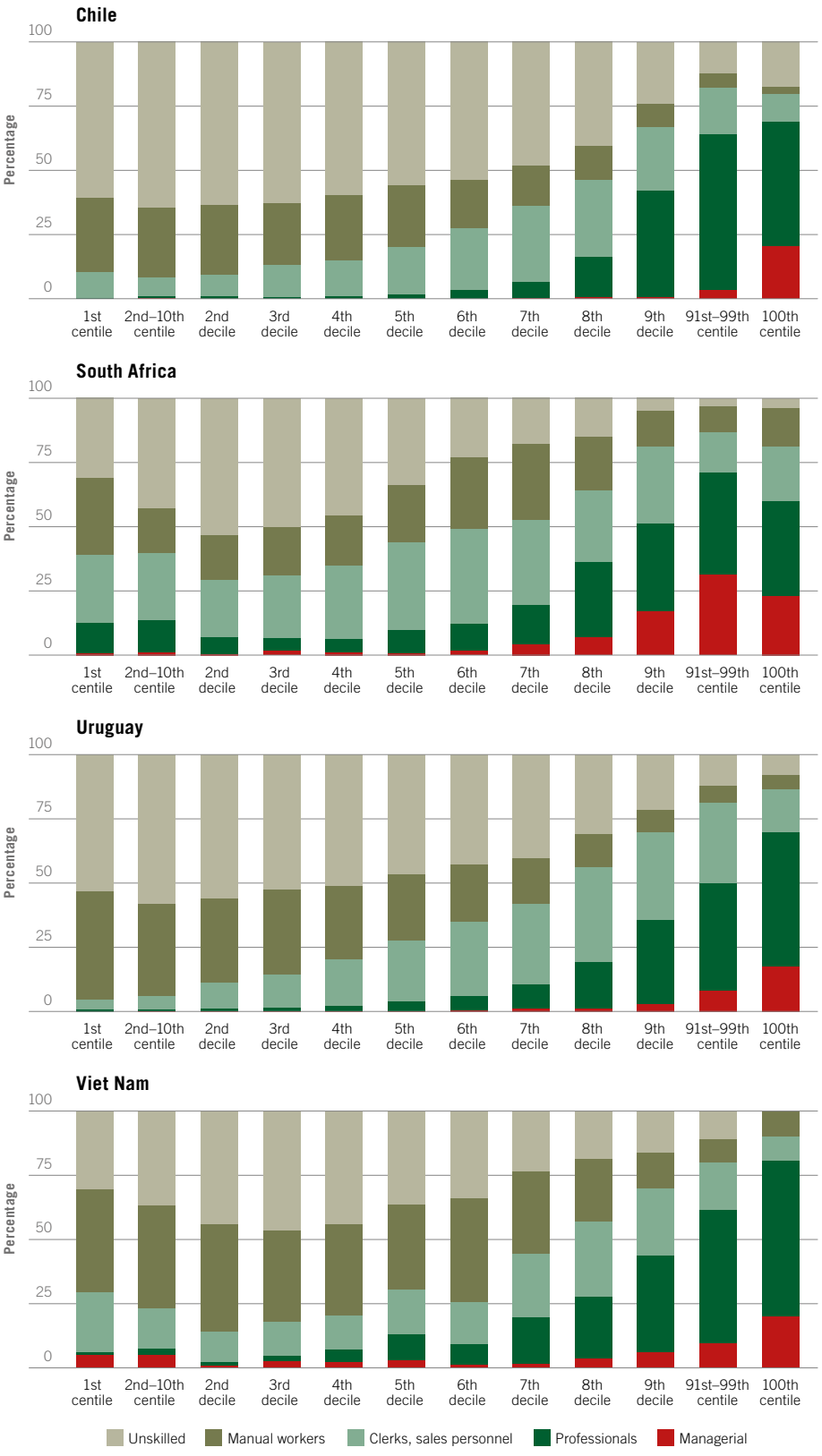
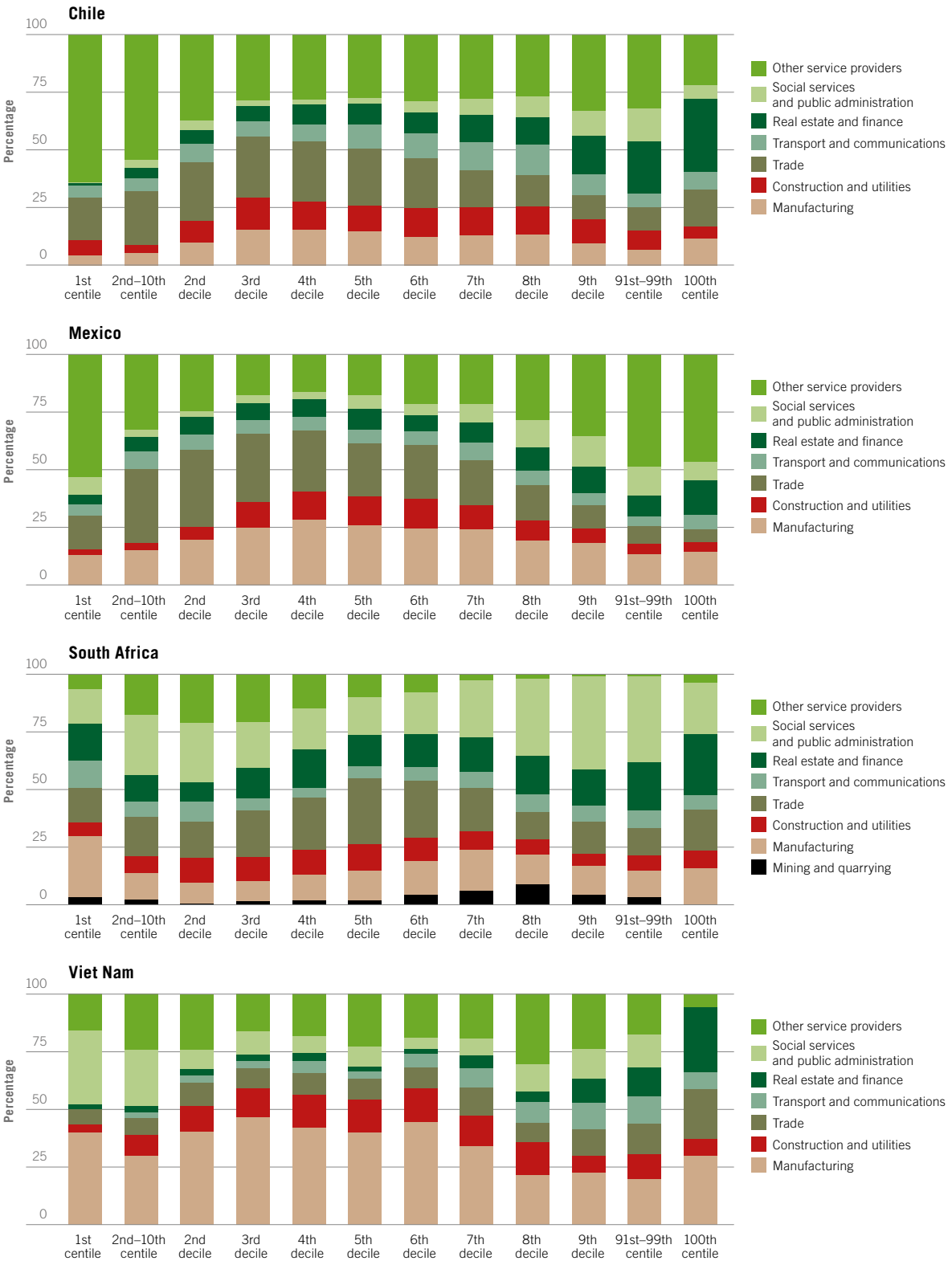


Figure 31 (cont.) – Economic sector



Source: ILO calculations based on national statistics (see Appendix II).

9.4 How workers' characteristics interact in the wage distribution

Figures 30 and 31 strongly suggest that wages are determined not only by individual skills-related characteristics such as level of education, age or tenure – which in some textbooks are described as a "stock of productive capital" that workers "rent out" to employers in exchange for a wage which reflects the value of this productive capital (see e.g. Ehrenberg and Smith, 2013, Ch. 5). These figures suggest that other factors, such as gender, enterprise size, economic sector and the type of contract also play important roles. The figures, however, show different variables independently from one another. What happens if we use a model that allows these individual characteristics to interact with each other? For example, where the distribution of education between adjacent centiles is not different, perhaps a difference in education between centiles will become apparent if we relate education to tenure, and perhaps that would explain why wages are so different between workers in different but adjacent centiles.

Box 6 describes the model we used and the results we obtained. This model confirms that variables such as age, education and tenure are indeed important determinants of individuals' wage levels. But at the same time, the results show that there exist enormous differences between individuals' actual wages and those predicted by the model on the basis of these characteristics. This is the case throughout the wage distribution, but it is particularly striking at the top and bottom ends of the distribution. At the bottom end of the wage distribution the prediction is significantly above the actual value, meaning that according to their characteristics many low earners are "underpaid" compared to what could be expected. The opposite happens at the top end, where many individuals are "overpaid" and earn much more than what is predicted by their characteristics. But there is also wide variation or "unpredictability" throughout the whole wage distribution. To put it in another way, the model is unable to correctly predict the wage distribution. This finding is in line with the existing economic literature which shows that there are large pay differences between seemingly identical workers employed in different sectors, occupations or types of enterprises (see e.g. Krueger and Summers, 1988; Katz and Revenga, 1989; Bound and Johnson, 1992; Murphy and Welch, 1992).

Box 6 The role of skills-related characteristics in determining wages

We constructed a model that explains hourly wages using observed skills-related characteristics of individuals: age, education and tenure (and we also control for the number of hours worked per month). With respect to age and tenure we allow square values of them to enter the specification so as to capture the positive but diminishing returns that ageing and seniority of the individual at the enterprise have on wages. Therefore, $\ln(w) = \alpha + X_i\beta + u_i$ is our model where the matrix X includes the seven variables just mentioned as well as interaction terms between the categories of education and age, tenure and monthly hours worked.* We estimate the model for each country separately, therefore controlling for country-specific effects.† The term $\ln(w)$ stands for the natural logarithm of wages: this transformation converts the dependent variable into one that has a normal distribution so that the data-generating process is consistent with the assumptions behind ordinary least squares estimation.

All models are estimated using weights that take account of the representation of individuals in each country and with respect to the population of European wage employees. The sample considers establishments with ten or more employees: this is a limitation and by no means implies that inequality or wage determination is not an issue among micro-enterprises. However, the data collection process is limited to this sample. The estimation of the model returns the coefficients $(\hat{\alpha}, \hat{\beta}_{age}, \hat{\beta}_{age-square}, \hat{\beta}_{education}, \hat{\beta}_{tenure})$ as well as the coefficients for interactions and the square of age and tenure. The estimated coefficients are used to project the expected value of hourly wages, that is, the prediction of $\ln(w_i)$ for the *ith* individual in the sample. Let this prediction be stated as $\ln(\hat{w}_i)$ – if explained in natural logarithms – or $\hat{w}_i$ if stated in levels.

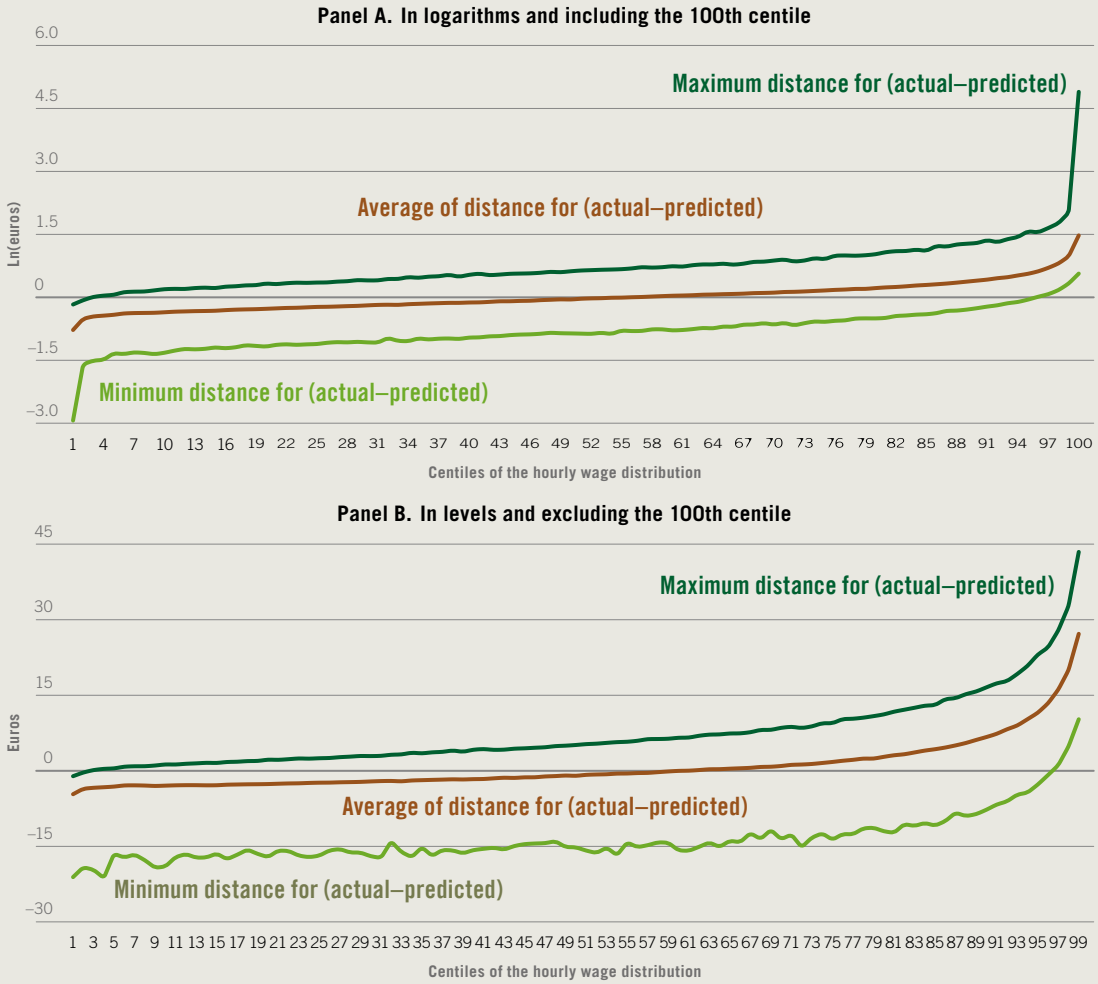
It is admitted that the linear model provides a correct representation of the log hourly wage distribution; therefore the predictions of these variables are as good as the specification – i.e. the set of explanatory variables. To explore the goodness of fit we can estimate the *residual*; this is defined as the difference between actual observed wages for the *ith* individual and his or her predicted value: $w_i - \hat{w}_i$. In order to summarize the residuals we rank all individuals (within country) according to the gross hourly wage and therefore allocate all individuals to a centile position. At each centile and for each country we take the maximum, the minimum and the average of all the residuals; we plot the weighted average – for the 22 countries in the sample – of these three estimates across ascending centiles. By plotting these minimum and the maximum estimates we show a range of values that reflect the variation in the values of the residuals at each of the centiles of the hourly wage distribution. Figure 32 shows the results: panel A is based on natural logs and panel B is based on actual values. The other difference between the two is that in the case of panel B we omit the value of the 100th centile because its inclusion would create a visual distortion at all other centiles.‡

A positive residual, that is, $w_i - \hat{w}_i > 0$, shows a situation where the individual is getting wages above those predicted by the specification in accordance with his or her labour market characteristics. The opposite is also true: if $w_i - \hat{w}_i < 0$, the individual receives wages below those that would be predicted by his or her characteristics.

Whichever of the two panels we look at in figure 32 we see the same pattern, so we focus on panel (b). Here, across the centiles of the hourly wage distribution we observe a range of residuals (the vertical distance between the minimum and the maximum), although the predictions are far closer to the actual values as we get close to the lower tail. Thus, up to approximately the 60th centile the average distance between actual wages and predictions is close to zero and mimics the weighted maxima. This is because for most wage employees in this side of the distribution (up to the 60th centile) the minima apply to fewer individuals. After the 60th centile the average value (i.e., $\frac{1}{n}\sum(w_i - \hat{w}_i)$ at each centile) becomes positive and this happens at an increasing rate as we move towards the top 1 per cent. This tells us that "on average" after the 60th centile individuals are rewarded above their expected outcome (considering their given characteristics). At this point the distance between the maxima and the average starts to widen because the number of individuals who fall below the average – i.e. closer to the minimum at each given centile – is now larger than at lower centiles. But it is also the case that at the 60th centile the "minimum", although it is still negative, starts to move towards a positive value. This means

Box 6 (cont.)

Figure 32 Europe, residuals after predicting hourly wages



Source: ILO calculations based on SES database.

that as we move towards the higher centiles of the hourly wage distribution, the range of minimum–maximum values shifts towards a range of positive values (rather than a range which moves between a negative and a positive value). In other words, at the higher centiles the likelihood that individuals are paid above the expected value – given their labour market endowments – increases. At the 95th centile, all individuals are predicted a value of hourly wages that would suggest they are "overpaid".

Using the same strategy, we compare the estimates of mutually exclusive population subgroups that in practice should not differ in terms of hourly wage. These are defined (a) by gender, (b) by work intensity, and (c) according to contractual agreement.[§] The results are shown in figure 33.

In the case of gender, the patterns are similar but the average of the residuals for males, at any given centile, is higher in value than that for females; that is, at any centile less is explained for males compared to how much the model can explain for females. This also results in the fact that males are, on average, "underpaid" up to the 58th centile, whereas females are, again on average, "underpaid" until the 70th centile. At the top centiles the positive range of values for the residuals is wider in the case of males. For example, at the 100th centile both males and females are overpaid, but females less so than males.

Box 6 (cont.)

Figure 33 Europe, subgroups

Source: ILO estimates based on SES database.

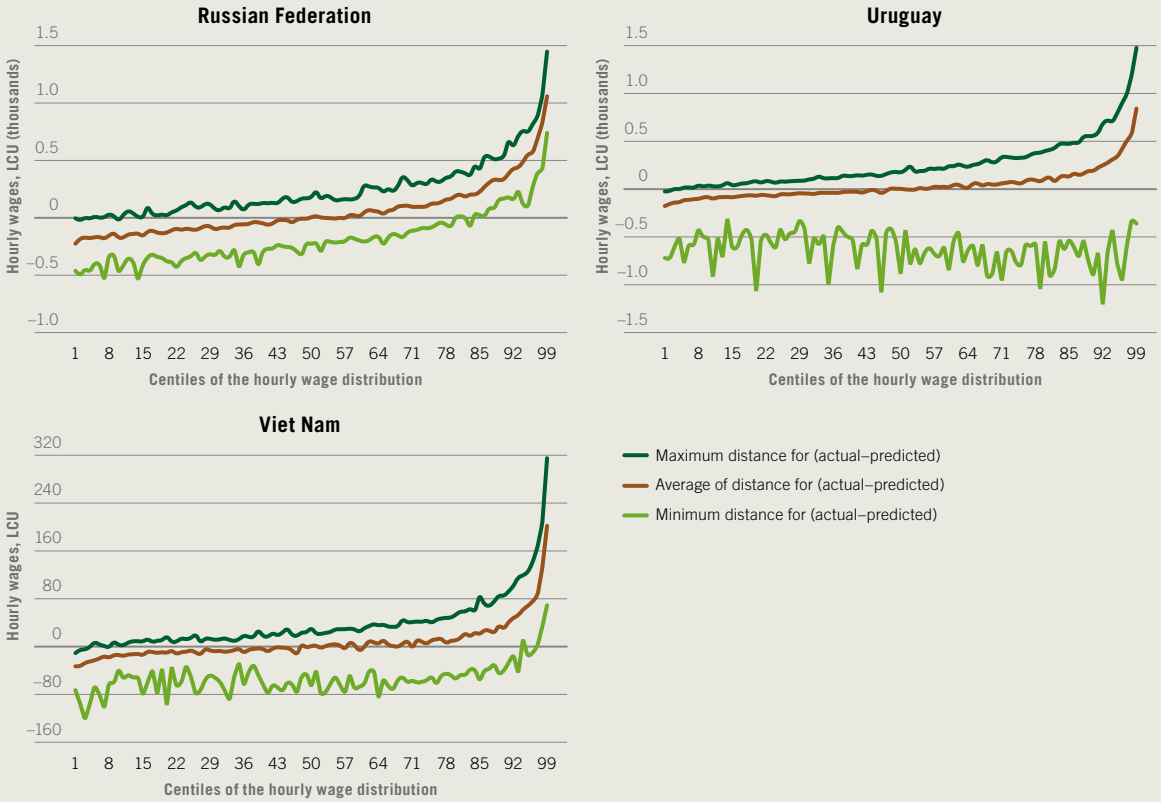
Finally, we repeat the exercise and show some residuals for emerging and developing countries. We find that some of the residuals are enormous (see figure 34).

Box 6 (cont.)

Figure 34 Residuals after predicting hourly wages, emerging and low-income economies

Box 6 (cont.)

Figure 34 (cont.)



Source: ILO estimates based on national statistics (see Appendix IV).

Note: All figures show up to the 99th centile. The vertical axis gives the residual, defined as the difference between the actual value and the predicted value (average over each centile). The axis label on each panel of the figure indicates whether the residual is based on hourly wages or on monthly wages. In all cases the numbers are based on local currency units (LCU).

* In total, the model is estimated for each country allowing for 30 variables: rather than selecting and excluding the reference variables, we let our statistical package (STATA) select and drop the variables that are collinear with others. For each country the software may select a different set of reference variables. What is important is that the information set is identical for all countries and, therefore, the specification leading to the predicted value is also identical between countries.

† We could further partition the sample into subgroups that are homogeneous is some particular way, for example, estimate the model separately for males and females. However, this would implicitly assume that returns to labour market endowments should differ according to gender, which should not be the case. That is, the projected value is the result of comparing the wages of each individual to those of everyone else in the sample. If we estimate by subgrouping we are also assuming that individuals with similar characteristics (e.g. education) but different in (say) gender, could receive different returns for their labour market characteristics: this would in practice reduce the error in estimation leading to a smaller estimate in the residuals. An alternative is to include the variable "gender" – or full time/part time, contract, occupation – in the specification; the result would be to control for gender difference (or other subgroup difference) by adding a gender premium that has to do with the behaviour of the labour market, but not with the endowments that individuals bring into the labour market. Our purpose is to allow exclusively for individual characteristics that should in principle explain wages – if at all – and let these characteristics interact in a model.

‡ In the case of Europe, at the 99th centile the average of the minima, maxima and distance between actual and predicted are €10.3, €43.5 and €27.3, respectively. Once we reach the 100th centile these estimates are €21.8, €2,702 and €69.1, respectively. The value of €2,702 would distort the plot showing the "maximum distance" leading to a plot similar to a horizontal line with a right angle at the extreme right side. Excluding the top centile helps to see what happens to the residuals across all the centiles in panel B. Panel A is not affected in the same way because of the scaling effect of the transformation to the natural logarithm.

§ Note that we did not apply the model separately for different groups in the population. We applied the model allowing all individuals to enter the estimation and with an identical specification – on a country-by-country basis to make sure that we considered the difference in the scale of wages between the countries in the sample. After applying the model we compared mutually exclusive subgroups.

10 Wage inequality between enterprises and within enterprises

10.1 Findings from the literature

The failure of classical skills-related arguments to explain a substantial part of the observed variation in wages has triggered an interest in the workplace as a determinant of wage inequality. To what extent is wage inequality determined by wage inequality *between* enterprises and to what extent is it determined by wage inequality *within* enterprises? This question has elicited growing interest in academic research, and new data structures have allowed researchers to disentangle employee-specific from employer-specific effects on the rising trends of wage inequality (e.g. Lentz and Mortensen, 2010; Lazear, Shaw and Stanton, 2016). From the mid- to late 2000s the availability of matched employee–employer data sets has provided researchers with data on both employees and the enterprises in which they work.

Findings from this literature show that wage inequality arises not only from differences in workers' skills, but also from a combination of differences in average wages between enterprises (what we call inequality between enterprises) and wage inequality within enterprises. The relative weight of these two factors in overall wage inequality differs across countries and time periods. In the United States, for example, wage inequality within enterprises seems to be larger than wage inequality between enterprises, but recent trends towards higher inequality have been driven more by changes in the latter than in the former. In other words, more wage inequality is now due to increases in inequality within enterprises and, to an even larger extent, to increases in inequality between enterprises. Among very large firms in the United States, both kinds of inequality have increased considerably (Song et al., 2015). In other countries the relative weights of these two factors have been different. In Brazil, for example, wage inequality between enterprises is larger than that within enterprises, and most of the fall in overall wage inequality between 1996 and 2012 was due to lower inequality between enterprises (Alvarez et al., 2016; see also the more comprehensive literature review in box 7).

Various reasons have been put forward as hypotheses to explain the phenomenon of rising wage inequality as a result of unequal enterprises. One is *productivity differentials*: the super-productive firms rise above the rest and can pay *all* their wage employees significantly more compared to other firms in the economy. Another is *sorting*: firms are becoming more specialized, with the most productive workers gravitating to the most successful firms (within their region, economic sector, etc.). Yet another reason, offering a powerful explanation of the phenomenon, is that of *polarization* in the types of skills employed by firms (Weil, 2014). Whereas before the late 1980s or early 1990s a company's workforce would typically possess a broad mixture of skills – from janitors to production workers to secretaries and managers – in the last two decades (with accelerating steps in the most recent years) there has been an increased outsourcing of some functions and services to subcontractors or franchisees. Employers have found it easier to turn work formerly done by employees into services provided under contracts with

independent providers, so that their workforces no longer represent a wide range of skills and their enterprises employ increased concentrations of high-skilled workers and drastically reduced numbers of low-skilled workers. As a result, low-skilled workers are finding employment in the low-wage sectors that now specialize in providing those contracted goods and services through outsourcing practices, while the firms that use these strategies most aggressively offer higher wages than mixed-skills firms.

Regarding the growing inequality *within* enterprises, two important factors have been the decline in wage premium for low-skilled workers in large firms (Song et al., 2015) and the growing wages of corporate managers, CEOs and high-skilled professionals, who have benefited from much higher wage increases than their co-workers (see e.g. Piketty, 2014; Sabadish and Mishel, 2012). Recent work by Piketty (2014) and Sabadish and Mishel (2012) has looked at newly available data that allow historical trends of executive pay to be drawn – in particular for the United States and the United Kingdom. According to these authors' estimates, the key driver of wage inequality is the growth of CEO earnings and compensation. This pattern is also seen in the rise in income inequality in certain Asian countries. For example, the use of stock options is becoming more and more popular in Japan (Nikkei Asian Review, 2016), while changes in the corporate culture of the Republic of Korea are leading towards a form of rewarding top management more closely resembling that typical of the United States (Ehrlich and Kang, 2001). Executive salaries have also been spotlighted in South Africa (Massie, Collier and Crotty, 2014).

Box 7 Wage inequality between and within enterprises: A review of the literature

Recent literature has emphasized the importance of an individual's workplace in determining wage income. The interest in the workplace as a determinant of income inequality stems from the fact that classical wage regressions fail to explain a substantial part of the observed overall variation in earnings (Mincer, 1974; Heckman, Lochner and Todd, 2003). Challenging the competitive wage-setting paradigm, Krueger and Summers (1988) showed that there are large pay differences between seemingly identical workers employed in different sectors of the US economy; other studies have arrived at similar conclusions across many countries. In addition, substantial wage differentials between workers within industries also remained unexplained. To address this gap, a recent strand of work has examined the patterns of income inequality between and within enterprises (firms or other establishments). This analysis is based on a decomposition of the variance of overall (log) earnings into two components: first, the between-firm dispersion in workers' average earnings; and second, the within-firm dispersion of workers' earnings conditional on between-firm level differences.

In recent work, Alvarez et al. (2016) applied this decomposition into between-firm and within-firm earnings inequality to Brazil's formal labour market and found that almost two-thirds of the overall earnings dispersion in Brazil's formal sector in 1996 came from between-firm differences in average earnings, i.e. the first component in the above decomposition. Conversely, one-third of the overall dispersion came from within-firm differences in pay, i.e. the second component above. Moreover, the authors showed that most of Brazil's decline in earnings inequality between 1996 and 2012 is explained by falling between-firm pay heterogeneity, while a fall in the within-firm pay distribution contributed less. For the period between 1986 and 1995 in Brazil, Helpman, Muendler and Redding (2015) show that most of the rise in wage dispersion during those years is also explained by rising between-firm pay heterogeneity.

Box 7 (cont.)

Song et al. (2015) show that in the United States, contrary to the case of Brazil, the within-firm variance is larger than the between-firm variance for the period from 1978 to 2013. But looking at changes over time, they find that two-thirds of the increase in wage inequality can be explained by growing wage inequality between firms, and one-third by the increase in wage inequality within firms. Among workers of "mega-firms" employing more than 10,000 workers, however, both inequality between firms and inequality within firms have increased considerably, and by roughly equal magnitudes. The authors attribute the rise in inequality of average wages across firms to increased worker segregation, with high-skilled workers clustering in some firms and low-skilled workers clustering in others. Using a separate data set, Barth et al. (2016) also show that in the United States a large share of the increase in earnings inequality between the 1970s and 2010s is explained by rising dispersion of earnings between establishments.

Together, these findings suggest that the workplace may be a quantitatively important component in wage determination and that changes in the distribution of firm-level pay can explain a substantial share of movements in overall earnings inequality over recent decades.

The central challenge in interpreting pay differences between firms is to distinguish between true firm-specific pay premiums and underlying worker heterogeneity. The observation that workers at some firms are better paid than other workers at other firms could derive from either of two fundamental sources of heterogeneity: on the one hand, the same worker could face large pay gaps between firms, referred to as between-firm pay differences or firm pay heterogeneity; on the other hand, workers may differ in earnings even while working for the same employer, referred to as between-worker pay differences or worker pay heterogeneity.

Both types of heterogeneity – between firms and between workers – will generally show up in the observed earnings distribution. Indeed, the two are indistinguishable in cross-sectional data. To distinguish between underlying firm pay differences and worker pay differences, Abowd, Kramarz and Margolis (hereinafter AKM), 1999, suggested following workers across different employers in longitudinal data. While their original study was on French labour markets, similar decompositions of overall wage inequality into firm and worker components have been applied to labour markets around the world. Later work includes Andrews et al. (2008), and Card, Heining and Kline (2013), for Germany; Iranzo, Schivardi and Tosetti (2008), for Italy; Card et al. (2016), for Portugal; Lopes de Melo (2015), and Alvarez et al. (2016), for Brazil; Bonhomme, Lamadon and Manresa (2015), for Sweden; and Abowd, Finer and Kramarz (1999), Abowd, Creecy and Kramarz (2002), Woodcock (2011), Sorkin (2015), and Song et al. (2015), for the United States.

Although these studies differ in important methodological aspects, their results are approximately in line with a decomposition of overall cross-sectional earnings inequality into 50 per cent due to worker pay heterogeneity, 20 per cent due to firm pay heterogeneity, and an overall explanatory power (R^2) in the range of 85 per cent. However, Card, Heining and Kline (2013), Alvarez et al. (2016), and Song et al. (2015), attribute a substantial share of the shifts in earnings inequality over time to changes in the distribution of firm pay heterogeneity in the AKM framework. Therefore, these findings broadly underline the levels and time trends in between- and within-firm inequality highlighted by the literature mentioned above.

An important follow-up investigation to the AKM decomposition is to consider what underlying factors give rise to firm-pay differences on the one hand and worker-pay differences on the other hand. To address this question, Alvarez et al. (2016), find that close to 60 per cent of the pay heterogeneity across employers is explained by differences in labour productivity, measured by value added per worker at the firm level. Barth, Moene and Willumsen (2014) also find that revenue per worker at the establishment level is a significant predictor of employer pay differences in the United States, although they find weaker explanatory power. On the worker side, Alvarez et al. (2016) find a moderate correlation between proxies for workers' skills and worker pay. However, a weakening link between productivity and pay accounts for the largest share of the decline in dispersion of both worker pay and firm pay over time.

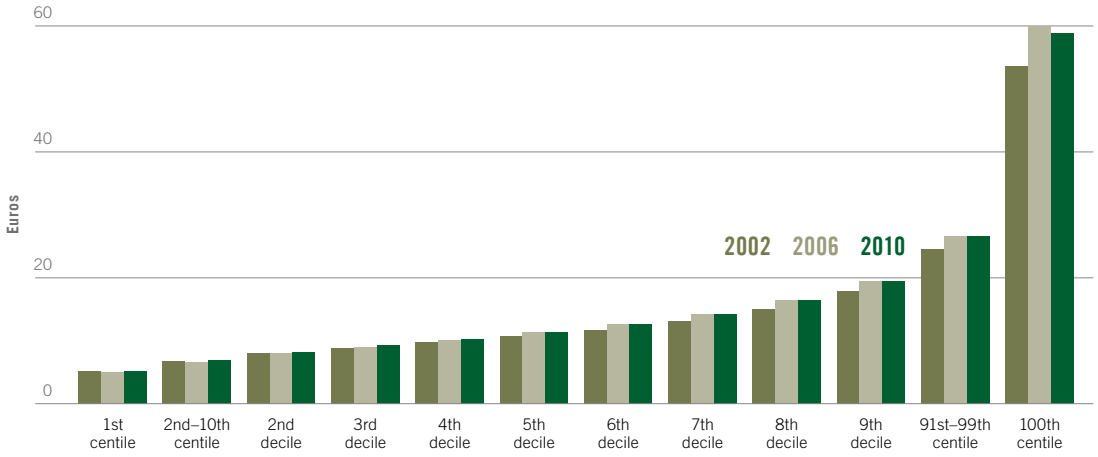
Source: Christian Moser, Columbia University.

10.2 Comparing average wages between enterprises

How much wage inequality is there between enterprises? We address this question by comparing average wages across enterprises. For this analysis, in which the central unit of research is the enterprise as opposed to the individual wage earner, enterprise-level data are required. For developed economies, we continue to rely on Eurostat's SES, for which we have data from 22 countries in Europe. As pointed out above, the SES is an employee–employer survey that provides not only information on enterprise outcomes (such as the average wage for the enterprise), but also detailed information on the individuals who work in those enterprises, a feature of the data which we exploit in subsequent sections of this report. Lack of or lack of access to employee–employer survey type of data for countries in other regions of the world means that we can only provide estimates for these other regions using classic enterprise-level surveys (see Appendix IV).

What can we observe? Instead of ranking individual workers according to their wages as in previous sections, in figure 35 we now rank all enterprises according to their average wages, splitting enterprises into ten groups (or deciles) and showing the average wages for each group of enterprises. We also pick out the first and last centiles (or 1 per cent). In Europe as a whole, for example, we find that in 2010, enterprises in the lowest 1 per cent paid, on average, €5.1 per hour worked, while firms in the top 1 per cent paid, on average, €58.8: the median enterprise paid on average about €12. The country examples in figure 36 show that there are wide differences across countries, with relatively high inequality between enterprises in the United Kingdom, intermediate values in France, Hungary, Luxembourg and Spain, and relatively low inequality between enterprises in Norway.

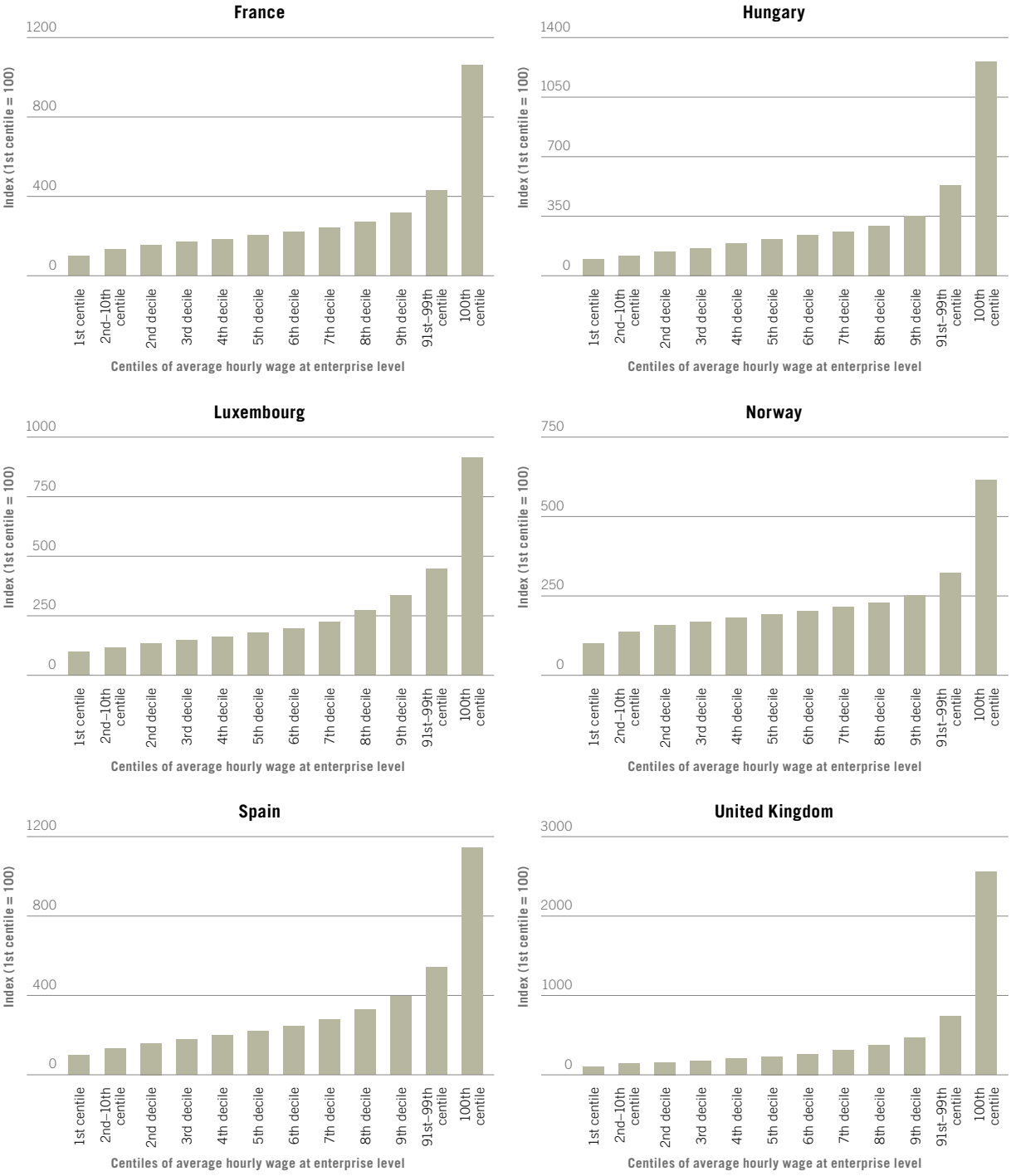
Figure 35 Wage inequality between enterprises, Europe, 2002, 2006 and 2010



Note: The countries are Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the United Kingdom. The measure "hourly wage" refers to the total gross hourly wage, including contractual and overtime pay, plus bonuses and benefits. Values are in euros in real terms with base year 2010. See Appendix IV for additional information on the data set.

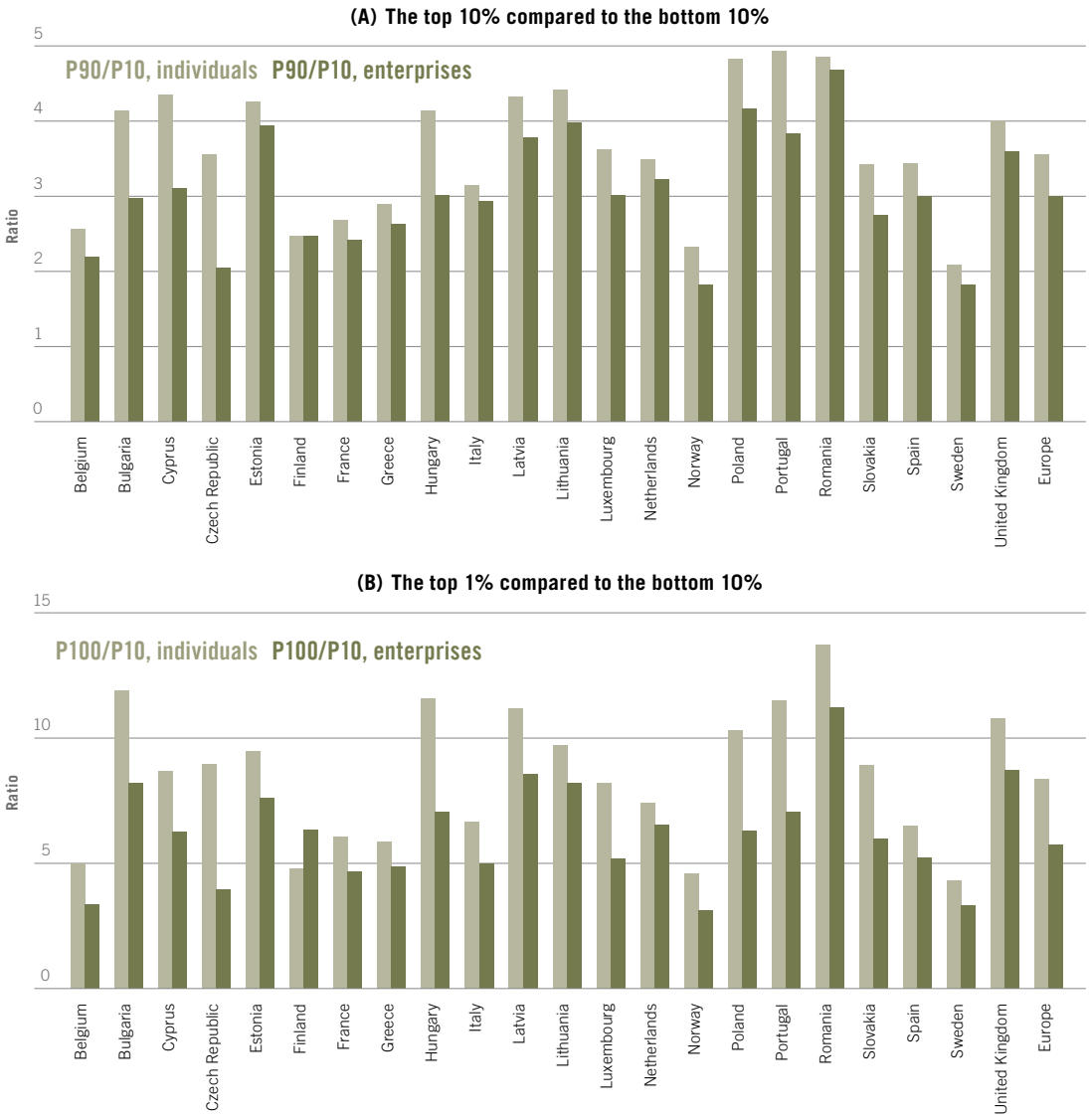
Source: ILO estimates based on the weighted average using 22 economies from the Eurostat SES, where the frequency weights are computed using the representation of enterprises at industry level in each of the countries available in the dataset; data source is OECD statistics.

Figure 36 Relative wage distribution at enterprise level, selected European countries, 2010



Source: ILO estimates using Eurostat SES survey. See Appendix IV for more information.

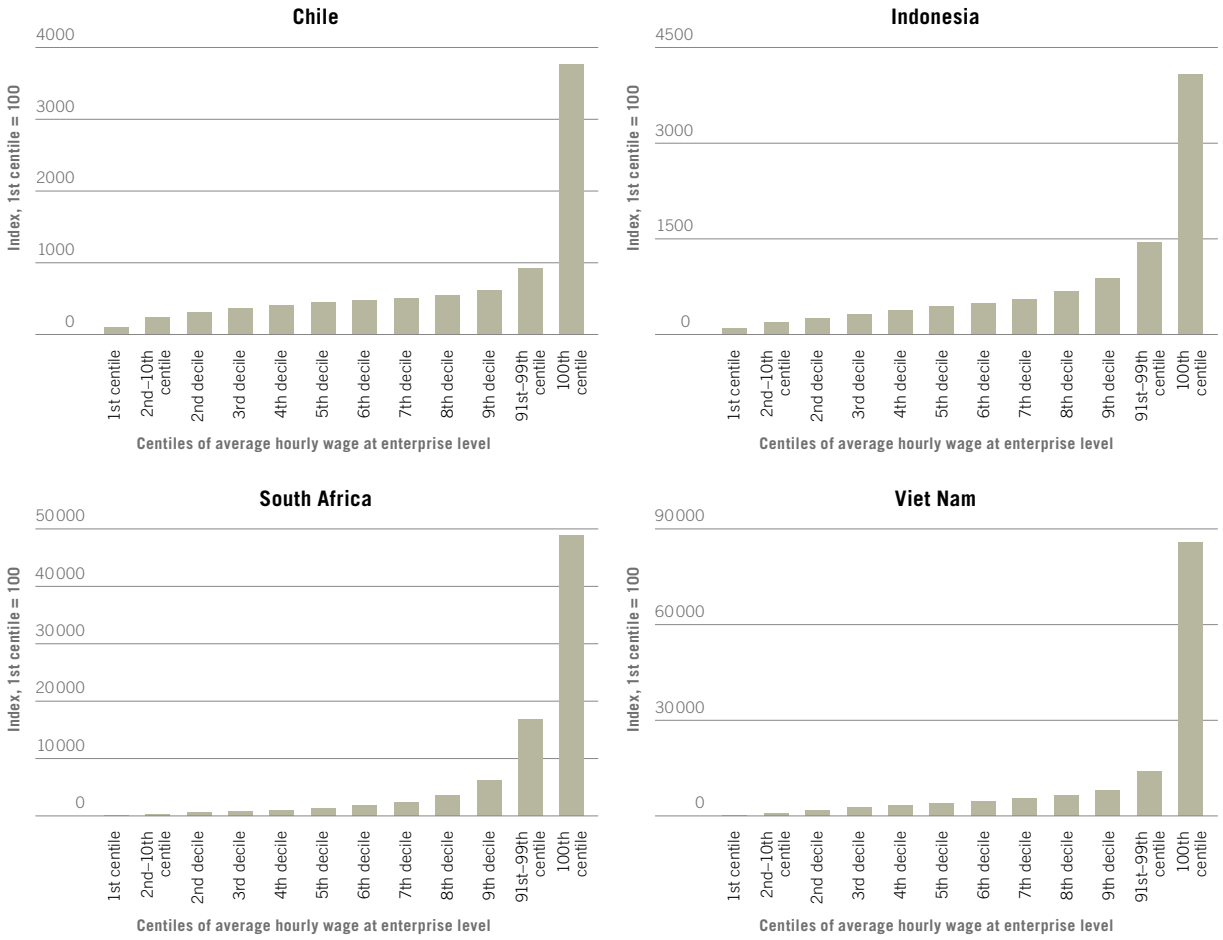
Figure 37 Wage inequality between individuals and between enterprises comparing P90/P10 and P100/P10, selected European countries, 2010



Source: ILO estimates using Eurostat's SES survey (see Appendix IV).

Figure 37 compares total wage inequality between individuals with wage inequality between enterprises, for two different decile ratios (P90/P1, i.e. the top 10 per cent and the bottom 10 per cent, and P100/P10, i.e. the top 1 per cent and the bottom 10 per cent). We can observe that in many countries there is some level of correspondence between a low level of wage inequality of individuals and a low level of wage inequality between enterprises (as, for example, in Sweden or Norway) or a higher level of inequality of both types (such as in the United Kingdom and Romania), though in some countries there is a large difference between the two types of inequality (as in the Czech Republic or Portugal, with

Figure 38 Relative wage distribution at enterprise level in selected developing countries



Note: Index with base 100 = 1st centile. Values for Viet Nam and Indonesia are based on comparing monthly earnings, whereas estimates for Chile and South Africa are based on hourly wages. Some countries are based on hourly wages and others on full-time equivalent income. South Africa data only cover a selection of informal enterprises.

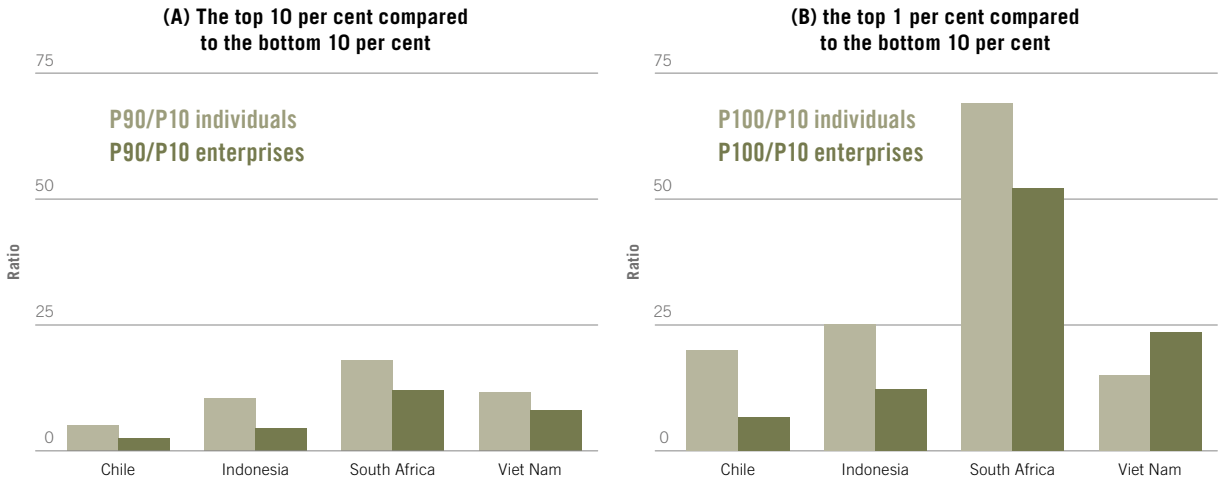
Source: ILO estimates using the latest years of a selection of enterprise surveys as described in Appendix IV.

wage inequality between individuals much greater than wage inequality between enterprises). We also see that when we compare the top 1 per cent with the bottom 10 per cent, inequality between individuals exceeds inequality between enterprises more markedly.

Looking at a sample of four illustrative developing countries in figures 38 and 39, it seems that inequality between enterprises tends to be larger in these countries than in developed countries. While in developed countries, the average wages of the top 10 per cent of enterprises tend to be two to five times as high as those of the bottom 10 per cent, in our sample of developing and emerging countries this ratio ranges from two in Chile to eight in Viet Nam and even 12 in South Africa.

Another way of looking at inequality in average wages between enterprises is shown in figure 40 for a sample of European countries. The circles in the figure show

Figure 39 Wage inequality between individuals and between enterprises, selected developing countries



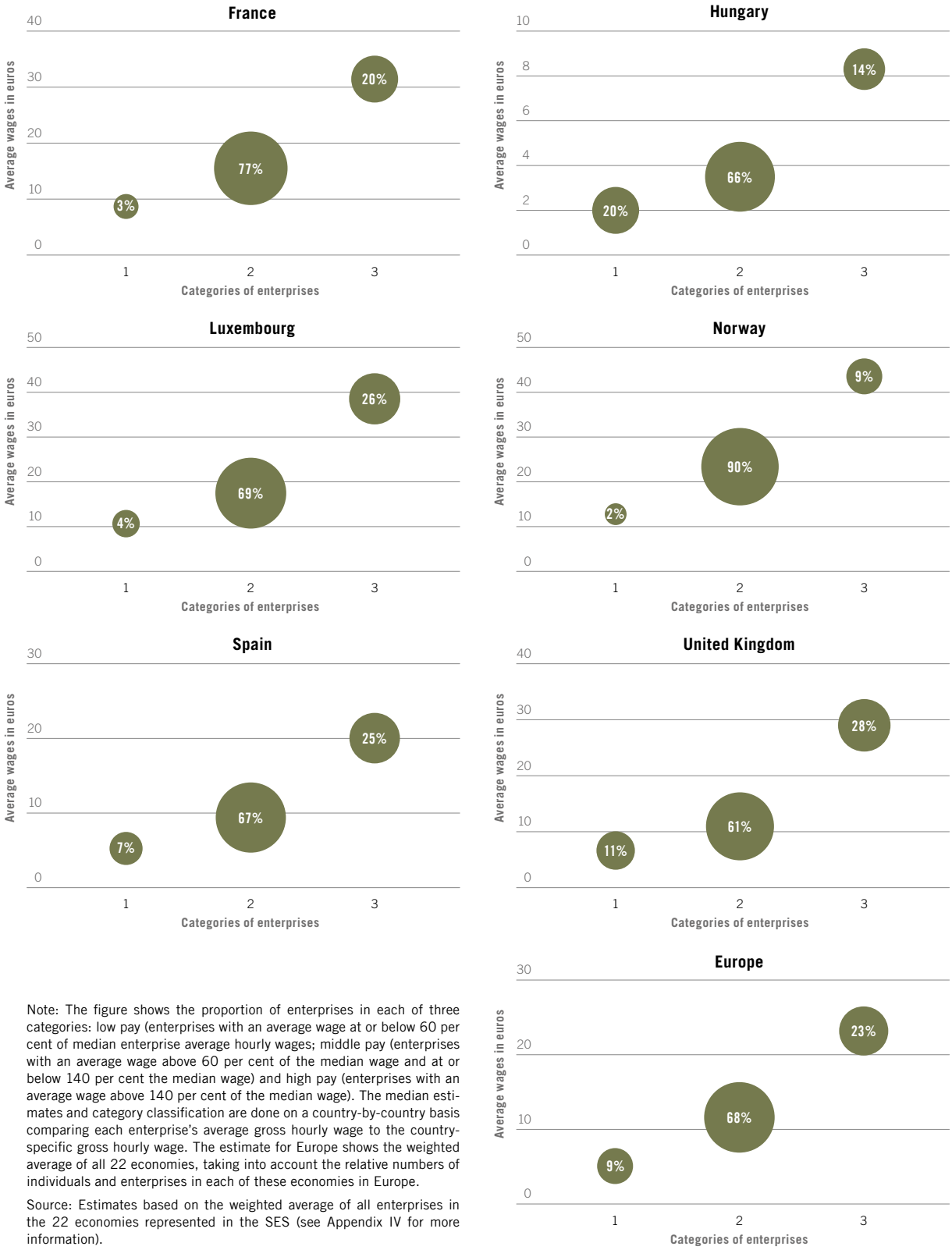
Source: ILO estimates using the latest years of a selection of enterprise surveys as described in Appendix IV.

the proportion of enterprises with high, medium and low average wages, where "low" wages are average wages below 60 per cent of the median average wage and "high" wages are average wages above 140 per cent of the median average wage. In our sample of illustrative countries, Norway has the highest proportion of enterprises with medium wages and the United Kingdom has the lowest (90 per cent in Norway against 61 per cent in the United Kingdom), while the United Kingdom has more firms with either high pay or low pay than Norway, which has very few enterprises with low average pay. Hungary has the highest ratio of enterprises with low pay (20 per cent) in this sample of countries.

Looking at our small sample of developing and emerging economies in figure 41, we see that developing countries tend to have relatively large gaps between a majority of low- and medium-paying firms and a group of 25–40 per cent of enterprises which have much higher average wages than others.

The share of enterprises with low, middle and high average wages to some extent reflects structural differences across countries. Comparing the United Kingdom and Norway in figure 42, we see for example that in Norway low-wage economic sectors (such as the hotel and restaurant sector) pay higher average wages and employ a lower proportion of workers than in the United Kingdom. The United Kingdom, by contrast, has a slightly larger financial and real estate sector, where average wages are substantially higher than in most other economic sectors in the country. The share of enterprises with low, middle and high average wages also reflects the respective stages of economic development of the different countries. Looking at Viet Nam in figure 42, we see that close to half of all wage earners are employed in the manufacturing sector, where wages are still relatively low on average.

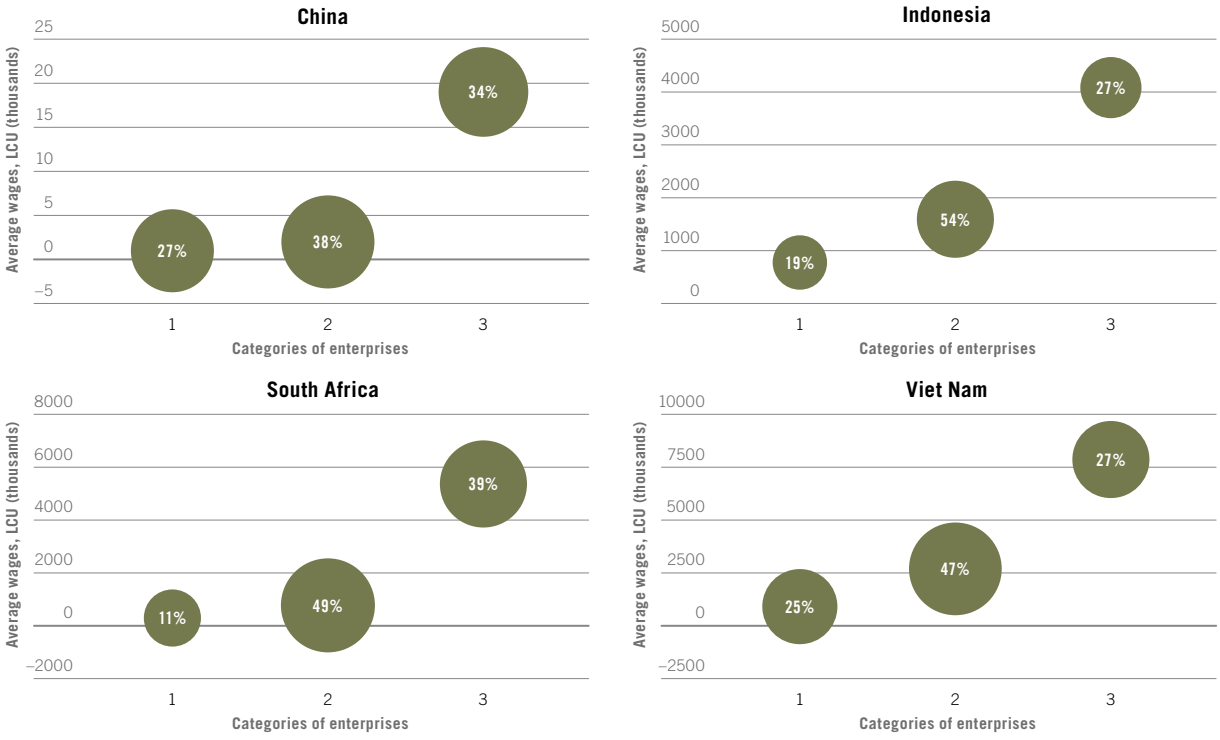
Figure 40 The share of enterprises with low, middle and high average wages in selected European countries and in Europe as a whole, 2010



Note: The figure shows the proportion of enterprises in each of three categories: low pay (enterprises with an average wage at or below 60 per cent of median enterprise average hourly wages; middle pay (enterprises with an average wage above 60 per cent of the median wage and at or below 140 per cent the median wage) and high pay (enterprises with an average wage above 140 per cent of the median wage). The median estimates and category classification are done on a country-by-country basis comparing each enterprise's average gross hourly wage to the country-specific gross hourly wage. The estimate for Europe shows the weighted average of all 22 economies, taking into account the relative numbers of individuals and enterprises in each of these economies in Europe.

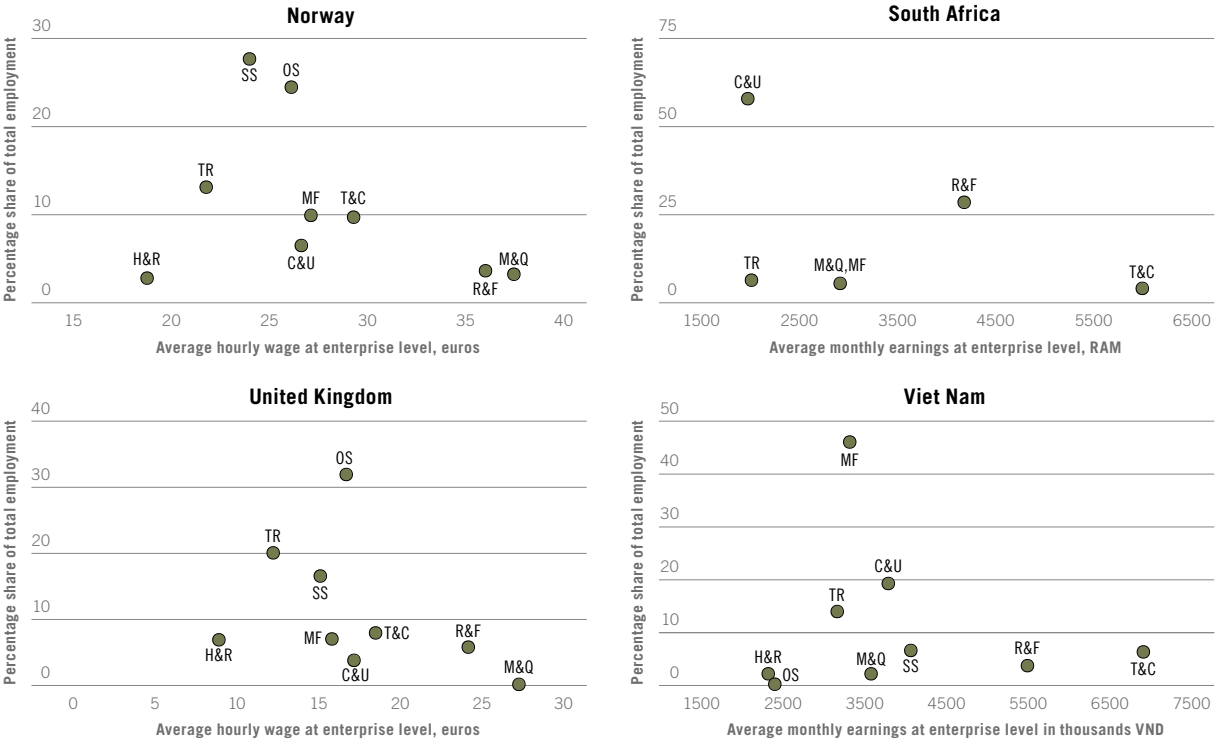
Source: Estimates based on the weighted average of all enterprises in the 22 economies represented in the SES (see Appendix IV for more information).

Figure 41 The share of enterprises with low, middle and high average wages in selected developing and emerging countries, latest years



Source: ILO estimates using the latest years of a selection of enterprise surveys as described in Appendix IV.

Figure 42 Share of employees and average wages by economic sector, selected countries



M&Q = Mining and quarrying; MF = Manufacturing; C&U = Construction and utilities; TR = Trade; H&R = Hotels and restaurants; T&C = Transport and communications; R&F = Real estate and finance; SS = Public administration and social related services; OS = All other services not listed above.

Source: ILO estimates. Data for Norway and the United Kingdom come from Eurostat SES whereas data for Viet Nam and South Africa come from enterprise surveys (see Appendix IV for data sources and further information).

10.3 Wage differences within enterprises compared to wage differences between enterprises

How much wage inequality is there *within* enterprises, as compared to that *between* enterprises? Understanding the wage structure within enterprises has only become possible in recent years thanks to the existence of "matched employee–employer" (MEE) data sets.[13] Until very recently most data sets at the level of the enterprise collected "average outcomes": the firm's accountant would answer a questionnaire requesting information on *average* wages, *average* number of employees or *average* turnover. But the average at enterprise level does not provide information on the distribution of wages within establishments. The provision of data in the form of matched employee–employer data sets makes it possible to investigate empirically the wage structure within enterprises, and to link the wage structure to other characteristics of the enterprise. When the data set provides a country-wide representative sample of enterprises, this can be used to estimate empirically the relative contributions of *within*-enterprise and *between*-enterprise wage inequality to the overall wage inequality observed in a given economy.

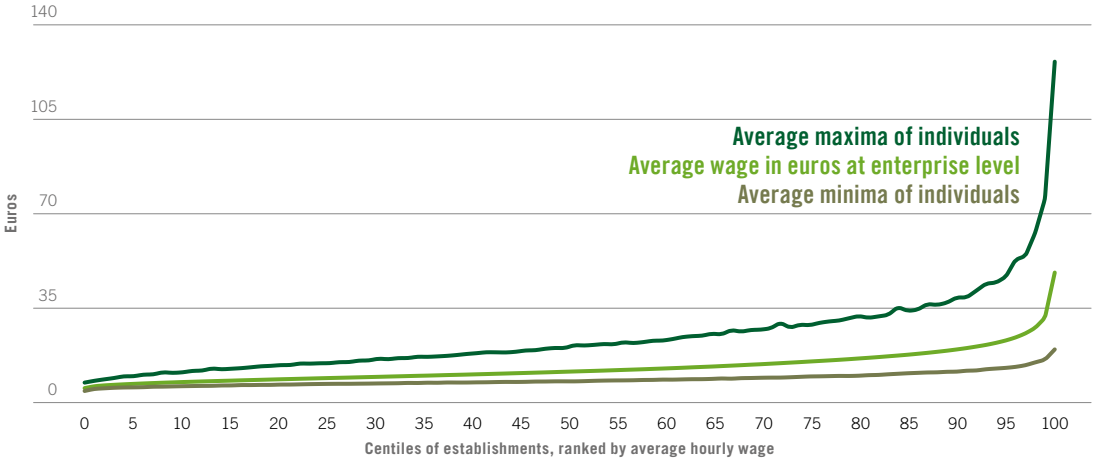
While it would be desirable to undertake this analysis for both developed and emerging economies, in practice few such data sets are available for the latter. We thus rely here on Eurostat's SES for 22 European countries, which we have used throughout Part II of this report.

Minimum and maximum wages paid

In figure 43 we divided enterprises into 100 groups (centiles) and ranked them in ascending order of their average gross hourly wages. We also superimpose the maximum and the minimum paid (on average) to individuals in these 100 groups of enterprises.[14] Whereas the inclination of the middle line in figure 43 provides a measure of wage differentials between enterprises, the vertical distance between the maximum and the minimum paid to individuals provides an indication of wage differentials within enterprises.

Comparing maximum and minimum wages paid, we can observe a considerable degree of wage inequality *within* enterprises, particularly among enterprises that pay higher average wages. For example, at the lowest centile of the average wages, enterprises pay on average wages between €5 and €7 an hour, whereas at the top centile they pay on average between €20 and €126. At the 50th centile, wages vary between €8 and €20. This does not mean that there cannot be very highly paid individuals in enterprises with low average wages. But in general, the higher the average wage in an enterprise, the more wage inequality within that enterprise. Figure 43 also shows that the distance between lowest and highest wages increases at a growing rate as we move towards the upper end of the establishment wage distribution: for example, at the 95 per cent centile enterprises pay between €13 and €47 (the latter 3.6 times the former); at the 99 per cent centile the distance is between €16 and €75 (4.7 times), and at the top centile between €20 and €126 (6.3 times). The fact that there is more inequality in firms with higher average wages, and that higher-paying establishments are not paying higher wages to all their wage employees, is further discussed and illustrated in box 8.

Figure 43 Establishments ranked by average hourly wage, with average minimum and maximum wages of individuals at each centile, 2010



Note: The central line is the average hourly wage of the establishments, at each centile, based on estimating each country's average independently and weighing the 22 estimates according to each country's weight in the population of enterprises in Europe. The "average lowest of individuals" is constructed as follows. From each of the enterprises in the sample we draw the lowest hourly wage paid. On a country-by-country basis we take the average of these lowest values inside each centile. We then estimate the weighted average of these 22 values to come up with a European average of the lowest wage paid in each of the centiles of this distribution of establishments. The "average highest" is constructed similarly by taking the highest wage paid at each of the establishments. There are approximately 470,000 enterprises represented in the SES data in 2010.

Source: ILO estimates based on SES database.

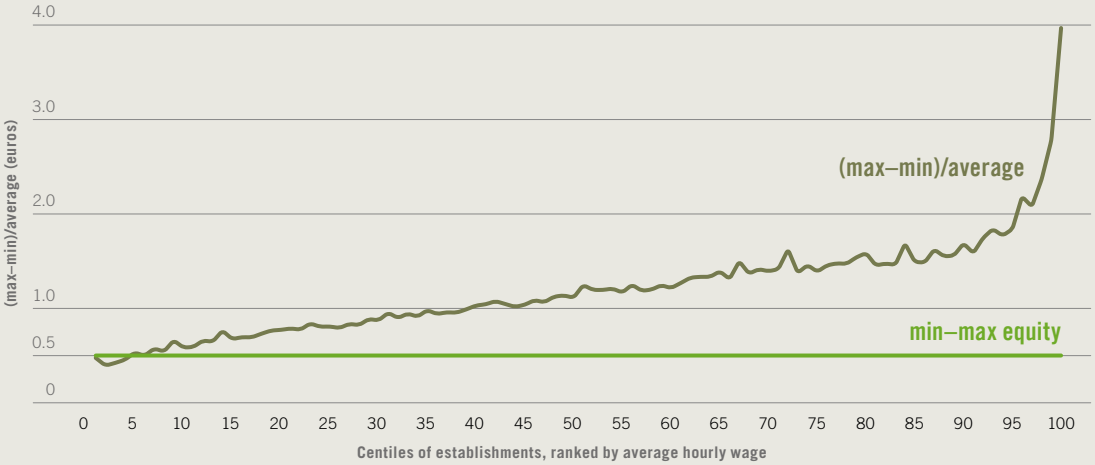
Box 8 Wage inequality within enterprise centiles

To complement figure 43, we present here two additional charts that illustrate wage inequality within centiles of enterprises ranked in ascending order of average wages. Figure 44 shows the gap between the minimum and the maximum at each centile as a percentage of the centile's specific enterprise average. Among low-paying firms the distance between the minimum and the maximum is relatively equitable around the average, but for establishments above the fifth centile the maximum wage starts to "fly away" from the average. From there on, the average wage is closer to the minimum wage than to the maximum wage; this is indicated by a min–max difference relative to the average that becomes more and more distant from the benchmark of 0.5. The weighted min-max difference progressively increases as we move up along the ranking of establishments according to average pay. This is evidence that "higher-paying establishments" are not paying higher wages to all their wage employees. Indeed, establishments with high average wages have a much wider dispersion between their employees as a result of very long upper tails in the establishment-specific wage distribution.

Figure 45 is based on the standard deviation – a statistic that best summarizes wage dispersion at establishment level. It shows the centile-average establishment's specific hourly wage standard deviation: that is, considering each enterprise independently, we estimate the establishment-specific standard deviation and take the average of these within the centile.* Figure 45 shows that variability increases with increasing average wages measured at establishment level; for example, at the 10th, 50th, 90th and 100th centile the average standard deviation is about €1.3, €3.2, €7.2 and €31.2, respectively. Thus the average variability in wages increases at an increasing rate as we move across the average establishment hourly wage distribution.

Box 8 (cont.)

Figure 44 Weighted min–max distance in hourly wages within establishments



Source: ILO estimates based on SES database.

Figure 45 Average wages within establishments and standard deviation

Source: ILO estimates based on SES database.

* When estimating measures of dispersion (such as the variance or its corresponding standard deviation) at enterprise level, we consider enterprises that provide at least two data points in the sample. On average, each enterprise provides about 18 data points and the use of sampling weights leads to the representativeness of the distribution within and between enterprises for any given country and for Europe as represented by the 22 economies available in the data. Dropping enterprises with fewer than 2 sample points implies dropping about 10 per cent of the data for 2010. Nevertheless, the withdrawal of these enterprises does not affect the original representation of the data at country level and has a negligible effect on the estimate of the plots in figure 43 and subsequent figures. All estimates that follow from this point onward are based on this sample selection criteria to make the estimates comparable between them.

It has previously been emphasized that inequality within enterprises can vary by economic sector and by the size of enterprises, where the latter is defined in terms of employment size: whereas economic sectors can experience differences in labour productivity, the decline in wage premium for low-skilled workers has been observed in larger establishments where growing wages of corporate managers, CEOs and high-skilled professionals may have contributed to growing within-enterprise inequality (see e.g. Song et al., 2015; Piketty, 2014; Sabadish and Mishel, 2012). This leads us to question whether the pattern observed in figures 43 to 45 will be replicated if the exercise is repeated to yield estimates by economic sector and size of enterprise.[15]

Table 3 shows the pattern for each of the nine economic sectors and each of the three size categories identified in the data: small (10–49 employees), medium (50–249 employees) and large (250 or more employees). The table shows the pattern in figure 43 and 44 repeated: irrespective of economic sector or size, inequality within enterprises is higher among enterprises that pay higher average wages. The

Table 3 Breakdown of estimates for figure 44 by sector and by size, average hourly wages, in euros, 2010: Selected centiles of weighted min–max distance of individuals' hourly wages within enterprises

	Bottom centile			50th centile			99th centile			Top centile		
	Minimum	Maximum	Relative distance	Minimum	Maximum	Relative distance	Minimum	Maximum	Relative distance	Minimum	Maximum	Relative distance
Population	4.30	7.40	57.8%	7.87	20.16	108.0%	15.85	75.40	190%	19.69	126.22	221%
Mining and quarrying	5.28	9.23	58.4%	9.87	21.38	87.7%	16.03	75.42	172%	20.83	94.32	166%
Manufacturing	4.45	8.05	62.9%	7.81	22.18	126.0%	13.86	76.72	227%	17.15	97.11	206%
Construction and utilities	4.56	8.04	59.7%	8.33	17.92	84.1%	14.46	67.61	191%	18.95	88.93	179%
Trade	4.28	6.69	44.6%	7.19	15.19	85.3%	12.11	62.60	194%	15.06	90.16	204%
Hotels and restaurants	4.17	7.38	62.4%	6.72	11.34	55.1%	10.08	41.99	173%	13.36	67.13	192%
Transport and communications	5.24	8.08	44.9%	9.12	23.55	108.2%	17.89	84.82	188%	23.98	121.07	195%
Real estate and financial services	5.87	9.74	52.9%	13.18	34.31	111.1%	24.69	140.13	209%	28.59	226.73	220%
Social services	4.00	8.61	91.8%	6.45	19.63	134.1%	12.52	45.28	147%	15.73	59.31	148%
Other services	4.24	7.23	58.0%	7.84	19.66	97.8%	15.85	59.44	149%	17.82	133.04	247%
Small	3.52	5.56	47.6%	6.32	13.62	84.2%	12.42	52.45	160%	15.98	93.74	195%
Medium	4.50	8.60	72.9%	8.41	23.02	120.0%	15.52	74.93	188%	19.24	151.35	262%
Large	5.37	10.65	77.5%	10.00	27.52	120.0%	19.78	91.81	188%	23.85	140.05	214%

Source: ILO estimates based on Eurostat's SES survey (see Appendix IV). The estimates are based on replicating figure 45 for each of the nine economic sectors and for each of the three size categories. The relative distance is based on comparing the average of minima to the average of maxima weighted by the average at a selection of centiles. See the note in figure 43 for reference.

common pattern would suggest that within-enterprise wage inequality is not necessarily the result of growing inequality in a particular sector or as a result of the size of the enterprise, but a feature that describes a common pay structure among enterprises that share a similar average wage. Thus, as average wages increase, wage inequality within enterprises grows in all sectors, but especially in real estate and finance, and in transport and communications. In terms of size, table 3 shows that within-enterprise inequality increases not just with increasing average wages but also with the size of the enterprise.

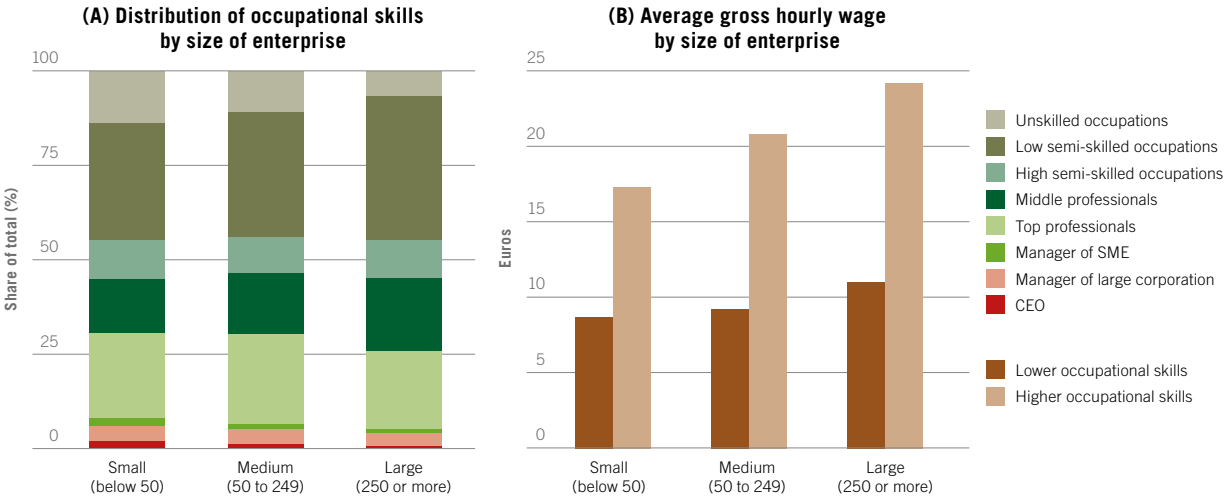
In figures 46 and 47 the panels marked (B) compare the average wage of lower-paid occupations to that of higher-paid occupations by economic sector and enterprise size, while the panels marked (A) show the distribution of wage employees by occupational category for each economic sector and for each size of enterprise. In all the figures the estimates are shown in bars organized from left to right according to the average wage paid in each sector or enterprise size. Thus, the first bar in figure 46 is that of the hotel and restaurant sector, which pays the

Figure 46 Occupational categories and wage differentials: Establishments classified by economic sector, ranked in columns by average hourly wage at enterprise level

Note: H&R = hotels and restaurants; TR = wholesale and retail trade; SS = social services; MF = manufacturing; C&U = construction and utilities; OS = other service providers; M&Q = mining and quarrying; TC = transport and communications; R&F = real estate and financial activities. The classification by occupation follows ISCO-88: CEO = chief executive officer; MCRP = manager of a corporation; MSME = manager of an SME; HPF = high professional occupation; MPF = mid-level professional occupation; HSKO = higher semi-skilled occupations; LSKO = lower semi-skilled occupations; LSO = low or unskilled occupations. In (b), "lower occupational skills" includes the low or unskilled occupations and those working in the lowest semi-skilled occupations; "higher occupational skills" includes those working as CEOs, as managers of corporations or SMEs, or in top professional occupations.

Source: ILO estimates based on SES database.

Figure 47 Occupational skills and wage differentials: Establishments classified by size, ranked by average hourly wage at enterprise level



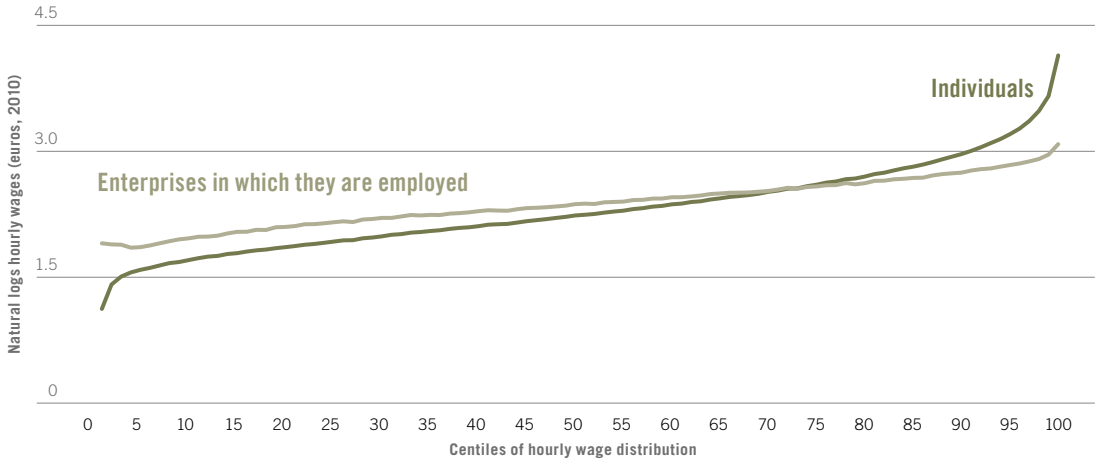
Note: For occupational categories and for a definition of the two occupational categories in (b), see notes to figure 46.
Source: ILO estimates based on SES database.

lowest average wage (€9 per hour) and the last bar is that of the real estate and financial sector, which pays the highest average wage (€24 per hour). We see that low occupational skills account for a significant fraction of wage employees in economic sectors with the lowest average wages (e.g. 75 per cent in the hotel and restaurant sector), but that there is almost no difference in the mix of occupational categories between the three enterprise sizes. However, the gap in average wages between top and low occupational skills in medium and larger enterprises (which pay on average €14 and €16 per hour, respectively) is wider than the same wage gap in smaller enterprises.

10.4 Comparing average wages and wages of individuals

Another way of visualizing the importance of wage inequality within enterprises is to compare the wages of individuals to the average wage of the establishments in which they work.[16] In figure 48 the steeper line represents the full range of wages of individuals, while the flatter line represents the average wage of the enterprises in which they work (see box 9 for a more technical explanation of how these lines are constructed). We see that in general it is true that low-wage employees work in enterprises associated with a low average wage and high-wage employees in enterprises associated with a high average wage. For example, individuals whose wages locate them at the tenth centile work in enterprises that pay an average of €7 per hour, while the better-paid workers located at the 90th centile work in enterprises that pay on average €19 per hour.[17] But the steeper slope of the individuals curve shows that there is considerably more wage inequality between individuals than there is inequality in average wages between enterprises.

Figure 48 Average hourly wages, individuals and enterprises, by centile ranking of individual wages



Notes: The horizontal scale shows the centile distribution of individuals' gross hourly wages. See box 9 for more details. The vertical scale shows the natural logarithm of hourly wages; the scaling helps fit the information into the graph while preserving the perspective that would otherwise be lost if the extreme values at the tails were to be shown in absolute values.

Source: ILO estimates based on SES database.

In fact, most people are paid less than the average of the enterprise in which they work. Among the 20 per cent of wage earners who receive wages above the enterprise average, wages grow exponentially. To see this we observe that at the end of the individuals curve, the top 1 per cent of individuals earn 630 per cent as much per hour as workers paid the average wage in the middle of the distribution (the 50th centile of the individuals line), even though the enterprises in which the top 1 per cent work pay on average only 130 per cent as much as the enterprises located in the middle of the distribution (the 50th centile of the enterprises line). This points to the fact that a more compressed distribution of average wages across enterprises might not necessarily reduce overall wage inequality unless it benefits those at the lower end of the wage distribution within these enterprises.

What happens at the extremes of the distribution, both for the very low-paid and the very high-paid individuals? The next two figures zoom in on the bottom and top centiles: here, instead of averaging at each centile of the hourly wage distribution – as in figure 48 – we average at each tenth of the centile, which allows us to refine the averages of the hourly wage at the extremes of the distribution. To do this we further break down each centile of the top and bottom deciles into 10 bins, so that we end up with the two extreme deciles each subdivided into 100 smaller groups. Figure 49 shows the low end of the wage distribution. We see that below the tenth centile of the bottom decile (i.e. the bottom 0.1 per cent) wages of individuals fall off the cliff, far below the average wages of enterprises in which they work, showing that there is large inequality at the very low end of the distribution: the bottom 1 per cent within this group receive €2.5 per hour but work for enterprises that register average wages of €10.2 per hour. In fact, it is interesting to see that at the very low end of the distribution the average hourly

Box 9 Representing wages of individuals and the enterprises which employ them

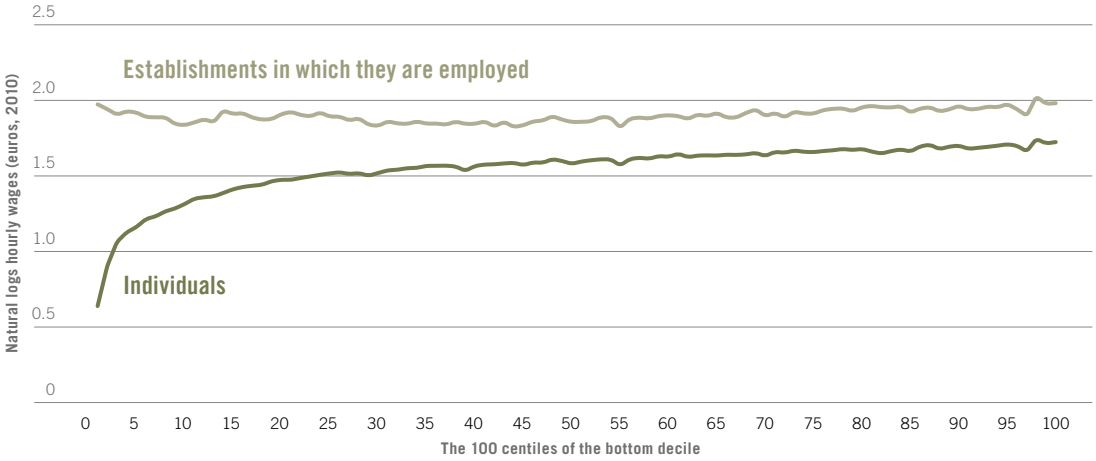
In figure 48, we rank individuals (i) in the sample according to their hourly wages (w_i, which stands for the natural logarithm of the hourly wage of the *ith* individual in the sample). In our case the sample reflects wage information from 22 countries in Europe in 2010. The ranking is done on a country-by-country basis to preserve the location of individuals in relation to the country-specific wage distribution. On the basis of this ranking, we plot the centile (c) specific average of the hourly wage ($\overline{w}^c = {}^1/_{n(c)} \Sigma_i w_i$) from the lowest to the highest centile (100 weighted average observations, where the weights reflect the country representativeness within the sample); this is the individuals line. We then estimate for each individual the "average wage" at his or her enterprise (j): this estimate is an individual-specific enterprise average because it excludes him or her from the computation. We weight and average these "enterprise-specific values" at each centile of the individual wage distribution ($\overline{w}^{j|c}$) and plot them; this is the enterprises line. The vertical distance between the individuals line and the enterprises line ($\overline{w}^c - \overline{w}^{j|c}$) is the centile-specific enterprise wage gap (the establishment's premium). We use natural logarithms to facilitate visual inspection, because this shrinks the vertical scale allowing us to compare point estimates between plots, as opposed to showing a pattern of shape.

A similar method has been used in the paper by Song et al. (2015), although the emphasis there is on growth rates rather than a comparison of values. However, our method deviates from theirs in a way that makes our estimates more robust to the effect that an individual's wages have on an establishment's wage variability. Song et al. (2015) allow each individual inside the database to enter into the estimation of the average of their enterprise. We think this would artificially pull up the enterprise average among those that are top wage earners and pull down the average among those that are low earners, thus somehow contributing to the hypothesis that "top earners are surrounded by high-earning co-workers". To avoid this we use the enterprise average excluding individual-specific effects: this means that in estimating the flatter line, we exclude the individual's wage when estimating the average wage of the enterprise for which he or she works. All our firms are based on a selected sample of enterprises that employ ten workers or more, but the number of surveyed employees is sometimes less than ten. We disregard all enterprises with fewer than two surveyed employees: this selection criterion implies dropping about 2 per cent of the sample, and those disregarded are similarly distributed between countries (according to the representativeness of each country). The threshold set at two is based on testing what happens if we disregard one, two, three or four: after disregarding one the difference is insignificant.

wage of these enterprises is slightly higher (€10.2) than that estimated among enterprises at the top end of these 100 bins (€9.5), yet at the 100th bin the average wage of individuals is €7, in striking contrast with the average hourly wage of €2.5 at the first of these 100 bins.

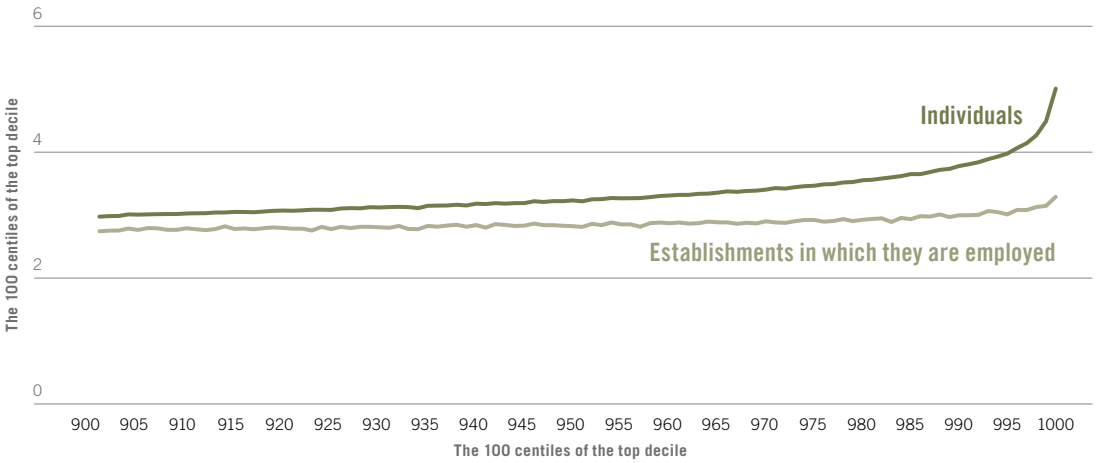
Figure 50 shows that wage inequality between individuals does not stop at the top 10 per cent: the top 1 per cent within this group (i.e. the top 1,000th) receive hourly wages that are not proportional to the average wages paid by the companies for which they work. The establishments for which these individuals work pay, on average, €45 per hour; these individuals themselves receive on average €211 per hour. Thus, whereas in figure 48 we saw that individuals in the top 1 per cent of the wage distribution received wages that were, on average, 169 per cent of the average

Figure 49 Zooming in on the bottom 10 per cent of wage earners: Average hourly wages, individuals and establishments



Source: ILO estimates based on SES database.

Figure 50 Zooming in on the top 10 per cent of wage earners: Average hourly wages, individuals and establishments



Source: ILO estimates based on SES database.

hourly wage in the enterprises for which they worked, once we isolate those in the top 10 per cent of the top 1 per cent we see that these individuals receive hourly wages that are, on average, 368 per cent more than the average hourly wage paid at the enterprises for which they work.

A useful exercise is to explore the outcomes of figure 48 for each economic sector and each of the three size categories (small, medium and large). We do this in table 4, where we summarize the outcome of figure 48 for each of these subgroups using a selection of centiles that together describe each of the two distributions (individuals and the enterprises for which they work). The first conclusion we draw from table 4 is that, irrespective of the economic sector or the size of the enterprise, the pattern observed in figure 48 is replicated. We can take, for

Table 4 Breakdown of estimates for figure 48 by sector and by size, average hourly wages, in euros, 2010: Selected centiles of individuals' hourly wage distribution and average wages for these individuals and for the enterprises for which they work

	Bottom centile		50th centile		99th centile		Top centile		Crossing centile
	Individuals	Their enterprises	Individuals	Their enterprises	Individuals	Their enterprises	Individuals	Their enterprises	
By industrial sector									
Mining and quarrying	3.32	7.21	8.87	11.44	46.97	35.22	72.56	36.17	92nd
Manufacturing	3.27	8.65	10.38	12.01	42.30	19.40	73.49	21.88	76th
Construction and utilities	4.16	10.78	11.04	12.53	40.14	21.19	65.94	25.42	76th
Trade	3.86	8.52	10.72	11.65	41.63	21.54	69.38	22.33	64th
Hotels and restaurants	4.22	7.56	10.52	10.13	42.23	21.68	82.67	14.68	44th
Transport and communications	3.96	10.55	10.98	12.83	41.88	24.24	67.29	26.90	87th
Real estate and financial services	2.99	13.06	11.12	16.13	46.30	35.76	107.49	48.36	99th
Social services	3.36	12.07	12.20	15.07	45.47	19.28	75.87	20.61	80th
Other services	4.12	8.58	11.39	14.00	46.29	26.08	84.66	31.31	84th
By size of enterprise									
Small	3.70	7.51	10.23	10.95	38.63	20.60	64.76	24.66	68th
Medium	3.50	8.61	10.52	12.12	39.33	21.39	72.98	26.19	78th
Large	4.06	12.34	11.87	14.74	46.61	26.06	88.08	32.80	79th

Note: The definition of economic sectors is based on the NACE Rev.2 classification. The distribution of enterprises in size categories is based on the number of employees at the enterprise: small = 10–49 employees, medium = 50–249 employees and large = 250 or more employees.

Source: ILO estimates using SES data for 22 countries.

example, the case of the transport and communications sector, where individuals in the top 1 per cent earn 513 per cent more per hour than workers in the 50th centile in the same sector, while the enterprises where the top 1 per cent work pay on average only 110 per cent more than enterprises located in the 50th centile in the same sector. Taking the 50th centile versus the top 1 per cent as our point of reference, we observe that the sector with the largest discrepancy between the distribution at enterprise level and that of individuals is the real estate and financial sector (866 per cent more per hour at the top centile relative to the 50th centile), which is also the sector with the largest degree of inequality between establishments (enterprises at the top paying 200 per cent more than those at the 50th centile).

In terms of size, we observe that the discrepancy between average pay at enterprise level and what individuals receive is higher in large enterprises than in medium-sized or small enterprises – even if between-enterprise inequality is relatively similar among the three groups. Thus, in large, medium and small enterprises the top 1 per cent earn, respectively, 642 per cent, 594 per cent and 533 per

cent more per hour than workers at the 50th centile in the same size of enterprise; yet the enterprises where the top 1 per cent work pay on average only 123 per cent, 116 per cent and 125 per cent more than the 50th-centile enterprise in large, medium and small enterprises, respectively. The last column in table 4 shows the centile at which the two distributions cross, i.e. the share of wage employees whose hourly wage falls below the average wage paid at the enterprise where they work: the higher this figure, the greater the concentration of hourly wage gains for the top 1 per cent among these enterprises. Except for the hotel and restaurant sector, in all other sectors and by size of enterprise, more than one-third of employees are paid less than the average wage of the enterprise in which they work. In the case of the real estate and financial sector, the estimates show that only individuals located in the top centile receive wages that are above the average paid in their enterprises.

10.5 How much wage inequality is due to within-enterprise inequality and how much to wage inequality between enterprises?

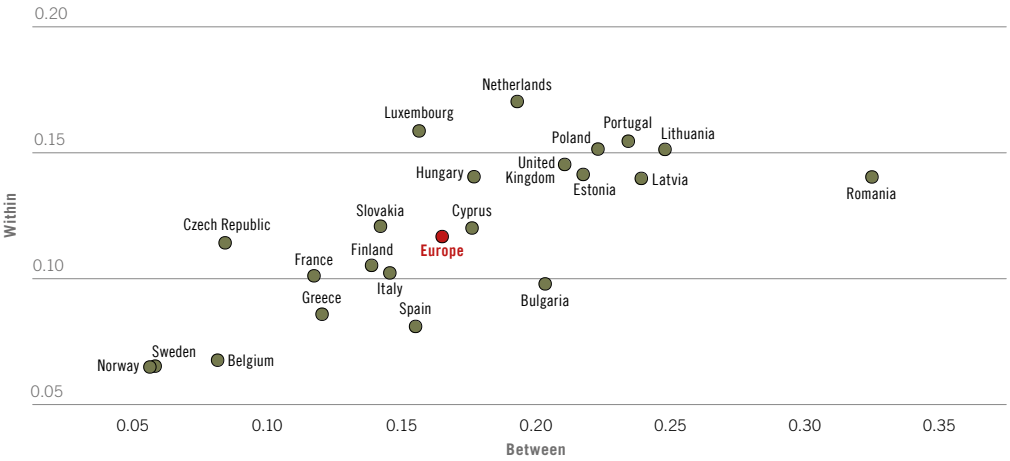
How much of total wage inequality is due to within-enterprise wage inequality and how much is due to wage inequality between enterprises? To answer this question we apply a so-called "variance decomposition", which has been extensively used in the literature to disentangle within- and between-enterprise inequality (see the literature review in box 7 above). The method we use is described in Appendix V. Following this method, we find that, for the 22 economies in Europe in the SES data set, wage inequality declined since 2002, although the decline during the crisis (after 2006) has been substantially higher than that during the pre-crisis period (2002–06). Despite this decline in wage inequality, the relative importance of the within-enterprise component has remained the same compared to that of the between-enterprises component. Across time the total variation due to differences *between* enterprises is slightly above the contribution of that *within* enterprises, but the latter accounts for a substantial share (about 42 per cent) of total wage inequality during this period.

Table 5 Gross hourly wage variation in Europe, within and between establishments, 2002–10

Year	Total wage variance	Within-establishments variance	Between-establishments variance	Residual
2002	0.296 (€86)	0.124	0.172	0.00023
2006	0.291 (€79)	0.135	0.171	–0.01500
2010	0.272 (€65)	0.118	0.165	–0.01100

Note: Estimates are based on real values; base year = 2010. The variance and its components are estimated independently for each country and each year; the numbers in the table show the weighted average among the 22 economies in Europe, the weights taking account of the population representativeness of each country in the database. Estimates are shown in logarithmic scale: the bracketed numbers for the total variance correspond to the equivalent values in euros according to the transformation defined in Appendix V. The same transformation cannot be applied to the within-enterprise, between-enterprises or residual components. The transformation in Appendix V could be applied to the between-enterprises component, but the value in euros generated would not be comparable to the euro value obtained by the transformation for the total variance. For more details, see Appendix V.

Figure 51 Decomposition of variance of hourly wage for 22 economies in Europe, 2010



Note: The estimates show the decomposition of the total variance excluding the residual. Adding the "between" and "within" values for each country independently provides a measure of total variance (excluding the residual). For example, in the case of Belgium, total variance (on the logarithmic scale) amounts to 0.147 where the "between" and "within" components are 0.082 and 0.068, respectively.

Source: ILO estimates based on SES database.

Although table 5 is indicative of the variance in wages and the importance of within-enterprise inequality in overall wage inequality, the estimates present an average across 22 economies that are likely to vary in terms of wage structures. Figure 51, which presents these countries independently, shows an interesting pattern: there is a positive relation between the two components, with higher values of between-enterprise inequality associated with higher values of within-enterprise inequality.

10.6 A parade of wage inequality within and between enterprises

In figure 52 we present a graphic illustration of wage inequality between and within enterprises in Europe. The two figures show inequality in a three-dimensional scale. Common to the two figures, in the horizontal axis we rank enterprises according to the average wages they pay, from lowest to highest; on the depth axis we rank workers in these enterprises according to their wages, from the lowest-paid to the highest-paid; on the vertical axis of panel (A) we see these workers' wage levels, whereas on the vertical axis of panel (B) we see the share of monthly earnings that goes to each of these workers in relation to the total monthly earnings generated at each centile of the enterprise ranking. It is important to bear in mind that the organization of workers and enterprises in panel (B) is also based on hourly wages because this is the common denominator that isolates the earnings of individuals from working time.

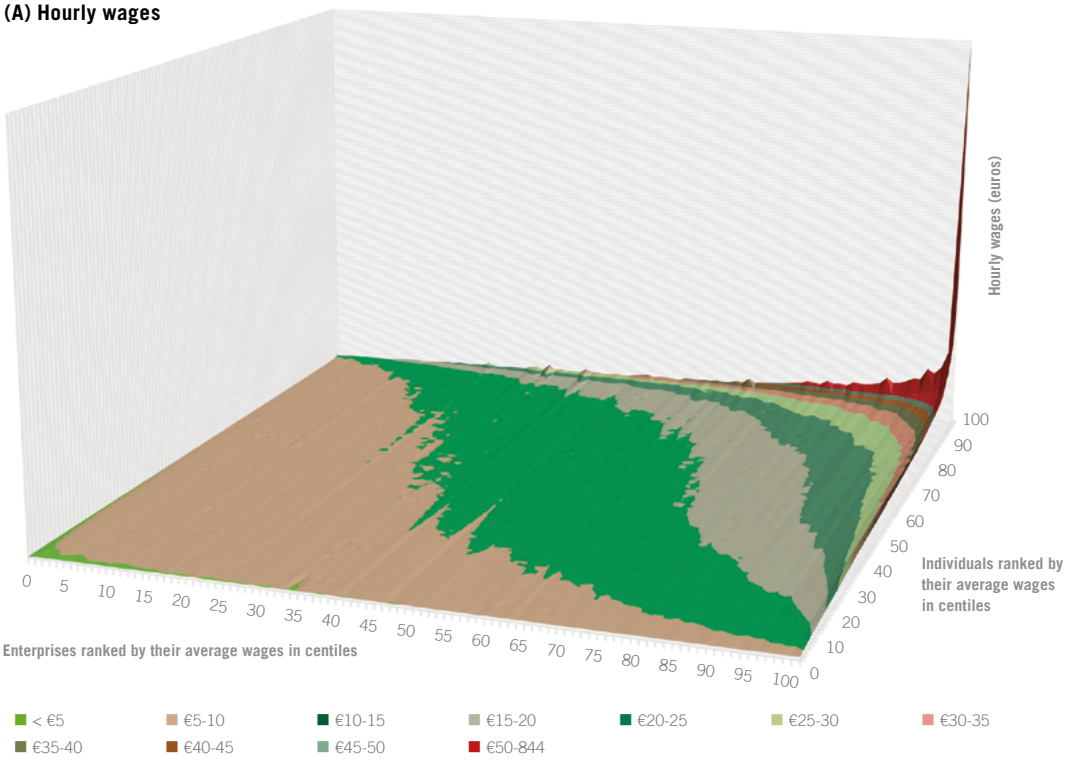
To clarify the reading of these two figures, the two examples that follow will be sufficient: looking at panel (A), we see that among the enterprises with the lowest average wage (first centile), the average wage of the lowest-paid (the bottom 1 per cent) is €2.5 per hour whereas the average wage of the highest-paid in the

same centile is €11.8, i.e., 372 per cent higher than the wage of those at the low end of the wage distribution. If we move to the establishments with the highest average wages (top 1 per cent), we see that the bottom 1 per cent get on average €7.1 per hour and the top 1 per cent get on average €844.2 per hour, i.e. 11,790 per cent more than those at the low end of the wage distribution in the same centile. Looking at panel (B), we observe that among the enterprises with the lowest average wage (first centile), the average share from total earnings generated in these enterprises – in one month – that goes to the lowest-paid (the bottom 1 per cent) is 0.04 per cent, whereas the share of total earnings generated in one month that goes to the highest-paid in the same (enterprise) centile is 2.5 per cent, that is, 62.5 times the share received by the bottom 1 per cent. If we move to establishments with the highest average wages (top 1 per cent) we see that the bottom 1 per cent get 0.01 per cent of all that is generated by these enterprises, whereas the best-paid top 1 per cent among these enterprises get 11.5 per cent of all the monthly income generated by these top enterprises: the latter represents 1,150 times the share received by the bottom 1 per cent in these enterprises at the top.

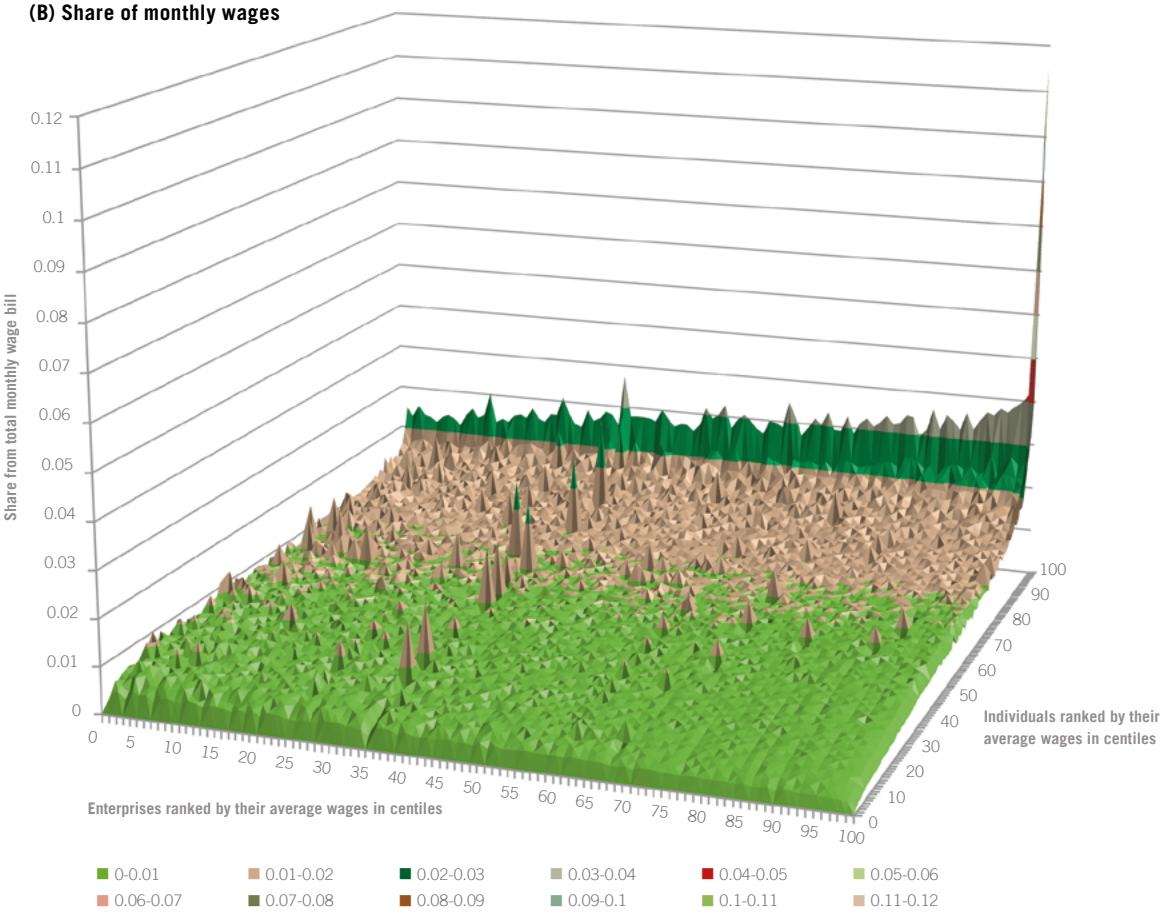
The array of this double distribution shows that there is a large shallow area in this topological representation that reflects the location of individuals who are the very low paid (less than €10 per hour), including most workers in low-paying enterprises; correspondingly, these individuals receive a very low share of all the income generated in a month. Following those that are paid less than €10 per hour, we find half of workers in middle-paying enterprises and a minority of workers in top-paying enterprises. In middle-to-high paying enterprises there is also a large surface where the topology starts to climb but where we have not yet reached the foot of the mountain (€10–30 per hour); this shows that even in enterprises with high average wages, there are many workers who earn no more than most workers in enterprises with mid-range average wages. But most striking is the high mountain peak at the top end of the distribution, i.e., right at the point where the mountain starts to be defined, showing that wages are very unequally distributed and that some establishments are paying extremely high wages to a few individuals. If wage inequality were due mostly to wage inequality between firms, the figure would show a mountain that rises gradually as we move along the centile distribution. Instead, panel (A) shows a relatively flat sea of wage earners in all kinds of enterprises, and a very few who sit on top of this high mountain. Panel (B) shows that once we add working time, inequality in the distribution of the share of the total wage bill is not too different from the pattern observed using hourly wages. However, whereas in panel (A) inequality in hourly wages was less evident among low average wage enterprises – due to the distorting effect of the peak of the mountain as a result of the top 1 per cent at top-paying enterprises – in panel (B) inequality between the top centiles and others – irrespective of the centile location of the enterprise – is now more evident; the share of the top-paid in low-paying enterprises is now located in a rising wall that underlines the growing share of earnings as we move in ascending order towards the top-paid in enterprises with high average wages.

Figure 52 The mountain of wage inequality in Europe, 2010

(A) Hourly wages



(B) Share of monthly wages



Source: ILO estimates based on SES database.

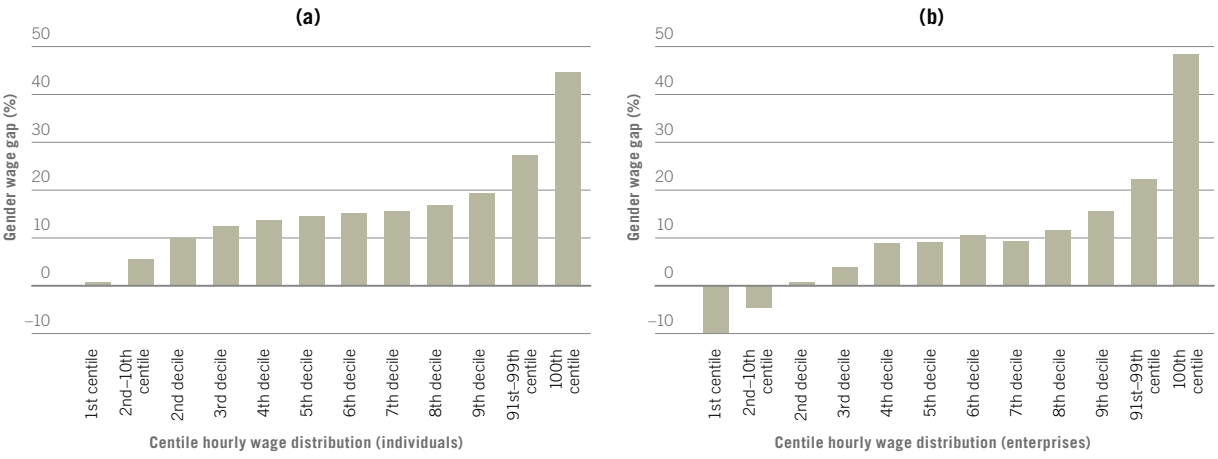
11 Gender pay gaps and the workplace

11.1 Gender pay gaps in the workplace

Reducing the gender pay gap remains a target for most economies in the world (see Part I of this report). While wage differentials between male and female workers have been quantified in a number of countries, less is known about the gender pay gap in relation to enterprises. We use the Eurostat SES database to estimate the gender pay gap between individuals (figure 53(a)) and the average gender pay gap in enterprises ranked in ascending order of average wages (figure 53(b)).[18] Figure 53(a) shows that in the population the gender pay gap is always positive and increases gradually as individuals get higher wages: in the bottom centile the gap is 0.7 per cent, whereas in the top centile it is about 45 per cent. Figure 53(b) shows that the gender pay gap increases with the average wage of enterprises: the higher the average wage, the wider the gender pay gap. This shows that not only is overall wage inequality higher in enterprises with higher average wages, but so is the gender pay gap.

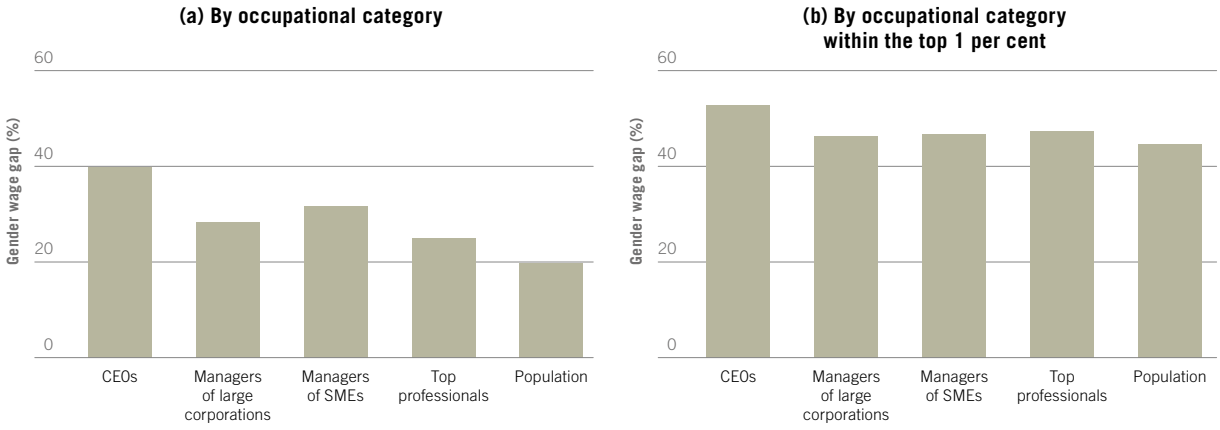
What is the gender pay gap among the highest-paid occupational categories? Figure 54 shows the gender gap for the four highest-paid categories: top professionals, SME managers, managers of large corporations, and CEOs. The gender gap is shown for two groups: in panel (a), for all those that are defined in such occupational categories, and in panel (b) for those categories comprising the top 1 per cent earners in the population. In both cases the figure compares these estimates to the gender gap in the corresponding populations. The figure shows that the gender pay gap is not just larger among the highest-paid occupational categories, but actually increases at the top end of the wage distribution. Thus, the gender gap among CEOs in the population is about 40 per cent – twice as high as the overall gender pay gap, which is about 20 per cent. Within the top 1 per cent, the gender pay gap reaches about 45 per cent overall, and among CEOs in the

Figure 53 The gender wage gap between individuals (a) in the population and (b) in the enterprise, 2010



Source: ILO estimates based on SES database; estimates show the weighted average for 22 countries and latest year (2010).

Figure 54 The gender wage gap among the top occupational categories and among the top 1 per cent of earners (hourly wages, 2010)



Source: ILO estimates based on SES database.

top 1 per cent it amounts to more than 50 per cent. In other words, within the top 1 per cent, male CEOs earn twice as much as their female counterparts.

Not only are women paid less, but as shown in table 6, there are also fewer women in highly paid occupations. Despite the approximately equal gender representation among wage earners (52 per cent males, 48 per cent females), the representation of males in the category of CEOs and managers of large corporations and of SMEs is 16.2 per cent, that is, twice as high as that of females (8 per cent). Moreover, if we focus on the top centile (the top 1 per cent), we can observe that in this segment of the population 51.4 per cent occupy top managerial positions, but that only 41 per cent of females in this top 1 per cent hold such positions, as opposed to 72 per cent of males in the top 1 per cent.

Table 6 Distribution of managerial positions in the population, Europe, averages for 2010

	Population (100%)	Males (52.1%)	Females (47.9%)
In the population:			
%, managers of SMES	1.9	2.1	1.7
%, managers of large corporations	3.9	5.1	2.7
%, Chief Executive Officers (CEOs)	6.4	9.0	3.6
TOTAL	**12.3**	**16.2**	**8.0**
In the top centile of individuals hourly wage distribution:			
%, managers of SMEs	6.8	25.6	6.1
%, managers of large corporations	32.6	33.7	26.8
%, Chief Executive Officers (CEOs)	12.0	12.9	8.2
TOTAL	**51.4**	**72.2**	**41.1**

Notes: The occupational skill category is based on the ISCO-88 classification. CEOs are classified as ISCO 121 (directors and chief executive officers); managers of large corporations are classified as ISCO 122 and 123 (corporate managers except CEOs and those of small and medium-sized enterprises); managers of SMEs are those classified as ISCO 13 (managers of smaller enterprises). We have excluded from our calculations ISCO 11 (that is, legislators and senior government officials or senior officials of specialized organizations).

Source: Estimates based on Eurostat, SES.

11.2 At what age does the gender pay gap appear?

It is well known that younger workers are often paid less than older workers. To a large extent this could be explained by differences in experience and tenure. But does gender also play a role in the determination of wages among younger workers in the population? Figure 55 compares the gender wage gap between age groups, again based on the weighted average of the 22 European countries used as our sample throughout the report. What the figure shows is that the gender gap is present from an early stage in labour market participation, but is higher for workers in categories above the age of 40. Thus, in Europe, on average, male wage employees aged 19 and below earn about 10 per cent more than female wage employees in the same age group; the panels in figure 55 further show that the youth gender gap is relatively common among countries that make up the average in Europe, although in some countries the gap does not exist or is negative (e.g. Norway) whereas in some others the gender youth gap is clearly above the European average (e.g. the United Kingdom).

Figure 55 Gender wage gap by age among wage employees, hourly wage distribution (real terms, base year = 2010)

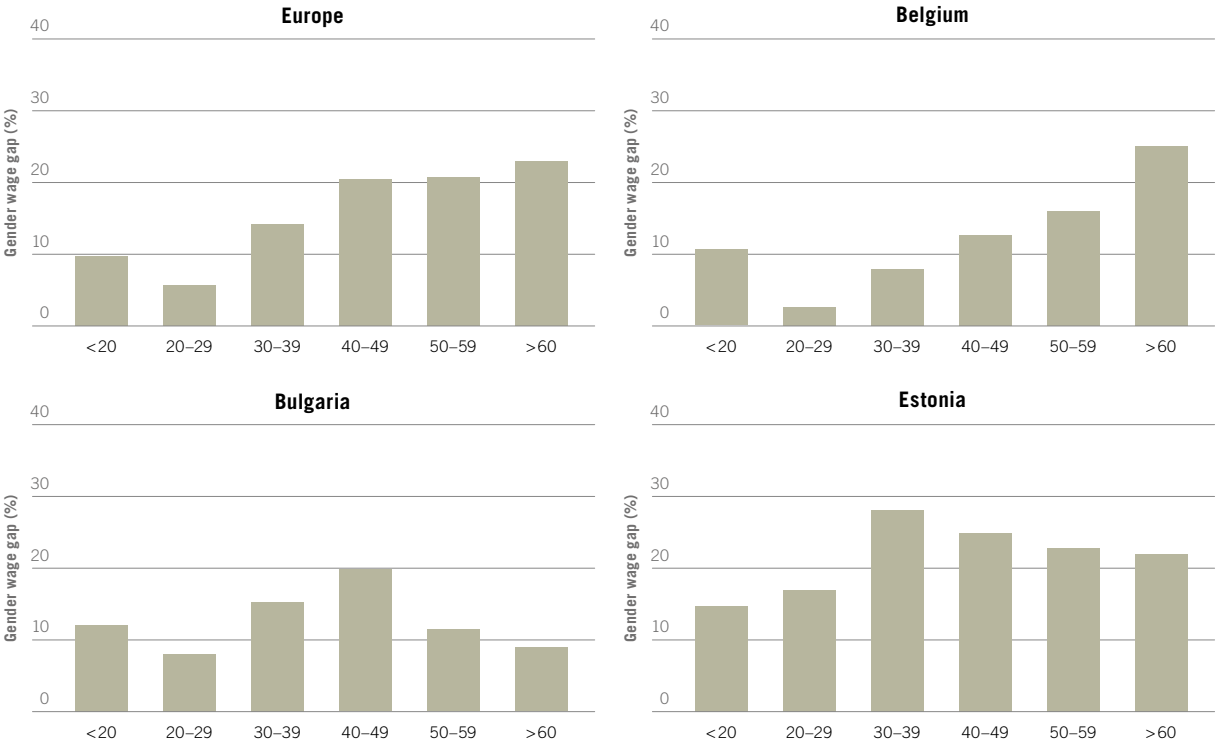
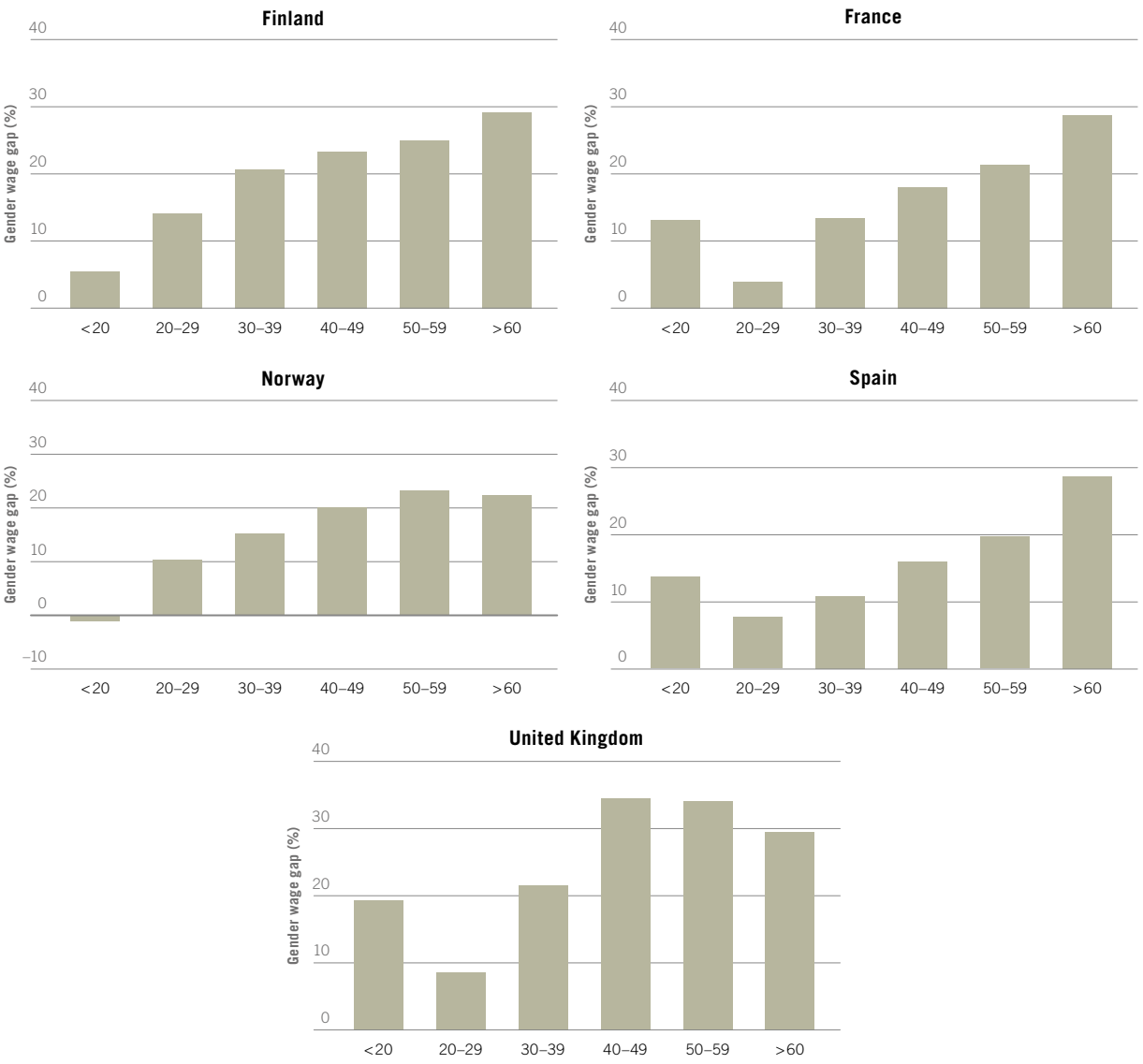


Figure 55 (cont.)



Note: Estimates show weighted averages for 22 European countries for 2010.

Source: ILO estimates based on SES database.

PART III Summary and conclusions

12 The importance of global-level policy coordination

Part I of this year's *Global Wage Report* shows that after the financial crisis global wage growth started to recover in 2010, but has decelerated since 2012, falling in 2015 to its lowest level in four years. During most of the post-crisis period global wage growth was driven to a large degree by relatively strong wage growth in developing countries in Asia and the Pacific, most notably in China, and also in some other developing countries and regions. More recently, this trend has slowed or reversed, with wages declining in Latin America and the Caribbean and in Eastern Europe, and slowing in Central and Western Asia, Africa and the Arab States. In developed economies, there was higher wage growth. But the wage recovery in some countries – including the United States and Germany – was not sufficient to offset the decline in emerging and developing countries, with the result that wage stagnation continues to characterize the global economy as a whole. The report also shows that, after some expected countercyclical upward movement in the labour share in many countries during the years 2007–10, the labour share has resumed its long-term decline in a majority of countries during the period 2010–15. Exceptions include China, Germany and the United States, but even in these countries there is a long way to go to reverse the long-term decline.

Stagnating average wages and declining labour shares have both social and economic consequences. On the social side, the disconnect between economic growth and wage growth means that workers and their families do not perceive that they receive a just share of the fruits of economic progress, potentially fuelling frustration. On the economic side, higher profit shares in developed economies often did not lead to more investment (ILO and OECD, 2015), while low wage growth dampened household consumption, which can reduce aggregate demand, particularly when wages stagnate in many large economies at the same time. In this respect, higher wage growth in Germany and the United States in 2015 has had positive economic effects beyond the borders of these countries. Where economically feasible, higher wage growth should be sustained or further encouraged. Of course, this cannot be the case in every single country, as in some countries higher wage growth may increase labour costs in a way that is not sustainable for enterprises, and may result in significant reductions in exports or investment. Differentiated country-specific approaches are thus needed.

In the present context, global-level policy coordination remains important to avoid the simultaneous pursuit by too many countries of wage moderation policies or competitive wage cuts with a view to increasing exports. If such policies are pursued simultaneously in too many countries, this could lead to a decline in regional or global aggregate demand and deflation. The inclusion of wage policies on the

agenda of recent G20 meetings has been a positive development. In 2016 the G20 called for the implementation of macroeconomic policies to achieve substantial wage and productivity growth, and for sustainable wage policy principles in which strengthened labour market institutions and policies – such as minimum wages and collective bargaining – can help wage increases to better reflect improvements in productivity growth. This followed the detailed *Policy priorities on labour income shares and inequality* upon which the G20 agreed in 2015[19] and which also identified excessive wage inequality as both a social and an economic risk.

13 Possible country-specific measures to reduce excessive wage inequality

What can be done to reduce excessive wage inequality? Part II of this year's report provides new evidence on the subject of wage inequality by showing that wages and wage inequality are determined not only by the skills-related characteristics of individuals (such as level of education, age or tenure) but also by wage inequality *between* enterprises and *within* enterprises. This approach highlights the fact that reducing wage inequality requires not only building up the skills of workers, but also the introduction of measures that can reduce both the inequality in average wages between enterprises and wage inequality within enterprises. In the following paragraphs we discuss some of the possible options, and how they may affect inequality between and within enterprises.

13.1 Minimum wages and collective bargaining

Minimum wages and collective bargaining have the potential to simultaneously reduce inequality between and within enterprises. The experience in Brazil, for example, shows that a minimum wage can compress wages within the lowest-paying enterprises, hence reducing within-enterprise inequality; but at the same time, by raising the lowest-paying enterprises' average pay, it also leads to some convergence in between-enterprise pay (Alvarez et al., 2016; Engbom and Moser, 2016). Collective bargaining can similarly help in reducing wage inequality within and between enterprises in much the same way. But the literature shows that differences in the way that collective bargaining is organized have different effects.[20] When collective bargaining takes place at the national, industry and/or branch level in multi-employer settings with coordination across levels, a larger proportion of workers are covered and inequality is likely to be reduced both within and between enterprises. The extension of collective agreements by governments to all workers in a particular sector or country can reinforce these effects. When the collective bargaining system is narrow, taking place at the company or workplace level, the effect is restricted to wage inequality within enterprises. It is thus not surprising that wage inequality tends to be lower in countries with an inclusive system of collective bargaining (Alvarez et al., 2016; Engbom and Moser, 2016).

The ILO has international labour standards on minimum wages and collective bargaining,[21] and has recently published policy guides on both subjects (ILO, 2015d and 2016e). With regard to minimum wages, some of the main dimensions of policy design include ensuring broad legal coverage; the full consultation or direct participation of social partners; setting and adjusting the level in a way that takes into account the needs of workers and their families as well as economic factors, including maintaining a high level of employment; and taking appropriate measures for effective application. With regard to collective bargaining, the Right to Organise and Collective Bargaining Convention, 1949 (No. 98), sets out the fundamental principles that allow for the effective recognition of the right to collective bargaining. This is complemented by the Collective Bargaining Convention, 1981 (No. 154), the aim of which is to promote collective bargaining that is voluntary and undertaken by parties that represent free and independent organizations. While collective bargaining is a voluntary process, countries need to establish an enabling framework within which it can be encouraged and promoted, both through legislation and through the creation of supporting institutions. ILO policy guides also point to the complementarity of minimum wages and collective bargaining as policy tools, both having roles in addressing particular aspects of wage stagnation and wage inequality in different countries.

New proposals and initiatives have also been taken in recent years to address the growing inequality between enterprises, particularly between buyers and their subcontractors (see Weil, 2014; Song et al., 2015), aimed at ensuring that all parts of the supply chain are included in collective bargaining agreements. At international level, some enterprises have recognized the difficulty of raising wages on an enterprise-by-enterprise basis in a competitive environment where buyers can shop for the lowest prices. One interesting initiative in this respect is the decision of some major global brands to start a joint initiative with manufacturers and trade unions to promote multi-employer industry-wide collective bargaining in garment-producing countries.[22]

13.2 Top salaries: Enterprise self-regulation or more regulation?

Given the magnitude of wage inequality within enterprises documented in this report, it is clear that enterprises have their own role to play in self-regulating to keep wage inequality within socially acceptable bounds. Enterprises play an important role in society and therefore should not only be accountable to their shareholders but also take into account the larger impact they may have on social inequality and cohesion.

It has been pointed out that, in an ideal world, excessive executive remuneration could be corrected by the actions of a critical mass of ethical and accountable executives, who could demonstrate values of responsibility and fairness (Massie, Collier and Crotty, 2014). Perhaps more realistically, enterprises can take action on fair remuneration through their company-level compensation policies. Both workers' and employers' organizations have an important role to play in this respect. The presence of worker representatives in enterprise-level remuneration committees could help in this regard. Social partners could also

issue recommendations on compensation policy to their members. In France, for example, two employers' organizations jointly published a set of recommendations on codes of practice as well as the remuneration of managers of companies listed on the stock exchange (AFEP, 2008 and 2013). Corporate social responsibility (CSR) initiatives may also help in this domain. Such tools can contribute to a socially responsible business culture. The ILO, in its *Conclusions concerning the promotion of sustainable enterprises*, considers that "sustainable enterprises engage in social dialogue and good industrial relations, such as collective bargaining and workers information, consultation and participation. These are effective instruments to create win-win situations, as they promote shared values, trust and co-operation, and socially responsible behaviour" (ILO, 2007, p. 5).

In practice, however, it seems that many CEOs effectively determine their own pay, and shareholders have been unable to ensure fair executive remuneration in line with social values or even with company performance. This has led to legislative action in some countries to strengthen transparency on remuneration and shareholders' "say over pay", including by making shareholder recommendations binding in some cases. Obligation to disclose remuneration could be expanded to top earners beyond CEOs and also to non-listed enterprises. At the same time, it must be recognized that shareholders may have an interest in supporting CEO pay packages designed to maximize shareholder value rather than long-term corporate performance. This raises the question whether more regulation is necessary to discourage such compensation packages. Some governments and political actors have recently suggested stronger measures in this direction, in response to popular reaction against inequality and perceived unfairness in economic systems (see May, 2016).

13.3 Productivity growth for sustainable enterprises

Given that differences in average wages between enterprises are also an important determinant of overall wage inequality, promoting productivity growth among sustainable enterprises may simultaneously permit higher average wages and reduce wage inequality. There need not be a trade-off between growth and inequality. Policies that lead to convergence in the firm productivity distribution can be expected to also help to close the pay gap among workers. These may include, for example, industrial policies promoting employment and productivity growth of small and medium-sized enterprises, or investment in innovation that improves product quality. In developing countries, structural transformation from low-productivity to high-productivity sectors may play an important role in this respect. This usually requires and also fosters an accumulation of skills and eventually a growing supply of more educated workers. Governments can facilitate these developments through quality public education, skills-training programmes and job-matching services. A growing supply of higher-skilled workers may also push up the wages of low-skilled relative to more skilled workers and thus reduce inequality.

Yet the proposition that policies leading to productivity gains among the lowest-paying enterprises also lead to wage increases at the bottom of the

distribution, thereby closing the income gap, remains a hypothesis with little empirical evidence to support it. If growing inequality between enterprises is due to polarization and outsourcing, there may be little scope for improving productivity at the low value added segment. There are also examples in global supply chains which show that productivity improvements in enterprises which produce, say, garments in developing countries translate into lower prices for buyers rather than higher wages for employees. Thus, higher productivity in low-paying enterprises may need to be accompanied by stronger wage policies and collective bargaining mechanisms.

More generally, the 2007 ILO *Conclusions concerning the promotion of sustainable enterprises* recognize that inequality and discrimination are incompatible with sustainable enterprise development, and emphasize the importance of an environment that is conducive to the creation and growth or transformation of enterprises on a sustainable basis. Such an enabling environment combines the legitimate quest for profit, which is one of the key drivers of economic growth, with the need for development that respects human dignity, environmental sustainability and decent work. A large array of factors come into play here, including peace and political stability, good governance, social dialogue, respect for human rights and international labour standards, stable macroeconomic policy, the development of an entrepreneurial culture, an enabling legal and regulatory environment, access to financial services, information and communication technologies, and physical infrastructure (ILO, 2007).

13.4 Gender and other pay gaps

Gender pay gaps – differences in average wages between men and women – remain a global concern. This report has highlighted the fact that although gender pay gaps occur in all types of enterprises, they are particularly large among enterprises with high average wages. This suggests that enterprise-level job evaluations remain an essential complement to legislation guaranteeing the right to equal wages for work of equal value, effective enforcement of this right by governments, and effective access to justice for workers to claim this right. Measures to keep CEO pay within certain boundaries (as discussed above) are also likely to narrow the wide pay gap between men and women CEOs documented in the report (see also ILO, 2015a, pp. 60–61).

In addition, labour market institutions and wage policies will be truly effective in reducing inequality (as discussed above) only if they include and protect groups that are vulnerable, disadvantaged or subject to discrimination. For example, if laws set lower wages for sectors or occupations primarily held by women, or exclude migrants from coverage of minimum wage laws, these groups will continue to suffer from inequality and in addition there will be downward pressure on all wages, especially at lower and middle wage ranges. This point takes on new relevance in the context of the current intense debates over employment and wages for migrant and refugee workers. The pay gaps between workers in the formal and informal economies can be reduced by policies that facilitate the transition from informal to formal for both workers and enterprises.

14 Other measures to reduce inequality

The measures just discussed are not, of course, the full story of how inequality can be reduced. In this regard it is worth recalling that the *Global Wage Report* is published every two years and that the previous report examined the relationship between wages, household incomes and broader inequality, and also probed the impact of gender, migrant status and the informal economy on wages and inequality. The report showed empirically that wage trends and opportunities for wage employment have an important impact on household income inequality. This suggested that efforts to reduce income inequality through education, progressive taxation, social transfers and other means should be complemented by policies that promote decent jobs. The most recent World Bank report comes to a similar conclusion, emphasizing "the importance of labour markets in translating economic growth into inequality reduction by increasing job opportunities and earnings" (World Bank, 2016, p. 2). Because policy areas addressed in the previous *Global Wage Report* continue to remain relevant, we briefly highlight some of them here.

14.1 Fiscal policies: Taxes and transfers

Fiscal policies, in the form of taxes and transfers, are needed to address overall income inequality (ILO, 2015a, pp. 63–64). In many developed economies taxation systems have become less progressive in recent years, amplifying the inequality found in the labour market. Reforms that address corporate and individual tax avoidance and targeted tax relief for low-income households can restore some of the lost progressivity to tax systems. Tax avoidance has recently become a major issue in many national policy debates, suggesting that the time may be right for such reforms. It is also essential that fiscal policy tackles inequality through transfers where payments are made to lower-income households directly as cash, or in the form of public employment opportunities, employment guarantees, or subsidized food or production inputs. Public pensions, education and health care are also powerful tools to reduce inequality in the present and future (ILO, 2014b).

Steeper and more progressive income taxes are also sometimes seen as a way to contribute to lower executive pay, reducing incentives for CEOs to demand compensation exceeding a certain threshold. Many strategies are currently used for tax avoidance, such as the delocalization of corporate offices or exploitation of the various gaps in national taxation legislation. However, public knowledge of and reaction to recent revelations about executive pay and tax avoidance may begin to limit the viability of these strategies. Levels of taxation on capital income and corporate activity should perhaps also be examined in light of the social objective of reducing inequality. One measure worth exploring may be the capping of tax deductions that companies are able to make when paying wages above a certain threshold (expressed, for instance, in multiples of the minimum wages in the company), so that the public does not subsidize abnormally high remuneration as a

result of the burden being shifted to average taxpayers. These avenues for using taxation to address high corporate compensation illustrate the complexity of tax policy and also the interaction of existing policies, which often provide privileges that increase inequality.

14.2 Policies that affect wages and wage distribution indirectly

Policies that affect wages and wage distribution indirectly are important elements of a comprehensive response. These include access to quality education, sustained programmes to improve the skills of the workforce, and better matching between jobseekers and jobs. They also include policies to address wage differentials often incurred by workers in non-standard forms of employment (particularly temporary and temporary agency workers), which are on the rise in many industrialized countries and tend to grow in developing countries in segments of the labour market previously associated with standard jobs. Measures to be adopted should seek to extend to workers in non-standard forms of employment protections that are enjoyed by workers in "standard" arrangements as well as better aligning the protections available under different employment arrangements. This would lead to the implementation of the principle of equality of treatment between workers, avoiding discrimination based on occupational status as well as reducing indirect gender-based discrimination and ensuring that employers do not make use of non-standard work only with the aim of lowering labour costs by offering worse remuneration and working conditions to particular groups of workers (ILO, 2016b).

When governments and social partners debate the ways to combat increasing inequality, it is important to remember that the dramatic increases that have occurred within the labour market and at enterprise level place a heavier burden on efforts to address inequality through taxes and transfers. This is taking place at a time when taxation systems in many countries have become less progressive and the ability of governments to collect taxes has been challenged by tax avoidance and cross-border profit-shifting strategies. This suggests that inequality will be effectively addressed only when it is tackled both through ambitious labour market and social policies that have a direct effect on wage inequality and through redistributive measures outside the labour market. More vigorous and ambitious action is clearly needed to implement wage policies at all levels that ensure a just share of the fruits of progress to all.

Appendix I

Global wage trends: Methodological issues

The methodology to estimate global and regional wage trends was developed by the ILO's Inclusive Labour Markets, Labour Relations and Working Conditions Branch (INWORK)[23] for the previous editions of the *Global Wage Report* in collaboration with the Department of Statistics, following proposals formulated by an ILO consultant and three peer reviews conducted by four independent experts.[24] This appendix describes the methodology adopted as a result of this process.

Concepts and definitions

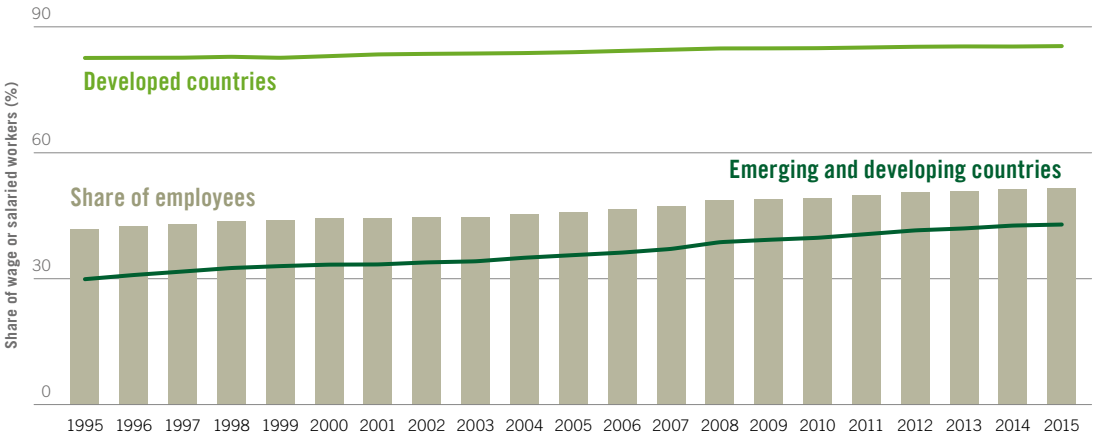
According to the international classification of status in employment (ICSE-93), "employees" are workers who hold "paid employment jobs", i.e. jobs in which the basic remuneration is not directly dependent on the revenue of the employer. Employees include regular employees, workers in short-term employment, casual workers, outworkers, seasonal workers and other categories of workers holding paid employment jobs (ILO, 1993).

As economies advance in terms of economic development, the proportion of workers who become wage employees increases: this is because own-account workers find better opportunities as wage employees. Female labour force participation also tends to be positively related to economic development. As a result, wage trends are affecting an increasing share of the employed population across the world. At the same time, not all people who work are paid employees. Particularly in developing countries, many are self-employed or are contributing to family businesses. Such workers receive an income from their work, but not a wage from an employer.

Figure A1 shows that the share of paid employees (or wage employees) has experienced an increase of about 10 percentage points during the last 20 years, rising from 41.8 per cent in 1995 to 51.6 per cent in 2015. In developed countries, where the incidence of own-account workers is relatively low and female participation is higher, the percentage of wage employees relative to the working population has remained high and stable during the observed period. Consequently, the global increase is driven mostly by emerging and developing countries, which have seen a 13 percentage point increase (from 29.9 per cent to 42.9 per cent) in wage employees in the two decades since 1995.

The word "wage" refers to total gross remuneration including regular bonuses received by employees during a specified period of time for time worked as well as time not worked, such as paid annual leave and paid sick leave. Essentially, it corresponds to the concept of "total cash remuneration", which is the major component

Figure A1 Share of paid employees in total employment, 1995–2015



Note: Country groups are those used by the ILO.
Source: ILO, 2015c.

Box A1 What are wages?

Wherever possible, in this report wages are defined according to the ILO definition of earnings adopted by the 12th International Conference of Labour Statisticians (ILO, 1973). They include:

(1) Direct wages and salaries for time worked, or work done. They cover: (i) straight-time pay of time-rated workers; (ii) incentive pay of time-rated workers; (iii) earnings of piece-workers (excluding overtime premiums); (iv) premium pay for overtime, shift, night and holiday work; and (v) commissions paid to sales and other personnel. Included are: premiums for seniority and special skills; geographical zone differentials; responsibility premiums; dirt, danger and discomfort allowances; payments under guaranteed wage systems; cost-of-living allowances; and other allowances.

(2) Remuneration for time not worked comprises: direct payments to employees in respect of public holidays, annual vacations, and other time off with pay granted by the employer.

(3) Bonuses and gratuities cover: seasonal and end-of-year bonuses; additional payments in respect of vacation periods (supplementary to normal pay); and profit-sharing bonuses. Earnings include cash earnings and in-kind payments, but the two should be distinguished from each other.

There are also related concepts which are broader. For example, labour cost includes earnings, but it also includes other elements such as: food, drink, fuel and other payments in kind, and cost of workers' housing borne by employers; employers' social security expenditure; cost of vocational training; cost of welfare services (e.g. canteen, recreational facilities); labour costs not classified elsewhere (e.g. cost of work clothes); and taxes regarded as labour cost (e.g. taxes on employment or payrolls). For a detailed description of these elements, see ILO, 1966.

Source: ILO, 1973.

of income related to paid employment (ILO, 1998). It excludes employers' social security contributions.

Wages, in the present context, refer to real average monthly wages of employees. Wherever possible, we collected data that refer to all employees (rather than to a subset, such as employees in manufacturing or full-time employees).[25] To adjust for the influence of price changes over different time periods, wages are measured in real terms, i.e. the nominal wage data are adjusted for consumer price inflation in the respective country.[26] Real wage growth refers to the year-on-year change in real average monthly wages of all employees.

Census approach

The methodology used for the global and regional estimates is a census method with non-response. In the census approach, the objective is to find wage data for all countries and to develop an explicit treatment in the case of total non-response (see "Treatment of total non-response", below). We have tried to collect wage data for a total of 191 countries and territories, grouped into six separate regions.[27] To enable easier comparison with regional employment trends, our regional groupings are compatible with those used in the ILO's *Global Employment Trends* Model (GET Model) (see Appendix II, tables A2 and A3). Tables A4 and A5 indicate global and regional coverage (see Appendix III).

Treatment of item non-response

In some countries for which we found data, the statistical series were incomplete, in the sense that data for some years were missing. Table A5 provides coverage information for each year from 2007 to 2015. As expected, the coverage of the database becomes lower for the most recent years since some statistical offices are still processing these data.

While the coverage in the most recent year is good in the developed economies and in Eastern Europe and Central Asia, in other regions, such as the Arab States and Africa, it is less so. For this reason, regional growth rates are flagged as "provisional estimates" when they are based on coverage which is less than 100 per cent and to draw attention to the fact that they might be revised once more data become available.

To address this kind of item non-response (i.e. gaps in the spread of countries for which we have data) a "model-based framework" is used to predict missing values.[28] This is necessary in order to hold the set of responding countries constant over time and so avoid the undesired effects associated with an unstable sample. Several complementary approaches were used, depending on the nature of the missing data points; these are described in detail in Appendix I of the 2010/11 edition of the *Global Wage Report* (ILO, 2010a).

Treatment of total non-response

Response weights

To adjust for total non-response (when no time series wage data are available for a given country), a "design-based framework" was used in which non-response was considered as a sampling problem. Because non-responding countries may have wage characteristics that differ from those of responding countries, non-response may introduce a bias into the final estimates. A standard approach to reduce the adverse effect of non-response is to calculate the propensity of response of different countries and then weight the data from responding countries by the inverse of their response propensity.[29] This implies that no imputations are made for non-responding countries.

In this framework, each country responds with a probability φ_j and it is assumed that countries respond independently of each other (Poisson sampling design). With the probabilities of response, φ_j, it is then possible to estimate the total, Y, of any variable y_j:

$$Y=\sum_{j\in U} y_j \tag{1}$$

by the estimator

$$\hat{Y}=\sum_{j\in R} \frac{y_j}{\phi_j} \tag{2}$$

where U is the population and R is the set of respondents. This estimator is unbiased if the assumptions are true (see Tillé, 2001). In our case, U is the universe of all countries and territories listed in table A2 and R is those "responding" countries for which we could find time series wage data.

The difficulty, however, is that the response propensity of country j, φ_j, is generally not known and must itself be estimated. Many methods are available in the literature to estimate the response propensity (see e.g. Tillé, 2001). In our case, the response propensity was estimated by relating the response or non-response of a given country to its number of employees and its labour productivity (or GDP per person employed in 2007 US$PPP). This is based on the observation that wage statistics are more readily available for richer and larger countries than for poorer and smaller countries. The number of employees and labour productivity are used since these variables are also used for calibration and size weighting (see below).[30]

For this purpose, we estimated a logistic regression with fixed effects as follows:

$$prob(response) = \Lambda(\alpha_h + \beta_1 x_{j2007} + \beta_2 n_{j2007}) \tag{3}$$

where x_{j2007} is ln(GDP per person employed in 2007 US$PPP) of country j in the year 2007, n_{j2007} is ln(number of employees) in 2007, and Λ denotes the logistic cumulative distribution function (CDF).[31] The year 2007 is chosen because it is the midpoint between 1999 and 2015. The fixed effects, α_h, are dummies for each of the regions with incomplete data (Asia and the Pacific, Latin America and the Caribbean, Arab States, Africa), while the two remaining regions with complete data form the omitted benchmark category. The logistic regression had a universe

of $N = 191$ cases and produced a pseudo $R^2 = 0.399$. The estimated parameters were then used to calculate the propensity of response of country j, φ_j.

The response weight for country j, ϕ_j, is then given by the inverse of a country's response propensity:

$$\phi_j = \frac{1}{\varphi_j} \tag{4}$$

Calibration factors

The final adjustment process, generally called calibration (Särndal and Deville, 1992), is undertaken to ensure consistency of the estimate with known aggregates. This procedure ensures appropriate representation of the different regions in the final global estimate. In the present context, a single variable "number of employees", n, in a given year t was considered for calibration. In this simple case, the calibration factors, γ_{jt}, are given by

$$\gamma_{jt} = \frac{n_{ht}}{\hat{n}_{ht}}, j \in h \tag{5}$$

where h represents the region to which country j belongs, n_{ht} is the known number of employees in that region in year t, and $\hat{n}_{ht}$ is an estimate of total number of employees in the region and the same year, obtained as a sum product of the uncalibrated weights and the employment data from the responding countries within each region.[32]

The resulting calibration factors for the year 2015 were 1.00 (Europe and Central Asia), 0.98 (Asia and Pacific), 0.99 (Americas), 1.16 (Africa) and 1.14 (Arab States). Since all calibration factors are either equal to or very close to 1, these results show that estimates $\hat{n}_{ht}$ were already very close to the known number of employees, n_{ht}, in each region. Note the calibration process was repeated for each year so that the weight of each region in the global estimate changes over time in proportion to its approximate share in the global wage bill.

Calibrated response weights

The calibrated response weights, ϕ'_{jt}, are then obtained by multiplying the initial response weight with the calibration factor:

$$\phi'_{jt} = \phi_j \times \gamma_{jt} \tag{6}$$

The regional estimate of the number of employees based on the calibrated response weights is equal to the known total number of employees in that region in a given year. Thus, the calibrated response weights adjust for differences in non-response between regions. The calibrated response weights are equal to 1 in the regions where wage data were available for all countries (developed economies; Eastern Europe and Central Asia). They are larger than 1 for small countries and countries with lower labour productivity since these are under-represented among responding countries.

Estimating global and regional trends

One intuitive way to think of a global (or regional) wage trend is in terms of the evolution of the world's (or a region's) average wage. This would be in line with the concept used for other well-known estimates, such as regional GDP per capita growth (published by the World Bank) or the change in labour productivity (or GDP per person employed).

The global average wage, $\bar{y}_t$, at the point in time t can be obtained by dividing the sum of the national wage bills by the global number of employees:

$$\bar{y}_t = \frac{\sum_j n_{jt} \times \bar{y}_{jt}}{\sum_j n_{jt}} \tag{7}$$

where n_{jt} is the number of employees in county j and $\bar{y}_{jt}$ is the corresponding average wage of employees in country j, both at time t.

The same can be repeated for the preceding time period $t+1$ to obtain $\bar{y}^*_{t+1}$, using the deflated wages $\bar{y}^*_{jt+1}$ and the number of employees n_{t+1}. It is then straightforward to calculate the growth rate of the global average wage, r.

However, while this is a conceptually appealing way to estimate global wage trends, it involves some difficulties that we cannot at present overcome. In particular, aggregating national wages, as done in equation (7), requires them to be converted into a common currency, such as US$PPP. This conversion would make the estimates sensitive to revisions in PPP conversion factors. It would also require that national wage statistics be harmonized to a single concept of wages in order to make the level strictly comparable.[33]

More importantly, the change in the global average wage would also be influenced by composition effects that occur when the share of employees shifts between countries. For instance, if the number of paid employees falls in a country with high wages but expands (or stays constant) in a country of similar size with low wages, this would result in a fall of the global average wage (when wage levels stay constant in all countries). This effect makes changes in the global average wage difficult to interpret, as one would have to differentiate which part is due to changes in national average wages and which part is due to composition effects.

We therefore gave preference to an alternative specification to calculate global wage trends that maintains the intuitive appeal of the concept presented above but avoids its practical challenges. To ease interpretation, we also want to exclude effects that are due to changes in the composition of the world's employee population. We therefore avoid the danger of producing a statistical artefact of falling global average wages that could be caused by a shift in employment to low-wage countries (even when wages within countries are actually growing).

When the number of employees in each country is held constant, the global wage growth rate can be expressed as a weighted average of the wage growth rates in the individual countries:

$$r_t = \sum_j w_{jt} \times r_{jt} \tag{8}$$

where r_{jt} is wage growth in country j at point in time t and the country weight, w_{jt}, is the share of country j in the global wage bill, as given by:

$$w_{jt} = n_{jt} \times \bar{y}_{jt} / \sum_j n_{jt} \times \bar{y}_{jt} \tag{9}$$

While we have data for the number of employees, n_{jt}, in all countries and relevant points in time from the ILO's *Global Employment Trends* Model, we cannot estimate equation (9) directly since our wage data are not in a common currency. However, we can again draw on standard economic theory which suggests that average wages vary roughly in line with labour productivity across countries.[34] We can thus estimate $\bar{y}_j$ as a fixed proportion of labour productivity, *LP*:

$$\hat{\bar{y}}_{jt} = \alpha \times LP_{jt} \tag{10}$$

where α is the average ratio of wages over labour productivity. We can therefore estimate the weight as

$$\hat{w}_{jt} = n_{jt} \times \alpha \times LP_{jt} / \sum_j n_{jt} \times \alpha \times LP_{jt} \tag{11}$$

which is equal to

$$\hat{w}_{jt} = n_{jt} \times LP_{jt} / \sum_j n_{jt} \times LP_{jt} \tag{12}$$

Substituting $\hat{w}_{jt}$ for w_{jt} and introducing the calibrated response weight, ϕ'_j, into equation (8) gives us the final equation used to estimate global wage growth:

$$r_t = \frac{\sum_j \varphi'_j \times \hat{w}_{jt} \times r_{jt}}{\sum_j \varphi'_j \times \hat{w}_{jt}} \tag{13}$$

and for regional wage growth:

$$r_{ht} = \frac{\sum_j \varphi'_j \times \hat{w}_{jt} \times r_{jt}}{\sum_j \varphi'_j \times \hat{w}_{jt}}, j \in h \tag{13'}$$

where h is the region to which country j belongs. As can be seen from equations (13) and (13'), global and regional wage growth rates are the weighted averages of the national wage trends, where ϕ'_j corrects for differences in response propensities between countries.

Differences in global and regional estimates between editions of the *Global Wage Report*

Since 2010, when the publication of regional and global wage growth estimates using the methodology outlined above began, there have been slight revisions to the historical estimates. While these revisions are relatively minor in some regions, such as the developed economies and Eastern Europe and Central Asia, they are more frequent and sometimes substantial in others. The revisions to regional estimates can be explained by several factors, briefly highlighted here.

- **Improvements and revisions to surveys which collect wage data.** Improvements and revisions to existing wage data and surveys often occur. They may include a change in the geographical coverage (e.g. from urban to national), a change in sector coverage (e.g. from manufacturing to all sectors), a change in employee coverage (e.g. from full-time employees only to all employees), etc. To the extent

that these changes influence the growth in wages they may also influence the regional estimate.

- **Exclusions.** In Latin America, Argentina has been excluded since the 2012 edition of the *Global Wage Report* (ILO, 2012a) because it identified inconsistencies in its wage series.
- **Availability of new data from non-response and response countries.** Particularly in emerging and developing economies, there is often a lag in the process time for data and/or their public availability. When new or older series are made available, they are incorporated into the regional estimates.
- **Revision of other data sources used to calculate the estimates.** Over time, revisions to the CPI, total employment, total employees and labour productivity can also influence regional and country estimates.

Table A1 Country-specific nominal wage and real wage growth, 2013–15

Nominal wage

Africa

Country	Currency	2013	2014	2015	Source
Algeria	DZD	36,104	37,826		Algeria National Statistical Office
Benin	XOF			46,596	Institut National de la Statistique et de l'Analyse Economique
Botswana	BWP	5,009			Central Statistical Office of Botswana
Egypt	EGP	3,298	3,493		Egypt Central Agency for Public Mobilization and Statistics*
Kenya	KES	42,886	46,095	50,355	Kenya National Bureau of Statistics
Lesotho	LSL	1,590	1,701	2,145	Lesotho Bureau of Statistics
Mauritius	MUR	23,785	24,607	25,933	Central Statistics Office of Mauritius
South Africa	ZAR		15,959	17,034	Statistics South Africa
Tanzania, United Republic of	TZS	380,553	400,714		Tanzania National Bureau of Statistics
Uganda	UGX	491,000			Uganda Bureau of Statistics
Zambia	ZMK		2,344,000		Central Statistical Office of Zambia

* Survey on wages only covers full-time employees

Arab States

Country	Currency	2013	2014	2015	Source
Bahrain	BHD	278	288	293	Kingdom of Bahrain Labour Market Regulatory Authority
Jordan	JOD	463	463		Jordan Department of Statistics
Kuwait	KWD	647			Kuwait Central Statistical Office
Oman	OMR	378			Oman Ministry of the National Economy
Qatar	QAR	9,667	10,483	10,568	Qatar Statistics Authority
West Bank and Gaza Strip	ILS	1,744	1,805	1,803	Palestinian Central Bureau of Statistics

Americas

Country	Currency	2013	2014	2015	Source
Brazil	BRL	1,891	2,062	2,174	Brazilian Institute of Geography and Statistics (IBGE)
Canada	CAD	3,949	4,053	4,126	Statistics Canada
Costa Rica	CRC	531,926	568,158	579,249	Central Bank of Costa Rica
Cuba	CUP	471	584		Cuba National Office of Statistics
Dominican Republic	DOP	13,538	13,661	15,309	Oficina Nacional de Estadística
Ecuador	USD	573	585		ILO SIALC
El Salvador	USD	302	298		Ministry of the Economy and General Direction for Statistics and Census
Guatemala	GTQ	2,026	2,184	2,186	Guatemala National Institute of Statistics
Honduras	HNL		6,577		Honduras National Statistical Institute
Jamaica	JMD	81,408	82,740	83,784	Statistical Institute of Jamaica
Mexico	MXN	6,406	6,376	6,580	Mexico National Employment Service Job Portal
Nicaragua	NIO	7,463	8,147	8,714	Ministry of Labour of Nicaragua (MITRAB)
Panama	PAB	987	1,042		Panama National Institute of Statistics and Census
Peru	PEN	1,413			Peru National Institute of Statistics
Puerto Rico	USD	2,240	2,258	2,288	US Bureau of Labor Statistics
United States	USD	3,577	3,662	3,746	US Bureau of Labor Statistics

Asia and the Pacific

Country	Currency	2013	2014	2015	Source
Australia	AUD	4,808	4,879	4,946	Australian Bureau of Statistics
Cambodia	KHR	505,186	642,000		National Institute of Statistics
China	CNY	4,290	4,697	5,169	National Bureau of Statistics China
Hong Kong (China)	HKD	13,807	14,240	14,848	Census and Statistics Department of Hong Kong*
India	INR	9,194			Government of India Ministry of Statistics and Programme Implementation
Indonesia	IDR	1,917,152	1,952,589	2,069,306	Statistics Indonesia of the Republic of Indonesia
Iran, Islamic Republic of	IRR	5,110,000			Statistical Centre of Iran
Japan	JPY	324,000	329,600	333,300	Japan Ministry of Health Labour and Welfare*
Korea, Republic of	KRW	3,110,992	3,189,995	3,300,091	Ministry of Labour of Korea
Macau (China)	MOP	12,145	13,145	13,805	Statistics and Census Service Macao SAR Government*
Malaysia	MYR	2,659	2,775	2,947	Department of Statistics of Malaysia
Mongolia	MNT		796,600	852,675	Mongolia National Statistical Office
New Zealand	NZD	4,169	4,294	4,424	Statistics New Zealand
Pakistan	PKR	12,118	13,155	14,971	Government of Pakistan Statistics Division
Philippines	PHP	9,107	9,582	10,113	National Statistical Office of the Phillipines
Singapore	SGD	4,622	4,727	4,892	Statistics Singapore
Taiwan (China)	TWD	45,664	47,300	48,490	National Statistics Republic of China (Taiwan)
Thailand	THB	12,003	13,244	13,487	National Statistical Office of Thailand
Viet Nam	VND	4,120,000	4,473,000	4,716,000	General Statistics Office of Vietnam

* Survey on wages only covers full-time employees

Europe and Central Asia

Country	Currency	2013	2014	2015	Source
Albania	ALL	36,993	37,323		Albania National Institute of Statistics
Armenia	AMD	146,524	158,580	171,615	National Statistics Service of Armenia
Austria	EUR	3,350	3,420		Statistics Austria
Azerbaijan	AZN	425	445	466	State Statistical Committee of the Republic of Azerbaijan
Belarus	BYR	5,061,418	6,052,367	6,714,997	Republic of Belarus Official Statistics
Belgium	EUR	2,974	3,079		Belgium Ministry of the Economic Affairs
Bosnia and Herzegovina	BAM	1,291	1,290	1,289	Agency of Statistics for Bosnia and Herzegovina

Country	Currency	2013	2014	2015	Source
Bulgaria	BGN	775	822	894	Bulgarian National Statistical Institute
Croatia	HRK	7,926	7,951		Republic of Croatia Central Bureau of Statistics
Cyprus	EUR	1,945	1,892	1,878	Statistical Service of Cyprus
Czech Republic	CZK	26,211	26,802	27,811	Czech Statistical Office
Denmark	DKK	38,525	38,958	39,575	Statistics Denmark
Estonia	EUR	949	1,005	1,065	Statistics Estonia
Finland	EUR	3,284	3,308	3,333	Statistics Finland*
France	EUR	2,829			INSEE - National Institute of Statistics and Economic Studies*
Georgia	GEL	773	818		National Statistics Office of Georgia
Germany	EUR	2,575	2,645	2,722	Federal Statistical Office of Germany
Hungary	HUF	230,714	237,695	247,784	Hungarian Central Statistic Office*
Iceland	ISK	398,000	415,000		Statistics Iceland
Ireland	EUR	2,986	2,981	3,037	Central Statistics Office of Ireland
Israel	ILS	9,030	9,317		Israel Central Bureau of Statistics
Italy	EUR	2,140	2,149	2,173	Italy National Bureau of Statistics
Kyrgyzstan	KGS	11,341	12,285		National Statistical Committee of the Kyrgyz Republic
Latvia	EUR	716	765	818	Statistics Latvia
Lithuania	EUR	646	677	714	Statistics Lithuania
Luxembourg	EUR	4,508	4,619		STATEC Luxembourg
Malta	EUR	1,321	1,341	1,380	Malta National Statistics Office
Moldova, Republic of	MDL	3,674	4,090		National Bureau of Statistics Moldova
Montenegro	EUR	726	723		Statistical Office of Montenegro
Netherlands	EUR	2,337	2,359	2,405	Statistics Netherlands
Norway	NOK	41,000	42,300	43,400	Statistics Norway
Poland	PLN	3,659	3,777	3,900	Central Statistical Office of Poland
Portugal	EUR	1,093	1,092		Gabinete de Estratégia e Planeamento (GEP) do Ministério do Trabalho e da Solidariedade Social*
Romania	RON	2,163	2,328		Romanian National Institute of Statistic
Russian Federation	RUB	29,792	32,495	33,981	Russia Federal State Statistics Service
Serbia	RSD	60,708	61,426	61,145	Statistical Office of the Republic of Serbia
Slovakia	EUR	824	858	883	Statistical Office of the Slovak Republic

Country	Currency	2013	2014	2015	Source
Slovenia	EUR	1,523	1,540	1,556	Statistical Office of the Republic of Slovenia*
Spain	EUR	1,884	1,882	1,902	Spain National Statistics Institute
Sweden	SEK	30,600	31,400	32,000	Statistics Sweden
Switzerland	CHF		7,308		Swiss Federal Statistical Office
Tajikistan	TJS	695	816	879	State Committee on Statistics of Tajikistan
The Former Yugoslav Republic of Macedonia	MKD	31,025	31,325	32,173	Republic of Macedonia State Statistical Office
Turkmenistan	TMM	1,047	1,153	1,263	State Committee of Turkmenistan Statistics
Ukraine	UAH	3,282	3,480	4,195	State Committee of Statistics of Ukraine
United Kingdom	GBP	2,172	2,173	2,202	UK National Statistics

* Survey on wages only covers full-time employees

Real wage growth estimate

Africa

Country	2013	2014	2015
Algeria	10.1	1.8	
Benin	2.1	2.1	2.1
Botswana	–1.7		
Egypt	11.0	–3.8	
Kenya	10.7	0.1	2.1
Lesotho	3.2	2.9	20.4
Mauritius	8.9	0.2	4.1
Morocco	0.3	1.7	1.5
Mozambique	4.5	17.9	
South Africa	0.0	–0.3	2.2
Tanzania, United Republic of	–1.1	–0.8	
Tunisia	0.3	0.6	1.3
Uganda	2.0		
Zambia	9.6	9.6	

Arab States

Country	2013	2014	2015
Bahrain	–4.2	0.9	–0.1
Jordan	1.1	–2.8	
Kuwait	–7.1		
Oman	6.7		
Qatar	8.3	5.0	–0.9
Saudi Arabia	5.6	9.3	5.2
West Bank and Gaza Strip	–0.8	1.7	–1.5

Americas

Country	2013	2014	2015
Bolivia, Plurinational State of	1.1	1.6	
Brazil	1.9	2.7	–3.7
Canada	0.8	0.7	0.7
Chile	3.9	1.8	1.8
Colombia	2.6	0.5	1.2
Costa Rica	1.6	2.2	1.1
Dominican Republic	10.6	–2.0	11.1
Ecuador	8.8	–1.4	–0.5
El Salvador	7.6	–2.4	
Guatemala	3.3	4.2	–2.2
Honduras	2.4	2.4	
Jamaica	–5.3	–6.1	–3.3
Mexico	–0.6	–4.3	0.5
Nicaragua	–0.4	3.0	2.8
Panama	16.1	2.9	
Paraguay	2.3	0.2	1.5
Peru	0.4	2.5	
Puerto Rico	–1.2	0.2	2.1
United States*	0.4	0.7	2.2
Uruguay	3.0	3.4	1.6
Venezuela, Bolivarian Republic of	–5.0		

* United States numbers are based on BLS CEU0500000012

Asia and the Pacific

Country	2013	2014	2015
Australia	1.5	–1.0	–0.2
Bangladesh	6.2	2.4	2.4
Cambodia	21.9	22.4	
China	8.8	6.2	6.9
Hong Kong (China)	–0.2	–1.2	1.2
India*	5.2	5.7	5.4
Indonesia	10.1	–4.3	–0.4
Iran, Islamic Republic of	–4.7		
Japan	–0.8	–1.0	0.3
Korea, Republic of	2.5	1.2	2.7
Macau (China)	1.5	2.1	0.4
Malaysia	4.7	1.2	4.0
Mongolia	7.9	7.9	1.1
Nepal	–0.2	3.1	–0.3
New Zealand	3.2	1.8	2.7
Pakistan	2.3	–0.1	8.9
Philippines	1.6	1.0	4.1
Singapore	1.9	1.2	4.0
Taiwan (China)	–0.6	2.4	2.8
Thailand	5.8	8.3	2.8
Viet Nam	2.9	4.3	4.8

* India wage growth is estimated

Europe and Central Asia

Country	2013	2014	2015
Albania	–3.8	–0.7	
Armenia	–1.6	5.1	4.3
Austria	0.0	0.6	
Azerbaijan	3.7	3.2	1.0
Belarus	16.4	1.3	–2.3
Belgium	–0.6	3.0	
Bosnia and Herzegovina	0.2	0.8	1.0
Bulgaria	5.6	7.7	9.9
Croatia	–1.4	0.5	1.8
Cyprus	–1.8	–1.3	
Czech Republic	–0.7	1.9	3.4
Denmark	0.3	0.6	1.1
Estonia	3.6	5.4	5.9
Finland	0.2	–0.5	0.9
France	2.1	0.8	1.1
Georgia	9.1	2.7	
Germany	0.5	1.9	2.8
Greece	–9.3	1.9	0.2
Hungary	1.7	3.2	4.3
Iceland	3.8	2.2	5.4
Ireland	–1.2	–0.5	1.9
Israel	0.9	1.1	
Italy	–0.3	0.2	1.0
Kazakhstan	1.6	3.9	–2.4
Kyrgyzstan	–0.8	0.7	
Latvia	4.5	6.1	6.7
Lithuania	3.9	4.6	5.8
Luxembourg	1.9	1.8	
Malta	1.0	0.7	1.7
Moldova, Republic of	3.7	5.9	
Montenegro	–2.3	0.3	
Netherlands	–1.0	0.6	1.2
Norway	1.4	1.1	0.4
Poland	2.7	3.3	4.2
Portugal	–0.6	0.1	
Romania	0.8	6.4	
Russian Federation	4.8	1.2	–9.5
Serbia	–1.9	–1.7	–2.4
Slovakia	1.0	4.2	3.2
Slovenia	–2.0	0.9	1.2
Spain	–1.4	0.0	1.6
Sweden	2.5	2.8	2.0
Switzerland	1.0	0.8	1.5
Tajikistan	19.1	10.7	7.7
The Former Yugoslav Republic of Macedonia	–1.6	1.1	3.0
Turkey	6.4	6.1	5.6
Turkmenistan	3.9	3.9	3.9
Ukraine	8.2	–6.5	–20.2
United Kingdom	–0.5	–1.4	1.3

Appendix II

ILO regional groupings

In 2015 the ILO switched from the regional grouping set out in table A3 to the new grouping set out in table A2. This report applies the new regional groupings for all estimates in Part I.

Table A2 New ILO regional groupings

Region	Sub region - broad	Countries
Africa	Northern Africa	Algeria, Egypt, *Libya*, Morocco, *Sudan*, Tunisia
	Sub-Saharan Africa	*Angola*, Benin, Botswana, *Burkina Faso*, Burundi, *Cameroon*, *Cabo Verde*, *Central African Republic*, *Chad*, *Comoros*, Congo, *Côte d'Ivoire*, Democratic Republic of the Congo, *Equatorial Guinea*, *Eritrea*, Ethiopia, Gabon, *The Gambia*, *Ghana*, *Guinea*, *Guinea-Bissau*, Kenya, Lesotho, *Liberia*, Madagascar, Malawi, *Mali*, *Mauritania*, Mauritius, Mozambique, *Namibia*, *Niger*, *Nigeria*, Reunion, *Rwanda*, Senegal, *Sierra Leone*, *Somalia*, South Africa, *Sudan*, Swaziland, United Republic of Tanzania, *Togo*, Uganda, Zambia, Zimbabwe
Americas	Latin America and the Caribbean	*Argentina*, *Bahamas (The)*, *Barbados*, *Belize*, Plurinational State of Bolivia, Brazil, Chile, Colombia, Costa Rica, *Cuba*, Dominican Republic, Ecuador, El Salvador, Guadeloupe, Guatemala, Guyana, *Haiti*, Honduras, Jamaica, Martinique, Mexico, *Netherlands Antilles*, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, *Suriname*, *Trinidad and Tobago*, Uruguay, Bolivarian Republic of Venezuela
	Northern America	United States, Canada
Arab States	Arab States	Bahrain, *Iraq*, Jordan, Kuwait, *Lebanon*, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, West Bank and Gaza Strip, *Yemen*
Asia and the Pacific	Eastern Asia	China, Hong Kong (China), Japan, *Democratic People's Republic of Korea*, Republic of Korea, Macau (China), Mongolia, Taiwan (China)
	South-Eastern Asia and the Pacific	Australia, Brunei, Cambodia, Fiji, Indonesia, *Lao People's Democratic Republic*, Malaysia, Myanmar, New Zealand, *Papua New Guinea*, Philippines, Singapore, *Solomon Islands*, Thailand, *Timor-Leste*, Viet Nam
	Southern Asia	*Afghanistan*, Bangladesh, *Bhutan*, India, Islamic Republic of Iran, *Maldives*, Nepal, Pakistan, Sri Lanka
Europe and Central Asia	Northern, Southern and Western Europe	Albania, Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, Norway, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, The Former Yugoslav Republic of Macedonia, United Kingdom
	Eastern Europe	Belarus, Bulgaria, Czech Republic, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia, Ukraine
	Central and Western Asia	Armenia, Azerbaijan, Cyprus, Georgia, Israel, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan, Uzbekistan

Note: Estimates in Part I of the report exclude countries in italics because of missing information or unreliable information.

Table A3 Former ILO regional groupings

Regions	Countries and territories
Developed economies	Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States
Eastern Europe and Central Asia	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Georgia, Kazakhstan, Kyrgyzstan Republic, Republic of Moldova, Montenegro, Russian Federation, Serbia, Tajikistan, The Former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan
Asia and the Pacific	Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, China, Fiji, Hong Kong (China), India, Indonesia, Islamic Republic of Iran, Korea (Dem. Rep.), Republic of Korea, Lao People's Democratic Republic, Macau (China), Malaysia, Republic of Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Viet Nam
Latin America and the Caribbean	Argentina, Bahamas (The), Barbados, Belize, Plurinational State of Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad and Tobago, Uruguay, Bolivarian Republic of Venezuela
Middle East	Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, West Bank and Gaza, Yemen
Africa	Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, United Republic of Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe

Appendix III

Coverage of countries by region and global estimates

Table A4 Coverage of the Global Wage Database, 2015 (percentage)

Regional group	Country coverage	Employee coverage	Approximate coverage of total wage bill
Africa	46.3	63.6	71.9
Americas	68.6	97.9	98.9
Arab States	75.0	74.4	89.4
Asia and the Pacific	64.1	98.9	99.7
Europe and Central Asia	98.0	100.0	100.0
World	69.6	95.4	97.9

Note: Country coverage refers to the number of countries for which we found wage data as a percentage of all the countries in the region; employee coverage refers to the number of employees in countries with data available as a percentage of all employees in the region (as of 2015). The approximate coverage of total wages is estimated based on the assumption that wage levels vary across countries in line with labour productivity (i.e. GDP per person employed, as of 2015), expressed in 2007 US$PPP.

Table A5 Coverage of the Global Wage Database, 2007–15 (percentage)

Regional group	2007	2008	2009	2010	2011	2012	2013	2014	2015
Africa	56.0	56.2	56.3	56.7	71.4	69.9	68.4	66.6	30.9
Americas	98.6	98.6	98.5	98.5	98.8	98.8	98.8	97.3	96.0
Arab States	50.7	50.8	88.8	88.8	62.0	61.6	61.3	54.6	49.4
Asia and the Pacific	99.8	99.8	99.7	99.5	99.5	99.4	92.3	88.8	88.5
Europe and Central Asia	99.7	99.7	99.6	99.6	100.0	100.0	99.5	99.5	92.0
World	95.6	95.4	97.1	97.0	96.5	96.3	93.9	91.9	87.6

Note: See text in Part I for estimation of coverage. A country is counted as covered only when a real observation is available, from either a primary or a secondary source. Countries are weighted based on the number of employees times average productivity. For the full methodology, see Appendix I.

Appendix IV

Data and country selection for Part II

Part II provides estimates that draw from a selection of countries. Data from Europe – in particular, data from 22 economies in Europe – provide estimates to represent developed economies. Emerging and low-income countries are represented according to data availability as described below.

Data representing estimates for developed economies

All estimates in Part II that reflect information on advanced economies are based on the Eurostat Structure of Earnings Survey (SES). The SES is a harmonized matched employer–employee data set that covers EU Member States, potential EU candidates and economies in the European Free Trade Association. In our case the data provided to us cover 22 countries: Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Sweden, Spain and the United Kingdom.

The 22 countries together provide information from 1.1 million enterprises based on a selection criterion that excludes micro-enterprises (i.e. enterprises with fewer than ten employees). Therefore, the sample is representative of small, medium and large enterprises, by location and economic sector, the latter based on the NACE Rev.2 definition. Based on these enterprises, the data provide actual detailed information from 22.4 million individuals who represent 308.2 million wage employees in these 22 countries. The representativeness of the population is based on frequency weights provided by Eurostat within the data set which make the samples representative of wage employees in each country and also of the overall wage structure in Europe.[35] The years covered by the data so far are 2002, 2006 and 2010. We have used the data from all these years, having converted monetary amounts (euros) to real values with 2010 as base year.

The purpose of the data set is to provide comparable harmonized data on the relationships between wages and remunerations, the characteristics of individuals (age, gender), labour market endowments of individuals (tenure, education, occupational skills, hours worked and full-time status, contractual arrangements and earnings source – contract, overtime or bonus) and the characteristics of the enterprise (economic sector according to NACE Rev.2; size, classified as small, medium or large; actual size of the enterprise; type of collective pay agreement signed by the enterprise; type of capital control – public or private).

The national statistical offices of each country are responsible for selecting the sample, and for preparing and implementing the questionnaires. Provision of

the variables to Eurostat by all countries is mandatory (EU Council Regulation No. 530/1999), which means that the level of non-response is negligible and that the quality of the data is extremely high and comparable between countries. To a large extent this allows us to provide estimates without the need to interpret the results through the use of confidence intervals.

Given the representativeness of the data and the fact that they cover all wage employees from age 14 upwards, we have not applied any particular sample selection criteria. Thus, all sample points are included in the analysis.

The fact that one data set provides information for both wage employees and employers (enterprises) means that we can accurately estimate the wage distribution for each economy (and the 22 countries as a whole), the wage distribution between establishments for each economy (and the 22 countries) and the wage structure (mean and variance) between establishments and within establishments.[36]

Data representing estimates for emerging and low-income economies

The fact that matched employer–employee data are not available for most countries means that we have relied on the use of distinct data sets to cover estimates from emerging and low-income countries that are comparable to those obtained with the SES. In particular, we have used labour force surveys and/or household surveys to provide estimates on the distribution of wages from the point of view of individuals in the population; and we have used independent enterprise-level surveys – which define the average wage for each enterprise, not that of individuals in the enterprise – to provide estimates on the distribution of average earnings at enterprise level. We now define each of the two sets in turn.

Labour force surveys and/or household surveys used to estimate the wage distribution of individuals

For ***Argentina***, we use the Encuesta Permanente de Hogares (EPH). The survey includes demographic and socio-economic characteristics of the population and is linked to the labour force. It is implemented by INDEC (Instituto Nacional de Estadísticas y Censos). In our analyses we used data for 2012. Micro-data are available for 31 urban areas *(aglomerados urbanos)*.

For ***Brazil***, micro-data are used from two surveys: the Pesquisa Nacional por Amostra de Domicilios (PNAD) and the Pesquisa Mensal de Emprego (PME). Both surveys are conducted by the Instituto Brasileiro de Geografia e Estatística (IBGE). Data are used for 2012.

For ***Chile***, data are used from the Encuesta de Caracterización Socioeconómica Nacional (CASEN), which is carried out every two to three years. Data are used for 2011.

Data for ***China*** are from the China Household Income Project (CHIP) for 2009. The survey is nationally representative and samples were randomly drawn from the larger annual national household income survey conducted by the National Bureau of Statistics (NBS). The purpose of these surveys is to estimate

wages, employment, consumption and related economic issues in both rural and urban areas of China.

The analysis for ***India*** is based on the Employment–Unemployment Survey (EUS) carried out by the National Sample Survey Office (NSSO) of India. It covers all major Indian states. The year (known as round) considered for the analysis is the 68th (July 2011 to June 2012).

The statistics for ***Indonesia*** are based on the national labour force survey (Survei angkatan kerja nasional, SAKERNAS). This provides the basis for calculation of all statistics related to employment, wages, income from self-employment and household employment-related income. The year 2009 is used for the analyses.

For ***Mexico***, the Encuesta Nacional de Ocupación y Empleo (ENEO) is used, taking data for the last quarter of 2014.

For ***Peru***, the Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (ENAHO) is used. It has been conducted since 1995 by the Instituto Nacional de Estadística e Informática (INEI) and is national in scope. Data are used for 2012.

For the ***Russian Federation***, the analysis was based on the Russian Longitudinal Monitoring Survey (RLMS-HSE).[37] The RLMS-HSE is conducted by the Higher School of Economics and ZAO "Demoscope" in cooperation with the Carolina Population Center, University of North Carolina at Chapel Hill in the United States, and the Russian Academy of Sciences' Institute of Sociology. The RLMS-HSE is nationally representative and is used because none of the regular official surveys contains information on wages and household income. Gorodnichenko and colleagues conclude that the "RLMS appears to be a reliable data source for examining the inequality trends in labor market outcomes, reported income, [and] consumption, with the common caveats of income underreporting and underrepresentation of the super-rich" (Gorodnichenko, Sabirianova and Stolyarov, 2010, p. 13). The World Bank also favours the RLMS over official data sources in a number of publications on inequality and poverty (e.g. World Bank, 1999).

For ***South Africa***, different data sets are used for the labour market and household income indicators since there is no single nationally representative survey for the appropriate period that includes enough detailed information on all variables. The labour force survey is used for the last quarter of 2013.

For ***Uruguay***, the Encuesta Continua de Hogares, implemented by the Instituto Nacional de Estadística (INE), is used for 2012.

Data on ***Viet Nam*** are from the Household Living Standard Surveys (HLSS) for 2010.

Enterprise-level surveys to estimate the wage distribution of individuals

We provide estimates for Chile, China, Indonesia, South Africa and Viet Nam.

The data for ***Chile*** draw on the Encuesta Longitudinal de Empresas (ELE), a survey representative of small, medium and large enterprises with a sample that covers about 2 per cent of all formal establishments in Chile. The data set includes both wage information and information on the revenue side of the establishment. We use the 2012 data, selecting only the last quarter of the year.

The data for ***China*** are based on the Chinese Enterprise Survey, which covers all private and state-owned enterprises from the manufacturing and utility sectors with annual revenue above RMB 500 million. Overall, the data set covers about 91 per cent of Chinese industrial output and 71 per cent of the Chinese industrial workforce. Our estimates are based on the data collected in 2012.

The data set for ***Indonesia*** is the Indonesian Annual Survey of Industries. The survey is conducted by the Indonesian Central Statistics Agency with sampling criteria based on the selection of large and medium manufacturing firms. The selection is such that the sample is representative of the population without the need to use sample weights. We used the 2013 annual data for our estimates.

The data from ***South Africa*** are from the South African Survey of Employers (SESE). This is a second-round survey where households that claim to be enterprise owners (in a first round) are followed up with an enterprise-specific set of questions. The data include information from self-employed which has been withdrawn from the sample. Overall, this survey is not necessarily representative of enterprises in South Africa and it has a representation of enterprises likely to be located in the informal economy. We used the 2013 annual data for our estimates.

The data for ***Viet Nam*** are based on the Vietnamese Enterprise Survey (VES), which is an enterprise survey conducted annually by the Vietnamese Statistical Office (GSO). It is a countrywide representative sample of all economic sectors as described in the NACE classification. We used the 2011 annual data for our estimates.

Appendix V

Variance decomposition

Let $w_{i,j}$ be the earnings of the *ith* individual in the population who works in the *jth* establishment. Individuals and establishments are representative of their respective populations. Let w_j be the average wage paid at establishment $j=1,...,J$ and let $\bar{w}$ be the average wage in the population (i.e., $\bar{w}=1/N\sum_i\sum_j w_{i,j}$, where $i=1,...,N$). We define the following identity:

$$w_{i,j}\equiv\bar{w}+\left(w_j-\bar{w}\right)+\left(w_{i,j}-w_j\right) \tag{1}$$

Subtracting $\bar{w}$ from both sides in (1) and taking the variance the following expression applies:

$$\begin{aligned}
&\textstyle\sum_j\sum_{i\in N(j)}(w_{i,j}-\bar{w})^2=\sum_j\sum_{i\in N(j)}(w_j-\bar{w})^2+\sum_j\sum_{i\in N(j)}(w_{i,j}-w_j)^2+\operatorname{cov}(j,i)\\
&\textit{where}\quad \operatorname{cov}(i,j)=0\\
&\Rightarrow\\
&\operatorname{var}(w_{i,j})=\textstyle\sum_j\left(\frac{N(j)}{N}\right)\times(w_j-\bar{w})^2+\sum_j\left(\frac{N(j)}{N}\right)\times\sum_{i\in N(j)}\left(\frac{1}{N(j)}\right)(w_{i,j}-w_j)^2\\
&\Rightarrow\\
&\operatorname{var}(w_{i,j})=\textstyle\sum_j P(j)\times(w_j-\bar{w})^2+\sum_j P(j)\times\sum_{i\in N(j)}\left(\frac{1}{N(j)}\right)(w_{i,j}-\bar{w}_j)^2\\
&\Rightarrow\\
&\underbrace{\operatorname{var}(w_{i,j})}_{\substack{\textit{Total variance}\\ \textit{among individuals}}}=\underbrace{\operatorname{var}(w_j,\bar{w})}_{\substack{\textit{Dispersion between establishments}\\ \textit{and individuals in the population}}}+\underbrace{\textstyle\sum_j P(j)\times\operatorname{var}(w_{i,j}\,|\,i\in j)}_{\substack{\textit{Sum of within-establishments dispersion}\\ \textit{weighted by the share of each establishment}\\ \textit{to total population of wage employees}}}
\end{aligned} \tag{2}$$

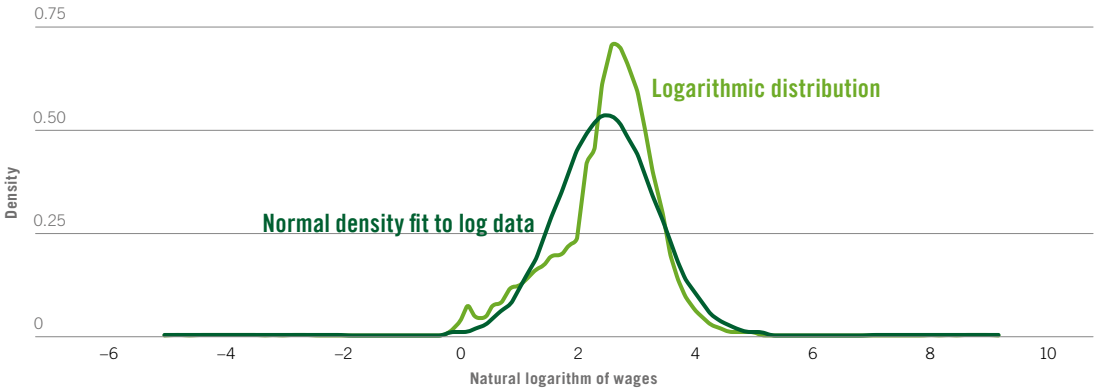
[38]

The variance decomposition requires estimating the variance of hourly wages at different locations of the wage distribution and across individuals and establishments. Our data show that the variable hourly wage at levels has a very long tail and therefore cannot (at levels) be normally distributed. Therefore we cannot apply the variance decomposition in (2) to the levels of the hourly wage distribution. Figure A2 shows that the natural logarithm of the variable is normally distributed; therefore we can apply the variance decomposition to the variable $\ln(w)$ assuming that $\ln(w)\sim N(\mu_w,\sigma_w^2)$ so that $\hat{\mu}_w=1/n\sum\ln(w)$ and $\sigma_w^2=1/n\sum(w-\bar{w})^2$ apply.

Table 4 in Part II shows estimates of the total variance in euros; these are based on the transformation given by the mean and the variance of the exponential distribution, that is, $w\sim f(\eta,v)$ where $\eta=e^{(\mu+0.5\sigma^2)}$ and $v=e^{(2(\mu+\sigma^2))}-e^{(2\mu+\sigma^2)}$. The same transformation cannot be applied to the value of its components because the decomposition of v for the components is not the same as that expressed in (2).

The estimates in table 4 of Part II show a term that we call "the residual". The fact is that the decomposition in (2) does not isolate the *between-establishments variance*, that is, it does not identify $(1/J)\Sigma_j(w_j-\bar{w}_j)^2$, which is what would compare the average establishment pay (w_j) with the between-establishments average pay

Figure A2 Log normal distribution for hourly wages



Note: ILO estimates. The two functions show the relative likelihood for the random variable "wages" where the latter are presented in the horizontal axis in logarithmic scale. The "logarithmic distribution" shows the kernel-based empirical distribution of (logarithmic) wages. The normal density fit to the log data shows the result of fitting a normal distribution with the mean and standard deviation of the natural logarithm of wages.

in the population of establishments, i.e. $\bar{w}_j = (1/j)\Sigma_j w_j$. This is why it is not accurate to consider the first term in the right-hand side of (2) as a measure of between-establishments variation and certainly not one that would be consistent with the analysis carried out in Part II. For example, when the average wage between enterprises ($\bar{w}_j$) is above the average between individuals ($\bar{w}$) – as is the case in our estimates and described in our population – the use of the first term in (2) is an overestimation of between-establishments variance. The discrepancy between the first term in the right-hand side of (2) and the actual measures of between-establishments variance is due to the fact that the within-establishment variance and the between-establishments variance come from two different distributions, each of which is defined by different populations (one of enterprises, the other of individuals). Our interest is to estimate the "between" and the "within" variance. Therefore, we estimate a modification of (2) that can be interpreted as follows:

$$\text{var}(w_{i,j}) = (1/j)\sum_j \left(w_j - \bar{w}_j\right)^2 + \sum_j P_j \left\{(1/N(j))\sum_{i\in j}\left(w_{i,j} - w_j\right)^2\right\} + Residual \qquad (3)$$

Table 4 shows the estimates of the left-hand side of (2) in the first column and three components in the right-hand side of (2) in subsequent columns.

The interpretation of the variance given in euros in table 4 could be as follows: in 2010 the variation in hourly wages between wage employees implies that 68 per cent of the population are located at about ±€8 from the average or 95 per cent are located at about ±€16 from the average. However, in the absence of within-enterprise wage inequality – or if wage inequality were less than estimates for the sample – the overall variance would be about 40 per cent lower, so that a significant fraction above the 68 per cent benchmark would then fall in the ±€8 interval from the average. This is just a crude approximation that allows us to give a meaningful interpretation of the value €65. The standard deviation is the square root of €65, i.e., €8.1. In the normal distribution about 68 per cent of the population is located at around plus/minus one standard deviation from the average, while 95 per cent are located at around plus/minus two standard deviations from the average.

Notes

Part I. Major trends in wages

1. Note that many countries are apparently experiencing difficulties in measuring inflation; in the EU, for example, there are significant differences between the consumer price index (CPI) and the deflators applied to household final consumption expenditures in national accounts. This raises questions about the accuracy of CPI measures.
2. Unemployment rates are from the IMF, *World Economic Outlook* database.
3. The average wage has been adopted as an ILO "decent work indicator" (ILO, 2012b).
4. The G20 comprises: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, the Russian Federation, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States and the European Union.
5. The proportion of global GDP is calculated as the sum of GDP of the 19 individual country members of the G20 (the 20th member being the EU) as a share of the world's GDP, based on purchasing power parity, as estimated in IMF, 2016a. Calculations of the share of total paid employees are based on ILO, 2015b.
6. Note that wage growth estimates for this region differ significantly from figures presented in earlier editions of the *Global Wage Report*, owing to the fact that the region now includes developed Asian countries such as Japan and the Republic of Korea.
7. The purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as US$1 would buy in the United States. This conversion factor is for private consumption (i.e. household final consumption expenditure). For most economies PPP figures are extrapolated from the 2011 International Comparison Program (ICP) benchmark estimates or imputed using a statistical model based on the 2011 ICP. For 47 high- and upper-middle-income economies conversion factors are provided by Eurostat and the Organisation for Economic Co-operation and Development (OECD).
8. It is also the case that the standard deviation has declined from 0.091 to 0.075, and that such a decline is due to the squeezing of the distribution from above: countries that have experienced a decline in inequality (in particular in Latin America) have contributed to a drop to the global inequality gap, despite the fact that globally, inequality has increased.

Part II. Wage inequality in the workplace

9. See e.g. the literature review in Blau and Kahn, 2009.

10. According to Mortensen, individual characteristics of workers only explain up to 30 per cent of the variation in wages (Mortensen, 2005, quoted in Lane, 2009).

11. The SES is a matched employer–employee survey, with detailed information on enterprises as well as on their employees. Our data cover the years 2002, 2006 and 2010, though it is not a panel structure: each year provides a cross-section representative of the given year but observations cannot be linked between periods. In total, our data provide information on 22.4 million individuals who together represent 308.2 million wage employees in Europe. These employees are drawn from 1.02 million surveyed enterprises that have been selected because they employ ten or more wage employees. Micro-enterprises are excluded from the survey.

12. It must be pointed out that data are not strictly comparable across countries, as they are influenced by survey methods and rates of non-response. It is also known that household surveys, which form the basis of our data for emerging economies, are often inaccurate when estimating extreme values, as top wage earners are reluctant to report their true wages.

13. Lazear's 1993 paper (Lazear, 1993) was one of the first written on the subject, but it was based on a single establishment. Other papers followed in which only a single firm was studied (e.g. Baker, Gibbs and Holmstrom, 1994), and it was not until 2004 that a number of studies began to appear looking at multiple firms at a given point in time (e.g. Lazear and Oyer, 2004). One early book on the subject, based on case studies from different countries and different data sets and edited by Lazear and Shaw (Lazear and Shaw, 2009), remains one of the key publications in terms of looking at employee–employer matched data for a selection of economies.

14. The maxima and minima show not the lowest- and highest-paid individuals within each centile, but the average of the minimum and maximum wages paid in enterprises within a given centile.

15. We follow EU Recommendation 2003/361 in defining three categories of enterprises: small (between 10 and 49 employees), medium (between 50 and 249 employees) and large (250 or more employees). By construction the SES data set does not include micro-enterprises (i.e. those with fewer than 10 employees). The share of employment (in the EU zone) of micro-enterprises is not negligible, with about 29 per cent of all wage employees in the non-financial sector working in this scale of enterprise (Eurostat, 2015). The share varies by country, with the highest proportions in southern European economies (e.g. in Greece with about 40 per cent) and lowest in Nordic and Anglo-Saxon economies (e.g. below 20 per cent in Luxembourg and the United Kingdom). However, in our pursuit of better understanding the contribution

of within- and between-enterprise wage inequality to overall inequality it is important to emphasize that the contribution of within-enterprise inequality is bound to be of lesser importance among micro-enterprises while the inclusion of these would have had an impact on the measure of inequality between enterprises. This remains a question for further research that cannot be covered in the present report.

16. See Song et al., 2015, for one of the first published examples of this particular method of viewing within enterprise wage inequality from the perspective of overall wage inequality.

17. These numbers are based on estimates of the enterprises and individuals lines using absolute values, whereas the plots in figure 48 are logarithms. The exponentials of the logarithms (the exponentials of the values in the lines shown in figure 48) are always an extremely good approximation to the absolute values. We prefer to make our comments in the text using absolute values so that our text and empirical exposition are exact and faithful to the non-scaled distribution, while the logarithmic scale in the figure provides us with a clear visual illustration by shrinking the vertical distance between extremes.

18. We could estimate the gender pay gap at each enterprise and average these over enterprises in the same ranking centile in the hourly wage distribution. This, however, would eliminate about 25 per cent of wage employees located in enterprises where we observe only male workers or only female workers. In a different exercise we have calculated the same estimate as in figure 53 having eliminated these 25 per cent, and the conclusions based on the full sample remain intact.

Part III. Summary and conclusions

19. http://g20.org.tr/wp-content/uploads/2015/11/G20-Policy-Priorities-on-Labour-Income-Share-and-Inequalities.pdf

20. Hayter, 2015.

21. The Minimum Wage-Fixing Convention, 1928 (No. 26), and the Minimum Wage Fixing Convention, 1970 (No. 131).

22. See the ACT (Action, Collaboration, Transformation) initiative, available at http://www.ethicaltrade.org/act-initiative-living-wages.

Appendix I

23. Formerly known as the Conditions of Work and Employment Programme (TRAVAIL).

24. ILO-commissioned report: Mehran, 2010. Peer reviews: Tillé, 2010; Jeong and Gastwirth, 2010; Ahn, 2010.

25. Aiming for the broadest possible coverage is in line with the idea that decent work and hence adequate earnings are of concern for all workers, and that statistical indicators should cover all those to whom an indicator is relevant. See ILO, 2008b.

26. This is done on the basis of the IMF's consumer price index (CPI) for each country. In cases where our national counterparts explicitly provide a real wage series, the real wage series is used in place of the nominal series deflated by the IMF CPI.

27. Our universe includes all countries and territories for which data on employment are available from the ILO's Global Employment Trends Model (GET Model), and thus excludes some small countries and territories (e.g. the Holy See and the Channel Islands) that have no discernible impact on global or regional trends.

28. This is in line with standard survey methodology, where a model-based framework is generally used for item non-response, while a design-based framework is used for questionnaire non-response.

29. For a discussion of the missing data problem, see also ILO, 2010b, p. 8.

30. An alternative specification with GDP per capita and population size produced very similar results.

31. Data for the number of persons employed and the number of employees are from KILM (ILO, 2015b), and data on GDP in 2005 US$PPP from the World Bank's World Development Indicators.

32. The estimate, $\hat{n}_h$, of the number of employees in region h is obtained by multiplying the number of employees in countries from the region for which we have wage data with the uncalibrated weights, and then summing up across the region.

33. See e.g. the work done mainly for industrialized countries by the International Labor Comparisons programme of the US Bureau of Labor Statistics (http://www.bls.gov/fls/). Since we do not compare levels but focus on change over time in individual countries, data requirements are less demanding in our context.

34. See also ILO, 2008b, p. 15 for the association between wage levels and GDP per capita. Notwithstanding this, wage developments can diverge from trends in labour productivity in the short and medium term.

Appendix IV

35. According to Eurostat, the 22 countries in our data set amount to about 500 million individuals in a region where approximately 85 per cent are of working age and of these about 75 per cent are actively engaged in labour market activities. Therefore the representativeness of the data is relatively accurate when using frequency weights. The use of these weights is applied at country level but also to weight each country's representatives within the sample so that we can arrive at estimates for the 22 countries.

36. For further information, see http://ec.europa.eu/eurostat/web/microdata/structure-of-earnings-survey.

37. See http://www.cpc.unc.edu/projects/rlms-hse, http://www.hse.ru/org/hse/rlms.

Appendix V

38. The covariance in expression (2) is $2 \times \sum_j \sum_i (w_j - \overline{w})(w_{i,j} - w_j)$, where the sum $\sum_j \sum_i (w_{i,j} - w_j)$ can also be expressed as $\sum_j (N(j) \times w_{i,j} - \frac{1}{N(j)} \Sigma w_{i,j})$ which equals zero; this is by construction since (1) is an identity.

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Eurostat, EU-SILC survey

Eurostat, SES

ILO, Global Wage Database

ILOSTAT

OECD Earnings Database

World Bank Open Database

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